RELATIONSHIP BETWEEN PESTICIDE RESIDUE LEVELS AND NEUROTOXICITY AMONG WOMEN ON FARMS IN THE WESTERN CAPE

Author: Motsoeneng Mamonyowe Portia
Supervisor: Mohamed Aqiel Dalvie

September 2014
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PART 0: PREAMBLE
RELATIONSHIP BETWEEN PESTICIDE RESIDUE LEVELS AND NEUROTOXICITY AMONG WOMEN ON FARMS IN THE WESTERN CAPE

MOTSOENENG PORTIA MAMONYOWE
STUDENT NUMBER: MTSMAM012

Thesis submitted to the Faculty of Health Sciences, University of Cape Town in fulfilment of the requirements of the degree Master of Public Health.

Supervisor:
Associate Professor Mohamed Aqiel Dalvie
Centre for Occupational & Environmental Health Research (COEHR)
School of Public Health & Family Medicine
Health Sciences Faculty, University of Cape Town
Declaration

I, Motsoeneng Portia Mamonyowe (MTSMAM012) hereby declare that the work in this mini dissertation is based on my original work (except where acknowledgements indicate otherwise) and has not, in whole or in part, been submitted towards another degree at this or any other university.

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Signature:____________________

Date: September 2014
Dedication

To my Family - Parents (Mathapelo and Tlhware Motsoeneg), my brother (Thapelo Motsoeneng), my nephew (Motlalepula Motsoeneng) and my grandparents (Majwalane and Jonas Dlamini). For their love and support thank you.

To my loving boyfriend Corey Springer. My pillar of strength thank you.
Acknowledgements

I would like to thank my supervisor, Associate Professor Mohamed Aqiel Dalvie from the Centre for Occupational and Environmental Health Research, School of Public Health and Family Medicine, University of Cape Town for his advice, insights and patience while working on this research project.

To the Centre for International Health of the Ludwig-Maximilian-University Munich, Germany (CIHLMU) and the Department of Education (health) Free State I would like to thank them for funding my studies while at the University of Cape Town.

A special thank you goes to the following organisations and individuals for their roles in the project:

Financial support:

The Women on Farms Project and the University of Cape Town (Prof Jeebhay Allergy Research Fund)

Sampling and provision of fieldwork venue:

Dr Colette Solomon and the rest of the WFP management and staff

Research assistance:

Algernon Africa, School of Public Health and Family Medicine, UCT

Dawn Venter, School of Public Health and Family Medicine, UCT

Mohammed Sharief Abrahams, School of Public Health and Family Medicine, UCT

Deon September, School of Public Health and Family Medicine, UCT

Michael Luma Ekema-Agbaw, Department of Psychology, Virginia Polytechnic Institute and State University
WFP staff

Laboratories:

National Institute for Occupational Health, Johannesburg

Path care
Thesis Abstract

**Background:** Farm workers and residents living in and around farms are exposed to pesticides. Women are vulnerable to health risks posed by pesticides. To date there are few studies that have investigated the relationship between pesticide residues in human body fluids and neurotoxicity.

**Objective:**
This study therefore aims to investigate the relationship between urinary pesticide residue levels and neurotoxicity amongst women working in farms in the Western Cape, South Africa.

**Method:** A cross-sectional study was conducted among 211 women recruited from farms (farm group, n = 121) and neighbouring towns (town group, n = 90). Testing included a general questionnaire, the Q16 questionnaire, reported pesticide exposures and measurement of urinary metabolite concentrations of dialkyl phosphates (DAP), the chlorpyriphos, metabolite 3, 5, 6-trichloropyridinol (TCPY) and pyrethroid (PYR).

**Results:** The median age of the Farm Group was 33 years (interquartile range: 27 - 40 years) and for the Town Group was 40 years (interquartile range 31-49 years). Median urinary pesticide metabolites were 6-49% higher in the Farm Group compared to the Town Group. The concentration (median and interquartile range) of DAP (sum of the 6 metabolites), TCPY and PYR (sum of the 5 metabolites) was respectively 141.42(37.4-249.8); 6.15(3.50-10.64) and 6.60(3.61-9.96) µg/g of creatinine in the Farm Group compared to 132(45.64-204.45); 4.26(2.72-8.27 and 5.26 (2.74-8.42) µg/g of creatinine in the Town Group.
The prevalence of all Q16 symptoms was higher amongst farm women compared to non-farm women. Three pyrethroids metabolites (cis- DCCA, trans DCCA, DBCA) were positively associated with at least 12 of the Q16 symptoms adjusting for confounders. The strongest association between for a pyrethroid metabolite was between problems with buttoning and DBCA (Odds ratio = 8.93, 95% Confidence Interval: 1.71-46.5. Problems with buttoning and reading was also significantly positively associated with, trans DCCA , DBCA. Taking notes due to problems with memory was positively significantly associated with DBCA. There was no association between Q16 symptoms and OP metabolites.

**Conclusion:** Women farm residents and rural women from neighbouring towns in the Western Cape are exposed to OP and PYR pesticides. The study provides evidence that PYR pesticides may result in neurotoxic effects but not OP pesticides. These results should be explored further in a bigger longitudinal study using more sensitive neurotoxic measures such as World Health Organisation Neurobehavioral Core Test Battery, The Brief Symptom Inventory and vibration sense threshold testing.
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Part A protocol
1. Introduction

1.1 Background

Farm workers and residents living in and around farms are highly exposed to pesticides. Women and children are the most vulnerable group to health risks posed by pesticides toxins. There are few studies that have investigated the relationship of pesticide exposure and neurological disorders in South Africa. This study therefore aims to investigate the effect of pesticide exposure on neurotoxicity amongst women working in farms in the Western Cape, South Africa. The study results will provide insight on the need to develop strategies to reduce pesticide exposure among women farm workers and residents.

1.2 Literature review

South Africa has the largest agriculture sector in sub-Saharan Africa. Farm workers and residents can be exposure to pesticides through various routes including exposure to pesticides sprayed on farms, residues in water and food, household usage, gardens, and lawn usage. The amount of pesticide usage in South Africa is regulated by the Fertilisers, Farm Feeds, Agricultural remedies and Stock Remedies ACT, 1947 (ACT NO ,36 OF 1947) of South African. This body is aimed at regulating the responsible usage of pesticide among the general population.
In many of the developing countries agricultural farming continues to grow due to the high demand of food security. And the need for high quality foods increases the usage of pesticides.

However, for a farm worker the workplace poses many health related hazards. The everyday usage of tractors, pesticide spreaders, harvesters, etc increases the risks of being exposed to highly concentrated amounts of pesticides, and most of the pesticide is either inhaled, ingested from drinking contaminated pesticide water, or mainly being absorbed by the skin. (Dalvie et al 2003). For women who breastfeed one of the health hazards they face is their breast milk getting contaminated with pesticide, which poses harm not only to mothers but also their children. Women farm workers who work as fieldworkers are said to be the highest risk group, due to high exposed to pesticide residues either in the soil or on the primary leaf surfaces.

Commonly known pesticides health effects include neurological, reproductive health effects and skin problems. Organophosphate (OP) pesticides are currently the most widely used insecticides and they have been associated with neurological disorders (London et al 2011, Rolhman et al 2006). Many international epidemiological studies have shown that there is an association between neurotoxicity and pesticide exposure. In SA, a cross-sectional study done by London et al showed that there is a significant association between reduced neurological tremor scores and previous pesticide poisoning (OR 4.08, 95%CI 11.48-11.22). However this study results showed no significant association between average lifetime OP exposure and neurological symptoms. Thus these results may suggest that the association between OP
exposure, without prior pesticide poisoning is either weak or does not exist (London et al 1998).

A nationwide survey conducted in the rural areas of South Korea among 1958 male farmers showed an association between pesticide exposure and depressive symptoms (OR = 1.61). For measuring depression symptoms among the participants a Korean version of Geriatric Depression Screening Scale was used (Kim et al 2012). The incidences and prevalence of neurodegenerative diseases like Parkinson diseases Alzheimer disease, multiple sclerosis and suicides are high in areas with high pesticide usage (Parron et al 2011).

1.2 Problem statement

World-wide pesticides usage has increased in the past few years, especially in the developing countries (Zhang et al 2011). Developing countries account for most pesticides consumptions due to fast growing agriculture sectors. Africa alone accounts for 3% of the world’s pesticide consumption of which 2% is used by South Africa (Zhang et al 2011). Pesticide exposure is a public health threat not only to agricultural workers but also to the general population (Zhang et al 2011). Continued wrongful disposal of these chemicals into the environment remains a major environmental health problem. Sixty seven tons of the pesticides chemicals are released into the environment yearly (Zhang et al 2011). Residues of pesticides, found in water, food, and in the environment, pose harm to both human and animal health. Each year approximately 370 000 people die from pesticides consumption, either in the form of rat poisoning or plant poisoning (Dawson et al 2010). Women and children remain the highest risk group(Freire et al 2012).
Pesticides are a combination of a multitude of chemicals used to kill, prevent, repel or extenuate any pests (insects, moulds, rats, snails, worms, weeds etc) used mainly in agriculture, health and other human interests. Pesticides are comprised of different classes including organophosphates, organochlorines, carbonates, organobromides, inorganics, phenoxy herbicides, and pyrethroids.

Pesticides exposure can be associated with damage to the nervous system and lungs, they also cause skin rashes, skin cancer and mental disorders such as Parkinson’s disease and Huntington’s disease (Parron et al 2011, Alavanja et al 2004). Other chronic effects include birth defects, development problems in children, lungs, liver, kidney and neurological diseases (Alavanja et al 2004, London et al 2012, Taetzsch et al 2012). Pesticides enter the human body either by the water we drink, the chemicals used in our homes for killing rats, cockroaches, bedbugs etc, chemicals used in producing crops or residues in the food we eat (Marion, 1995).

Humans may suffer acute and long term chronic effects due to pesticide exposures (Bjorling-Poulsen et al 2008). Exposure to pesticides has been associated with increase depression in cotton farmers (Keifer et al 1996). Rolhman and colleagues in 2006 also showed that long time low levels exposure to pesticides may be associated with neurological damage (Rolhman et al 2006). Studies in developing countries show that women working in agriculture is a high risk group (London et al 2002, Zhang et al 2002). Increased risk of neurological disorders has also been associated with pesticide exposure (Parron et al 2011). Exposure to
pesticides among Brazilian farmers has also been associated with psychiatric disorders and suicidal behaviour (Freire et al 2012)

Neurotoxicity develops when one is exposed to natural or toxic substances, which can affect the normal functioning of the nervous system and the brain. Common symptoms include impairment memory, low concentration, and problems with reaction time, reasoning, thinking, language, personality changes, depression and feet and hands numbness (Mason et al 2013).

Neurotoxicity and neurodegenerative disease like Parkinson’s disease have been associated with chemical exposure of pesticides (Parron et al 2011). Commonly used insecticides like organophosphates have been associated with neurological damage. Neurological damage is characterized into the central nervous system (CNS) disorders and peripheral nervous system (PNS) disorders. The commonly known disorders are Alzheimer’s, Parkinson’s and Huntington’s disease.

A member of the organophosphate (OP) insecticide, chlorpyrifor, a commonly used insecticide in crops, has also been associated with neurotoxic effects, reproductive and development effects (Perera et al 2005). Many of the pesticides health related effects may go unnoticed for ages especially among agricultural workers (Zhang et al 2002).
1.3 Justification

Farmworkers are exposed to a number of hazards due to the nature of their work. Potential adverse health effects includes, respiratory problems, depression, suicidal behaviour, neurologic disorders and cancer. Some of these conditions have been associated with long or short term pesticides exposure. However the usage of pesticides in the agriculture industry continues to be high despite the already mentioned health related effects of pesticide exposure. South Africa alone consumes 2% of the world pesticides production, and only one study has been published on the neurotoxic effects of pesticides usage. Studies done in other countries have found that there is an association between pesticides exposure and neurological disorders. Long term pesticide exposure has been associated with deficits in cognitive and psychomotor functioning (Kamel et al 2003). A recent study done by London et al in 2012 showed that prolonged organophosphate insecticides (pesticides) exposure may be associated with psychiatric disorders (London et al 2012). However there was no research done on the association of pesticides residues and neurotoxicity.

The currently available data both international and here at home on health effects of pesticides exposure, are mainly on adult male farm workers, children and females are under-represented especially in the developing countries, however female farmworkers are high risk group. Most of the women farm workers suffer neurological damage but go unnoticed for years, due to the level of education and accessibility to healthcare.
Thus, this current study will shed some light on the association of pesticides exposure and neurotoxicity among farm women in the Western Cape. The study results will be used by the farm owners, policy makers, environmental advocacy groups and other stakeholders in implementation of interventions that will reduce the risk of exposure to pesticides and neurotoxicity. The data produced from this study will also provide an indication of the prevalence of neurological disorders among farm women. Knowledge about the burden of neurotoxicity among the women farm workers will also assist in the prevention and control strategies to reduce the health related disorders associated with pesticide exposure.

1.4 Research Question

Does pesticides exposure cause neurotoxicity among women farm workers in the Western Cape?

1.5 Hypothesis

Exposure to pesticides among farm women in the Western Cape cause neurotoxicity.

1.6 Aim

To determine the neurotoxic effects of occupational and environmental pesticides exposure amongst women on farms in the Western Cape.
1.7 Objectives

- Determine the demographic and socio-economic factors of the study population.
- Measure the OP pesticides exposure of the women.
- Determine neurotoxicity amongst the women
- Determine the confounding factors for the relationship between pesticides exposure and neurotoxicity.
- Determine the association between pesticides exposure and neurotoxicity in women controlling for applicable confounders.

2. Methods

2.1 Study Design

The study is part of a larger cross-sectional study investigating the association between pesticides exposure and its health effects on rural women in the Western Cape. The data was collected in 2009 from 211 women recruited from farms and the neighbouring towns in the Boland regions of Western Cape Province in South Africa. The study data was collected with the assistance of a non-governmental organisation, Women on Farms (WFP). WFP assisted in the recruitment of participants, providing the study site and transportation of the participants.
2.2 Population and sampling

2.2.1 Inclusion criterion

The main study inclusion criteria included women from the Boland region of Western Cape who currently lived in the farms and those in the surrounding towns. Men and children were excluded from the study.

2.2.2 Study population

A total number of 211 women were recruited by the WFP into the study, 113 of these women were living and working on a farm and 98 from the surrounding towns. Initially the WFP was instructed to recruit 100 women from the farms in the 5 most accessible (located near the fieldwork site) but representative crop farming areas in the Western Cape which include Stellenbosch, Ceres, Paarl, Grabouw and Worcester and 100 women not living on farms from the areas surrounding the farms. Approximately 4 women, 20 participants each from farms and towns, from each of the 5 targeted areas were targeted.

The participants were from the most accessible houses and for the farm area 5-10 most accessible farms in the area were chosen. One adult female participant per household was selected. Eight of the women who lived in a town but worked in the farms were included into the farm group. And 24 of the women included in the farm group lived in the farms but they did not work in the farms. The participants who lived in the farms are referred to as “Farm Group” and those women who stayed in the towns and did not work in the farms were called
“Town Group”. The table below shows the study population. The participants were not randomly selected due to time-constrains and logistic difficulties.

**Table 1: Study Participants**

<table>
<thead>
<tr>
<th>Area</th>
<th>Town Group (n=90)</th>
<th>Farm Group (n=121)</th>
<th>Total (n=211)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceres</td>
<td>19</td>
<td>23</td>
<td>42</td>
</tr>
<tr>
<td>Grabouw</td>
<td>3</td>
<td>35</td>
<td>38</td>
</tr>
<tr>
<td>Paarl</td>
<td>23</td>
<td>16</td>
<td>39</td>
</tr>
<tr>
<td>Stellenbosch</td>
<td>22</td>
<td>25</td>
<td>47</td>
</tr>
<tr>
<td>Worcester</td>
<td>23</td>
<td>22</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>121</strong></td>
<td><strong>211</strong></td>
</tr>
</tbody>
</table>

### 2.2.3 Sample size

Using the results from a recently published study by Wesseling et al 2002. The calculated sample size using the two sample comparison of proportions (Stata Corporation. 2003) with exposure/control ratio =1, significance level of $\alpha = 0.05$ and 80% power, to detect a prevalence 25-45% of neurotoxicity among farmer is 164 participants.

### 2.3 Measurement

#### 2.3.1 Instruments

Questionnaires

Since this study is part of a big study, a subset of the questionnaire will be used for the analysis of this study objectives (Appendix A1 and A2). The questionnaire was translated both into Afrikaans and Xhosa and then back translated into English to ensure language accuracy. The questionnaire included demographic information (age, education level, language), household factors (house owner, house utilities, people living in the household),
economic factors (occupation, family socio-economic statues), residential history (where participant live and lived before), work history (current occupation, previous occupation), alcohol usage, smoking and other drug usage (usage of drugs, age started using drugs), household pesticide usage (household usage of pesticides in the house, gardens), neurotoxicity Q16.

The Q16 questionnaire is commonly used in studies to study the prevalence of neurotoxic symptoms among the workers who are exposed to toxic substances. This questionnaire has 16 questions on the symptoms which these workers commonly describe eg. Short memory, poor concentration, tired etc (Lundberg et al 1997). Interviews were administered in the participants preferred language. The study fieldwork was done in the WFP premises.

2.4 Pesticide biomonitoring

OP pesticide residues testing

Spot urinary samples (50 ml) were collected in plastic containers topped with a plastic cap and kept on dry ice in the field and during transport and then stored at -20 degree Celsius before being sent to the laboratory for analysis. The urine samples were couriered to National Institute for Occupational Health (NIOH) laboratory in Johannesburg which has already set up methods for measuring the organophosphate pesticide metabolites, dialkyl phosphates and the chlorpyrifos metabolite, 3,5,6-trichloropyridinol (TCPY).

Urine samples (50 mL) were collected from participants in plastic containers topped with a plastic cap. A indoor clean toilet was available for participants who were told to take precautions not to contaminate samples such as removing contaminated clothing, washing
hands before handling containers, not touching the inside of containers and closing the containers immediately after producing the sample. The samples were kept on dry ice in the field and during transport and then stored at -20° centigrade before being sent for pesticide analysis to the NIOH laboratory, Johannesburg, SA. The DAP metabolites, dimethylphosphate (DMP), dimethyldithiophosphate (DMTP), dimethyldithiophosphate, (DMDTP), diethylphosphate (DEP), diethylthiophosphate (DETP), and diethyldithiophosphate (DEDTP); TCPY and PYR metabolites were measured according to the method by Hardt et al 2000 with slight modifications.

Briefly, after allowing the samples to thaw at room temperature, 2mL of urine was pipetted into screw top vials, which already contained approximately 2g of sodium chloride. An internal standard, dibutylphosphate was added to all tubes. The samples were acidified with 250µL hydrochloric acid (6M), and extracted with a mixture of acetonitrile /diethylether(1:1 v/v). The extraction was repeated, and both the extracts were combined. The extracts were dried under a gentle stream of nitrogen, with the temperature set not higher than 40°C. The dry residue was suspended in acetonitrile (500µL), followed by the addition of approximately 10g of anhydrous potassium carbonate. Derivatization was performed by adding pentafluorobenzyl bromide (50µL) in a sealed vial and heated overnight (16 hours) at 40°C. After cooling to room temperature, the pentafluorobenzyl esters were extracted with hexane (5mL) twice. The extracts were combined and dried down under a gentle stream of nitrogen. The samples were reconstituted in toluene(100µL) and transferred to gas chromatography (GC) vials with low volume inserts fitted, and were ready for analysis.

Analysis were performed on a HP 6890 GC equipped with a split-splitless injector, a HP 7683A automatic liquid injector system and a HP 5973 mass selective detector (MSD,
quadrupole). GC conditions were as follows: capillary column, 5% phenylmethylpolysiloxane DB 5MS (30m x 0.25 mm i.d x 0.25µm film thickness, J & W Scientific, Folsom, CA). Temperatures were as follows: injection port 250°C; transfer line 280°C; column 140°C for 3 min, raised at a rate of 7°C/min to 227°C, and then raised at a rate of 20°C/min 260°C for 5 min. Helium (99.999% purity) was used as the carrier gas. The sample injection volume was 1µL, with split less injection.

The MSD was operated in negative chemical ionization mode, using methane (99.9999% purity) gas. The source temperature was at 150°C and the quadruple temperature set at 100°C. The MSD was operated in selected ion monitoring mode (SIM).

A multi-component stock solution of all 6 dialkyl phosphate (20µmol), TCPY and PYR metabolites were used to prepare the calibration. From the stock solution, nine calibration standards were prepared with concentrations of 0, 500, 1000, 1500, 2000, 2500, 3000, 4000 and 5000 nmol/L. For quality assurance, we used spike pooled urine at a concentration 2000 nmol/l for each of the metabolites.

Results were adjusted for urinary creatinine to take account of hydration. Urine samples with creatinine concentrations within and outside the WHO recommended creatinine concentration range of 0.3 x 106 µg/L – 3.0 x 106µg/L were distinguished and taken into account in the analysis. Those outside the WHO range are not presented. The limit of detection (LOD) for all analytes were determined and values too low to be quantified were assigned a value equivalent to the LOD x (2)-1/2. The LOD for the pesticide metabolites were 0.5 µg/l for
TCPY; 1 μg/l for DMP; and 0.05 μg/l for DMTP, DMDTP, DEP, DETP, DEDTP, cis-DCCA, trans-DCCA, DBCA, 4F3PBA and 2PBA.

2.5 List and definition of Variables

The following list of variables will be used for the study analysis.

**Exposure variables of interest**

(a) Organophosphate metabolite concentrations in urine:

(i) TCPY

(ii) Six DAP metabolites (DMP, DEP, DMTP, DMDTP, DETP and DEDTP)

(b) Pyrethroid metabolites (3PBA; 4F3PBA; DBCA and cis-DCCA and trans-DCCA]

(c) History of living on the farms, current farm residence, being born on the farm and household pesticide usage.

**Outcome variables**

The following outcome variable will be used:

(a) Neurotoxicity outcomes will include the items in the Q16 questionnaire.
2.6 Validity and reliability of the study

The Q16 questionnaire has been validated for identifying long-term health effects including neurotoxicity Q16 (Axelson & Hogstedt et al 1988). The rest of the questionnaire was based on that used in previous studies in the Western Cape.

2.7 Pilot study

The questionnaire was piloted to test and work out the logistics for the main study. The pilot study for the main study fieldwork was conducted from 24 October to 3 December 2009.

3 Analysis plan

3.1 Data analysis plan

Statistical software STATA 11 (Stata Corp, Texas) will be used for data exploration and analysis of this study. Release 11 Statistical software.

3.2 Data Exploration

Descriptive analysis will be carried out to provide a general characteristics of the data set eg; the number of observations, the normality of the collected information, missing information. The following tests will be used to test if the data is normally distributed Shaphiro S wilk test. If the data is not normally distributed suitable transformations will be made. For all the continues values which are not normally distributed, median and interquartile ranges will used to summarise the variables and for further analysis non parametric tests will be used.
And those which are normally distributed the mean, standard deviation will be calculated and for further analysis parametric tests will be used. To determine any outliers in the data Box and Whisker plots will be drawn. Chi-squared test and contingency tables will be used to test and compare the pesticides exposure difference between the two groups. Univariate analysis will be carried out for the first part of the study analysis.

Univariate analysis of independent variables

**Table 2: Continuous variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Farm group</th>
<th>Town group</th>
<th>t-test (difference of means)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...etc</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3: Categorical variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Farm Group</th>
<th>Town Group</th>
<th>X^2 test (difference of proportions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...etc</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The different categorical variables will be described using frequency distributions and percentage.

**3.3 Bivariate associations**

The bivariate analysis will be carried out to determine the associations between the variables and the outcome of interest. To determine significance of the association between the numerical and dichotomous variables the Wilcoxon rank sum or t test will be carried out. For
categorical variables the chi-square test will be used and the Fischer’s Exact test will be used for values which are less than 5.

3.4 Multivariate analysis

Multiple logistic regression analyses will be used to test for associations between dichotomous outcomes and exposure variables while controlling for confounding variables and linear regression will be used for the Q16 score.

4. Ethics

The study was conducted according to the Helsinki Declaration. The main study proposal was approved by the ethics committee at the University of Cape Town Human Research and Ethics Council committee (reference number 393/2009) (Appendix C). Information regarding the study was made available in the mother tongue of participants to ensure full understanding of the provided information. To ensure autonomy written consent were obtained from the participants. To improve subject confidentiality in the study only the author and the supervisors were able to access the study data. Participants remained anonymous for the study data collection, data analysis and the write-up. Study Codes were used for identification of the participants instead of the participant’s real names.

Study information sessions were held to provide the participants with the study information. The following information was provided to the participants during the information sessions, description of the research, names of the researchers, contact person information, purpose of research, expected benefits to participants, costs pertaining participation and expected risks or
discomfort. The participants were free to participate or decline participation into the study at any time without any consequences.

Dissemination of the results - A feedback session will be held on the farms, to provide the participants with the study results and be told about the potential interventions to reduce the harmfulness of pesticides exposure to the farmers.

4.1 The study risk or harms

There are no real additional harm to the women since the current study only involves the analysis of the already collected data.

4.2 Benefits

There will be no financial benefits from this study. However the study results will help in further understanding of the harm that pesticides exposure pose on the farm workers

5. Stakeholders, reporting and implementation

The study stakeholders are as follows:

The women who participated in the study

The farm owners

The WFP women on farms

The University of Cape Town
6. Reporting

The study results will be disseminated to the relevant stakeholders involved with the ultimate aim of implementing the necessary interventions and strategies to reduce the risk of neurotoxicity due to pesticides exposure among the farm workers. These interventions will be discussed and implemented where possible. The gathered information will also be written up as a journal article and published, the published article will be available at the University of Cape Town various libraries.

7. Logistics

**Table 4**: Time line

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8. References


35


Organophosphate and n-Methyl Carbamate pesticide among Banana Workers.


Part B  Literature Review

THE RELATIONSHIP BETWEEN PESTICIDE EXPOSURE AND NEUROTOXICITY AMONG WOMEN FARM WORKERS.
1. Introduction

Pesticides include herbicides (used to kill weeds), insecticides (used to kill insects), fungicides (used to kill fungi), rodenticides (used to kill rats, mice, and other rodents), plant regulators and others (Weiss et al 2004, Aktar et al 2009). They are used in the home, in businesses, in public places, in agriculture and horticulture. Organophosphates (OP) are globally the most widely used insecticides (Binukumar et al 2011, Quinn et al 2011). There are many different OP’s used as insecticides for e.g. 40 different types are registered with the US- EPA (www.epa.org). Another group of chemicals widely used as insecticides are the pyrethroids (PYR), which are used for agricultural and household purposes. There are over 3500 registered PYR products in the used globally (www.epa.org).

Pesticide usage in South African agriculture is the highest in the region and is not decreasing (Dalvie et al 2009). The Western Cape is one of the most agriculturally productive provinces in the country and focuses on agriculture as an important industry and income earner. The crops which are commonly grown in this area include grapes, mangoes, apples, potatoes and wheat. In the Western Cape chlorpyrifos and azinphos methyl are commonly used organophosphates to control arthropods pests in orchards (Reinecke et al 2007). The commonly used PYR insecticides used in the Western Cape include cyfluthrin, cyhalothrin, cypermethrin, pypermethrin, deltamethrin and esfenvalerate (Quinn et al 2011).
Previous studies show that the pesticide usage is high in the rural environment in the Western Cape compared to the urban areas. (Dalvie et al 2003, Dalvie et al 2009, Dalvie et al 2011). Women farm workers are at particular risk from occupational and environmental hazards in agriculture resulting from farm work, spray drift and from environmental exposures (Forastieri et al 1999, McCoy et al 2002). Women are more likely to be employed to work on activities with high pesticide exposure compared to men and the ones who are tasked with the mixing of the chemicals for pesticide applicators and tractor sprayers (Rother et al 2000). During harvesting seasons women are mainly the once who will work in the fields collecting and packaging of the harvested crops. In many instances women working in the field are exposed to tractor sprayers and because protective clothing is rarely available for them, they are directly exposed (Nkurlu et al 1999, Araujo et al 1999).

An important concern about toxicity due to organophosphate use is that more than 3 million people experience acute organophosphate poisoning yearly (www.who.int/topics/pesticides/en/) according to the World Health Organisation.
1.1 Objectives of the literature review

The objectives of this literature review was to review currently available data on the neurotoxicity associated with OP and pyrethroid pesticides, types and mechanisms of neurotoxicity due to these pesticides, methods used to measure neurotoxicity, epidemiological evidence of neurotoxicity caused by OP and pyrethroid pesticides in women, and bio-monitoring of OP and pyrethroid pesticides in agricultural communities.

1.2 Search strategies

This review used electronic sources including PubMed / Medline, EBSCO, Scopus, Google Scholar and JSTOR as well as paper sources including text books, journals and previous thesis from the University of Cape Town Medical Library. The following keywords were used for searches in electronic resources: OP pesticides, pyrethroid pesticides, OP pesticides and neurotoxicity, pyrethroid pesticides and neurotoxicity, OP pesticides and neurotoxicity and women, pyrethroid pesticides and neurotoxicity and women, OP bio-monitoring, pyrethroid pesticides, bio-monitoring, urinary levels of OP pesticides, urinary levels of pyrethroid pesticides, neuropsychiatric tests and the Q16 questionnaire. The searches on neurotoxicity of pesticides focussed on women from general populations and farming populations exposed to pesticides but also include men. Epidemiological studies from all countries and with different study designs were considered in this review.
2. Neurotoxicity associated with OP and pyrethroid pesticides

Both OP and pyrethroid pesticides can disrupt the general cellular mechanisms necessary for supporting the high metabolic activity of both the central and the peripheral nervous system. (Keifer et al 2007).

2.1 Neurotoxicity of OP pesticides

There are four general categories in which the neurotoxic effects of OP pesticide poisoning can be summarised. Firstly, acute cholinergic effects causing acute poisoning (Costa et al 2006). Secondly, the intermediate syndrome (IMS) which may develop between one or four days post-acute pesticide poisoning (Balali-Mood et al 2012). Thirdly OP - induced delayed neurotoxicity(OPIDN) which follows after repeated pesticides exposure or and it may follow after 4 weeks of acute pesticide exposure (Lotti et al 2005). Lastly, chronic neurotoxicity resulting from long term exposure to pesticides (Ray et al 2001).

The acute toxicity of OP pesticides are associated with their inhibition of the enzyme acetylcholinesterase (AcHE), that is primarily found in the synaptic membrane whose function is to produce choline and acetate that are important for the regulation of synaptic activity in the central and the peripheral systems (Elersek et al 2011). The accumulation of acetylcholine in the synaptic cleft causes neuromuscular paralysis in the body (Gupta et al 2006). In the peripheral system the excess accumulation of acetylcholine causes the activation of muscarine and nicotine receptors which increases the activation of the sympathetic and parasympathetic parts. Acute effects due to OP pesticides include neurotoxic
symptoms like headaches, acute pesticide poisoning, vomiting, teary eyes, insomnia and confusion (Rother and Jacobs, Steenland et al 1994, Ross et al 2013, Sanborn et al 2004).

Long-term low dose neurotoxic effects due to OP exposure have been associated with cognitive effects, reduction in sensory and motor functioning, psychological dysfunction, change in behaviour, neurodegenerative and neurodevelopment effects, as well as suicide (Sanborn et al 2007, Starks et al 2012). Chronic effects are, however, not yet well understood (Sanborn et al 2007, Starks et al 2012). There are a number of possible mechanisms which have been proposed for chronic OP neurotoxicity including prolonged AChE inhibition, abnormal cerebral circulation, long term pre-synaptic disorder, disturbed cellular turnover and trans- membrane signalling and CNS receptor deregulation (Jamal et al 2002).

2.2 Neurotoxicity of pyrethroid pesticides

Neurotoxicity due to pyrethroid insecticides have been attribute to their disruption of nerve membrane permeability to sodium ions which impairs nervous system function (Soderlund et al 1989, Weiss et al 2004). Pyrethroids can be subdivided into two subclasses based on the mode of action on the sodium channels. Type I pyrethroids (e.g. allethrin, permethrin, bifenthrin, resmethrin and tetramethrin) produces repetitive nerve discharge causing whole body tremors and prostration. Type II pyrethroids (e.g. cyhalothrin, cypermethrin, cyfluthrin and deltamethrin) produces stimulus- dependent nerve depolarazation and blockage which is associated with hyperactivity, incoordination, writhing and convulsions (Soderlund et al 1989, Palmquist et al 2012).
Pyrethroid neurotoxicity is much lower than that of OPs. Pyrethroid compounds which have the \textit{IR} cis configuration (e.g. \textit{1R,cis}-permethrin (permethrin) and NRDC 157 (a deltamethrin analogue) are toxic to mammals (Soderlund et al 2002).

3. Methods used to measure neurotoxicity

Due to the complexity of the central nervous system (CNS), using a single tests to assess neurotoxic effects of pesticides may be inadequate (Bjorling-Poulsen et al 2008). Testing for neurotoxicity is aimed at determining changes in the structure and/or functioning of the CNS and tests currently used include indexes of neurofunction, behaviour and specific psychological effects. Neuropsychology is thought to be the most sensitive means of detecting neurotoxic damage (Lezak et al 2004).

Tests used for testing neurotoxicity include psychometric tests, electroencephalography (EEG), neurological examination, nerve conduction tests, needle electromyography (EMG), quantitative sensory neuromuscular testing, jitter testing, cognitive evoke potentials, SPECT (single photon emission computer tomography), the 28-item General Health questionnaire (GHQ-28), the GHQ Depression subscale, Beck’s scale for Suicidal Ideation (SSI) and the Q16 questionnaire (Lundberg et al 1997, Slikker et al 2000, London et al 2012).

The Q16 questionnaire was developed by Hogstedt in the early 1980’s (Ihrig et al 2001) to determine neurotoxicity among workers exposed to chemicals, and it has been used in a
number of studies investigating neurotoxicity of pesticides. The Q16 questionnaire consists of 16 Yes/No questions on symptoms commonly associated with neurotoxicity (Lundberg et al, 1997).

4. Epidemiological evidence of neurotoxicity caused by OP and pyrethroid pesticides

4.1 OP studies on neurotoxicity

There are numerous epidemiological studies in the literature that have investigated the neurological effects of OP pesticides. Recently Ross et al. (2012) conducted a systematic review on neurobehavioral problems associated with low-level exposure to OP pesticides for the period 1960-10th February 2012. A total of 644 articles were found from which 16 studies were selected for the review including studies from both developing and developed countries. The inclusion criteria included: evidence of prolonged exposure to OPs, comparison of exposed individuals with unexposed individuals, investigation of effects of long-term low-level exposure in the absence of an episode of acute poisoning and objective measures of cognitive function and validated measures of emotional state. The review found an overall significant relationship between low level OP exposure and cognitive functioning (language, general knowledge, attention psychomotor speed and memory). The review also showed that neurobehavioral health problems due to pesticides develop from prolonged exposure and not from a single exposure (Ross et al, 2012). Duration of OP exposure that can result in neurotoxicity ranged from 2- over 20 years. The review concluded that there was still uncertainty on the association between long term pesticides exposure and some neurobehavioral effects. Most of these studies were conducted on men and women with no gender differences reported.
4.2 Pyrethroid studies on neurotoxicity

Laboratory evidence has shown that PYR pesticides cause behavioural effects and effects CNS motor activity (Nasutī et al 2006, Starr et al 2012). Common symptoms which have been associated with PYR toxicity are over excitement, restlessness and body tremors from ingestion of type I PYR pesticides. Dizziness, headache and fatigue are associated with type II PYR pesticicides (Sonderland et al 1989, Bradberry et al 2005). No epidemiological study investigating the neurotoxicity of pyrethroid pesticides could be found in the literature.

4.3 Studies investigating neurotoxicity due to OP and PYR pesticide exposure in women.

Only two studies could be indentified in the literature that have investigated neurotoxic effects of OP pesticides only on women. The first was a small cross-sectional study that found that the neurobehavioural scores of 51 women employed as gardeners and exposed to OP pesticides were significantly lower than that of 25 women who did not work with chemicals. The following neurotoxic outcomes were measured: depression, reaction times, motor steadiness, tension and fatigue (Bazylewicz-Walczak B et al 1999). The second was a case control study that found that reported exposures (recent exposoure, years using pesticides, washing contaminated clothing) to OP pesticides amongst 341 women with glicomas were not significantly higher than 528 controls (Carreon at al 2005). As indicated before, no epidemiological studies were found that investigated neurotoxic effects of PYR pesticides. With no gender differences reported in studies conducted in men and women, there is therefore a lack of studies investigating neurotoxic effects of OP and PYR pesticides amongst women. More studies, especially large longitudinal studies in both developed and developing
countries using sensitive exposure measures identifying specific pesticides as well as sensitive neurotoxic outcome measures are required in the literature.

4.4 Studies on neurotoxicity in South Africa

To date in South Africa only two studies have investigated the neurotoxic effects associated with pesticides exposure amongst farm workers (London et al 1998, London et al 2012). In a cross-sectional study of 752 grape farm workers (41% female) from 57 farms in the Western Cape, neurotoxicity was measured using the 28-item General Health questionnaire (GHQ-28), the GHQ Depression subscale and Beck’s scale for Suicidal Ideation (SSI). The results of the study did not show an association between long-term OP exposure and impulsivity, depression or depression among the study participants. The study found an association between past pesticide poisoning and mood disorders (London et al 2012).

The other study was also a cross-sectional investigation into the association of pesticide long term exposure and neurotoxicity measured using neurological symptoms and tremor scores. Among 247 Western Cape farm workers, of which 164 were pesticide applicators and 93 non applicators. The results showed a significant association between reduced neurological tremor scores and previous pesticide poisoning (OR 4.08, 95%CI1.48-11.22), but there was no significant association between average lifetime OP exposure and neurological symptoms (London et al 1998).
5. Urinary levels of OP and pyrethroid pesticide residues

Measurement of pesticide residues in human body fluids is a useful tool for assessing short-term pesticide exposure to agricultural pesticides. The body fluids in which pesticides have been measured include amongst others blood, saliva and urine. Urine is the most commonly used body fluid because of its availability in high volume compared to other bodily fluids (Kapka-Skrzypczak et al 2011). The use of urinary pesticide metabolites as biomarkers to assess acute or short-term exposure to pesticides is well described (Roberts and Reigart, 1999; Maroni et al, 2000). This review will focus on urinary metabolites of OP and pyrethroids as these were measured in the study.

5.1 Urinary levels of OP pesticide metabolites in farming communities

Most of the OPs are metabolized to one or more of the six dialkyl phosphate metabolites (DAP). The measurement of urinary DAP is a sensitive indicator of non-specific short-term (24-48 hours) exposure to OP’s in humans (Roberts and Reigart, 1999). Exposure to specific OP pesticides is also measured and the most commonly monitored pesticide is chlorpyrifos. In humans the major chlorpyrifos-specific metabolite is 3, 5, 6- trichloro-2-pyridinol (TCPY) which is used as a bio marker to test for the short-term exposure (24-48 hours) to chlorpyrifos and chlorpyrifos-methyl in human.

The only study that measured urinary levels of pesticide residues in South Africa, was a cross sectional study among Western Cape grape farm workers to investigate the effects of chlorpyrifos spraying on urinary levels of DAPs among applicators and non-applicators. The study found that the median level of the dimethylthiophosphates (DMTP) and
dimethyldithiophosphates (DMDTP) measured before and after spraying were higher among the farm workers compared to non-farming communities in other settings and at the high end of the spectrum compared to farm workers in other settings. (Dalvie et al. 2011).

5.2 Urinary levels of pyrethroid pesticide metabolites in farming communities

Commonly measured pyrethroid metabolites includes [3- phenoxybenzoic acid (3PBA); 4-fluoro-3-phenoxybenzoic acid (4F3PBA); cis-2, 2-dibromovinyl-2, 2-dimethylcyclopropane-1-carboxylic acid (DBCA) and cis- and trans-isomers of 2, 2-dichlorovinyl-2, 2-dimethylcyclopropane-1-carboxylic acid (cis- and trans-DCCA)]. The most frequently measured of these metabolites is the 3PBA. No previous study has measured pyrethroid metabolites in South Africa.

6. Conclusion

There is strong epidemiological evidence that OP pesticides causes acute neurological impairments but the evidence that they cause chronic neurological impairment is still growing. Although there is evidence from laboratory studies that PYR pesticides cause neurotoxic effects, there are no epidemiological studies that have investigated neurotoxic effects PYR pesticides. Because limited understanding of the central nervous system functions, the diversity in the neurotoxic events and the large number of cellular and molecular targets involved there remains uncertainty about mechanism and dose response relationship associated with the pesticide exposures.
Most of epidemiological studies that investigated neurotoxic effects of pesticides were conducted on both men and women with no gender differences reported. There are also few studies that have investigated the relationship between pesticide metabolites and neurotoxicity. Epidemiological studies investigating neurotoxic effects of pesticides among women, especially large longitudinal studies in both developed and developing countries using sensitive exposure measures identifying specific pesticides as well as sensitive neurotoxic outcome measures are required in the literature. Future research should also focus on a better understanding of the central nervous system in order to fully understand the neurotoxic effects associated with pesticide exposure. This is particularly relevant to South Africa who has a growing number of women exposed to pesticides on farms and where both OP and PYR pesticides are commonly used and have been detected in the environment.
7. References


organophosphate and n-methyl carbamate pesticides among banana workers.


Part C: Publication- ready Manuscript

This manuscript is prepared for submission to the journal of Environment International. The journal’s guidelines for authors are attached (Appendix E), The Author has adhered to these guidelines with the exception that some of the tables have been included in the articles main text.
Title: Relationship between urinary pesticide residue levels and neurotoxicity among women on farms in the Western Cape

Authors:
Motsoeneng Mamonyowe Portia a*, Mohamed Aqiel Dalvie a
a Centre for Occupational and Environmental Health Research (COEHR)
School of Public Health and Family Medicine
University of Cape Town.

*Correspondence directed to:
Motsoeneng Mamonyowe Portia: mamonyowe.portia.64@gmail.com

*Abbreviations: DDT, dichlorodiphenyltrichloroethane; WFP, Women on Farms Project; OP, Organophosphates; PYR, pyrethroids; DAP, dialkyl phosphate; TCPY, 3,5,6-trichloropyridinol; OR, odds ratio; 95% CI, ninety five percent confidence interval; IQR, interquartile range.
Abstract

**Background:** Farm workers and residents living in and around farms are exposed to pesticides. Women are vulnerable to health risks posed by pesticides. To date there are few studies that have investigated the relationship between pesticide residues in human body fluids and neurotoxicity.

**Objective:**
This study therefore aims to investigate the relationship between urinary pesticide residue levels and neurotoxicity amongst women working in farms in the Western Cape, South Africa.

**Method:** A cross-sectional study was conducted among 211 women recruited from farms (farm group, n = 121) and neighbouring towns (town group, n = 90). Testing included a general questionnaire, the Q16 questionnaire, reported pesticide exposures and measurement of urinary metabolite concentrations of dialkyl phosphates (DAP), the chlorpyriphos, metabolite 3, 5, 6-trichloropyridinol (TCPY) and pyrethroid (PYR).

**Results:** The median age of the Farm Group was 33 years (interquartile range: 27 - 40 years) and for the Town Group was 40 years (interquartile range 31-49). Median urinary pesticide metabolites were 6-49% higher in the Farm Group compared to the Town Group. The concentration (median and interquartile range) of DAP (sum of the 6 metabolites), TCPY and PYR (sum of the 5 metabolites) was respectively 141.42(37.4-249.8); 6.15(3.50-10.64) and 6.60(3.61-9.96) µg/g of creatinine in the Farm Group compared to 132(45.64-204.45); 4.26(2.72-8.27) and 5.26 (2.74-8.42) µg/g of creatinine in the Town Group.
The prevalence of all Q16 symptoms was higher amongst farm women compared to non-farm women. Three pyrethroids metabolites (cis- DCCA, trans DCCA, DBCA) were positively associated with at least 12 of the Q16 symptoms adjusting for confounders. The strongest association between for a pyrethroid metabolite was between problems with buttoning and DBCA (Odds ratio = 8.93, 95% Confidence Interval: 1.71-46.5. Problems with buttoning and reading was also significantly positively associated with, trans DCCA , DBCA. Taking notes due to problems with memory was positively significantly associated with DBCA. There was no association between Q16 symptoms and OP metabolites.

**Conclusion:** Women farm residents and rural women from neighbouring towns in the Western Cape are exposed to OP and PYR pesticides. The study provides evidence that PYR pesticides may result in neurotoxic effects but not OP pesticides. These results should be explored further in a bigger longitudinal study using more sensitive neurotoxic measures such as World Health Organisation Neurobehavioral Core Test Battery, The Brief Symptom Inventory and vibration sense threshold testing.

**Keywords:** Neurotoxicity, Organophosphates, pyrethroid, neurotoxicity, Q16, female farmer workers.

**Highlights:**

- Rural women who live on farms have higher levels of pesticide residues compared to rural women who reside in towns
- Women who live or work on farms reports higher neurotoxic symptoms than those who do not live on farms
- Exposure to PYR was associated with neurotoxic outcomes
1. Introduction

Organophosphate and pyrethroids insecticides, commonly used in agriculture have been associated with neurological deficits (Bjorling-Poulsen et al 2008). Neurological effects from exposure to or poisoning from to OP pesticides include problems with memory, sleeping, numbness, dizziness, weakness, confusion, depression, personality changes, thinking, concentration and language disabilities (Ross et al 2012). The neurotoxic effects of pesticide exposure can be summarised into both acute and chronic health effects. Acute neurotoxic effects are well studied and it is said to be caused by the inhibition of the enzyme acetylcholinesterase (AChE) causing changes in central nervous system function (Costa et al 2006, Lauder et al 1999). However there remains conflicting information about the severity of chronic neurotoxic effects of pesticides exposure (Ross et al 2012).

There are numerous epidemiological studies in the literature that have investigated the neurological effects of OP pesticides. Recently Ross et. al. (2012) conducted a systematic review on neurobehavioral problems associated with low-level exposure to OP pesticides for the period 1960 -10th February 2012. The review found an overall significant relationship between low level OP exposure and cognitive functioning (language, general knowledge, attention psychomotor speed and memory). The review also showed that neurobehavioral health problems due to pesticides develop from prolonged exposure and not from a single exposure (Ross et al 2012). Duration of OP exposure that can result in neurotoxicity ranged from 2- over 20 years. The review concluded that there was still uncertainty on the association between long term pesticides exposure and some neurobehavioral effects. Most of
these studies were conducted on men and women with no gender differences reported. Women are increasing exposed to pesticides in agriculture (Rother et al 2000). There is limited evidence from two studies in the literature that have investigated neurotoxic effects of OP pesticides only on women and no studies investing PYR neurotoxicity (Bazylewicz-Walczak B et al 1999, Carreon at al 2005).

Urinary concentration levels of pesticide metabolites such as the six dialkyl phosphate (DAP) metabolites of organophosphate pesticides, 3,5,6- trichloropyridinol (TCPY) which is a specific metabolite of chlorpyrifos (Smith et al 2009) and metabolites of pyrethroid pesticides have been shown to be higher in farm workers compared to the general population. (Barr et al 2008, Phung et al 2012). However, only 2 studies have investigated the association between urinary levels of pesticide metabolites and neurological health (Eskenazi et al 2007, Bouchard et al 2010) but these were on chid participants and not on adults. To our knowledge there is no previous study which has investigated the association between urinary levels of pesticide metabolites and neurotoxicity in adults.

South Africa is the highest user pesticides in sub-Saharan Africa and the Western Cape is an important agricultural area in the country (Zhang et al 2011, Reinecke et al 2007). Pesticide residues have been detected in environmental samples and high levels in farm workers (Dalvie et al 2011, Dalvie et al 2006, Rother et al 2000 ). One study has been conducted investigating neurological disorders due to agricultural pesticides amongst farm workers in the Western Cape and this study did not provide evidence of neurotoxicity due to OP exposure (London et al 1998). No previous studies have been conducted investigating the
relationship between pesticide residues levels in biological samples and neuroxicity in South
Africa. Female farm workers in South Africa are increasingly exposed to pesticides (Bowers
et al 2009).

The data presented in this paper is part of a bigger study investigating neurotoxic, respiratory
health and reproductive health effects of pesticide exposure among women living/working on
farms in the Western Cape in South Africa. The aim of this analysis is to investigate the
effect of occupational and environmental pesticide exposure on neurotoxic outcomes
measured by means of the Q16 questionnaire.

2. Material and Methods

2.1 Study design, population and sampling

A cross-sectional study of women farm workers and residents and women living in towns
neighbouring the farms, in the Western Cape region of South Africa was conducted during the
period 24 October to 3 December 2009. The Women on Farms Project (WFP), a rural
women’s rights non-governmental organisation, assisted with the recruitment of participants.
About 100 women living on farms were targeted from the 5 most accessible agricultural areas
representative of the Western Cape and 100 women from neighbouring towns that were about
5 to 10km away from agricultural areas (Supplementary Material, Table 1). The only
inclusion criteria for women from these areas was age (above 18 years and below 70 years).
The study areas included Stellenbosch, Ceres, Paarl, Grabouw and Worcester. Farm workers and residents were selected from the 5-10 most accessible and representative farms in each area and town dwellers from the most accessible and representative houses in each area. One adult female participant per household was selected. A total of 211 women were recruited into the study including 113 women currently living on a farm and 98 residents in towns. There were 8 women who lived in town but were actually farm workers. In total there were therefore 97 farm workers (89 women living in farms and 8 not living in farms). There were an additional 24 women residing but not working on farms who were included with the farm workers in the “Farm Group (n = 121) as the results of sub-analysis showed they had similar results to that of farm workers. The remaining 90 women who neither lived nor worked on a farm are referred to as “Town Group” (Figure 1). The study was approved by the University of Cape Town’s (UCT) Research Ethics Committee (Reference 393/2009). Informed consent was obtained from participants prior to the interview.
2.2 Questionnaire

The questionnaire had sections on socio-demographic information (age, schooling, home language, income, employment); residential history (farm or town); pesticide household pesticide exposure; occupational and environmental pesticide exposure (being an applicator, re-entry pesticide exposure, pesticide drift, distance of residence to spraying and other exposures to agricultural spraying), job history (farm worker, non-farm worker, number of years in a job, job title), lifestyle factors (smoking, drug usage and alcohol consumption), pesticide poisoning and the Q16 questionnaire commonly used in studies that investigating
neurotoxic symptoms among the workers who are exposed to toxic substances (Lundberg et al 1997).

The Q16 questionnaire which consists of 16 questions, with yes/ no responses to symptoms associated with neurotoxicity. The Q16 questionnaire has been used successfully by many neurotoxic researchers although the instrument has been criticized for lacking sensitivity and specificity (Bast-Pettersen et al 2006).

The study interviews were administered in the participants preferred language and the questionnaire was translated into Afrikaans and Xhosa and then back translated into English. Fieldwork was done on the WFP premises.

2.3 Urinary pesticide metabolites determination

Urine samples were collected in 50 ml plastic containers. Participants were instructed to take precautions not to contaminate samples by not removing contaminated clothing, making sure that they wash their hands before handling urine containers, not touching the inside of containers and closing the containers immediately after producing the sample. The samples were then kept on dry ice, and stored at -20 degree Celsius before being sent for analysis at the National Institute for Occupational Health (NIOH) laboratory in Johannesburg, South Africa. The urine samples were analysed for the organophosphate pesticide metabolites, dialkyl phosphates, the chlorpyrifos specific metabolite, TCPY and pyrethroid metabolites.
Briefly, after allowing the samples to thaw at room temperature, 2 ml of urine was pipetted into screw top vials, which already contained approximately 2g of sodium chloride. The samples were acidified and extracted. The extraction was repeated, and the two extracts were combined and dried. The dry residue was suspended in acetonitrile (500µL). Derivatization was performed by adding pentafluorobenzyl bromide (50µL). After cooling at room temperature the samples were reconstituted and transferred to gas chromatography ready for analysis.

Analysis was performed on a HP 6890 GC. For calibration a multi-component stock solution of all 6 dialkyl phosphate (20µmol) metabolites, TCPY and PYR metabolites were used. For quality assurance, we used spike pooled urine at a concentration 2000 nmol/l for each of the dialkyl phosphate metabolites, TCPY and PYR metabolites.

Results were adjusted for urinary creatinine to take account of hydration. Urine samples with creatinine concentrations within and outside the WHO recommended creatinine concentration range of 0.3 x 106 µg/L – 3.0 x 106µg/L were distinguished and taken into account during analysis. Those outside the WHO range are not presented (n = 18).

The following metabolites were measured: OP metabolites (according to the methods by (Hardt et al, 2000) including dimethyl phosphate (DMP), diethyl phosphate (DEP), dimethyl thiophosphate (DMTP), dimethyl dithiophosphate (DMDTP), diethyl thiophosphate (DETP), diethyl dithiophosphate (DEDTP); and 3,5,6- trichloropyridinol (TCPY), the specific chlorpyrifos metabolite (Sams & Jones, 2011) and the 5 PYR metabolites 3- phenoxybenzoic acid (3PBA), 4-fluoro-3-phenoxybenzoic acid (4F3PBA), cis-2,2-dibromovinyl-2,2-
dimethylcyclopropane-1-carboxylic acid (DBCA), and cis- and trans isomers of 2,2-dichlorovinyl-2,2-dimethylcyclopropane-1-carboxylic acid (cis- and trans-DCCA) (according the methods of (Areebola et al 1999).

The limit of detection (LOD) for all analyses were determined and values too low to be quantified were assigned a value equivalent to the LOD x (2)-1/2. The limit of detection (LOD) for the pesticide metabolites were 0.5 μg/l for TCPY; 1 μg/l for DMP; and 0.05 μg/l for DMTP, DMDTP, DEP, DETP, DEDTP, cis-DCCA, trans-DCCA, DBCA, 4F3PBA and 2PBA (n < LOD = 8, 1, 1 for TCPY, DAP and PYR respectively). There were 8, 16 and 11 insufficient urine samples for TCPY, DAP and PYR analysis respectively.

2.3 Variables

The outcome variables included the dichotomous (Yes, No) Q16 questions, a continuous Q16 score variable which was calculated as the sum of positive responses (positive responses coded as 1 and negative responses as 0) to Q16 questions. The Q16 score was also dichotomised at the median and 75th percentile. The exposure variables included the dichotomous self reported history of living or working on farms (Yes, No), Farm Group/Town Group, and born on a farm as well as the urinary pesticide metabolite levels which were analysed as continuous variables.
2.4 Statistical Analysis

The selected software for analysis was Stata: Release 11 (StataCorp.al Software.College Station,TX:StataCorp LP). Since all continuous variables were not normally distributed, median and interquartile ranges were used to summarise these variables. After conducting univariate and bivariate analysis, multiple logistic regression analyses were used to test for associations between dichotomous outcomes and exposure variables while controlling for confounding and linear regression was used for the Q16 score. Confounders were selected on an *a priori* basis, according to biological plausibility, or based on their association with outcomes in bivariate testing if p < 0.1. (Tables 2a, b provided in the supplementary materials). Age, education, household income were selected *a priori* and drugs, alcohol usage, current smoking, language and previous poisoning were selected based on bivariate testing. Exposure variables were then added separately to all the different outcomes adjusting for these covariates.

To test for effect modification, interaction variables were created between exposure variables and potential effect modifiers (smoking, years of schooling and being born on a farm). These were the products between each exposure variable and a suspected effect modifier. For all the outcomes, an interaction term between the variable and the exposure variable of interest was included in the model. If this interaction term was significant (p<0.05), the variable would be an effect modifier. None of the interaction terms were significant so all were not retained in the models.
3. Results

3.1 Participants

Two hundred and eleven women were recruited into the study with 20% (n= 42) coming from Ceres, 18% (n=38) from Grabouw, 19% (n= 39) from Paarl, 22% (n= 47) from Stellenbosch and 21% (n = 45) from Worcester. Table 1 (Supplementary section) summarises the distribution of Farm Group and Town Group (as already been defined earlier) that participated in the study. Twenty- five (28%) of the women in the Town Group previously lived on farms. Among all the studied participants only two (2%) of the farm workers reported that they were applicators.

3.2 Demographic information, socio-economic status, lifestyle factors and self-reported pesticide exposure

In both groups Afrikaans was the most spoken language (> 87%) and less than 1% of the total studied population spoke English (Table 1). The median age in the Town Group was higher (40.5 years) than in the Farm Group (33 years) due to the fact that 25% of the Town Group were older than 50 years (excluding women aged higher than 50 years from the analysis did not change the results in the study). The number of women who attended school were not different in the two groups with over 96% of the participants in both groups who had attended school. The number of women who had matriculated was significantly more in the Farm Group although only 2% overall matriculated in both groups.
Median household income was statistically significantly higher in the Town Group.

Unemployment was statistically significantly higher in the Town Group compared to the Farm Group (17% compared to 71% in the Town Group).

**Table 1:** Demographic information, socio-economic status, living and working history and lifestyle factors of participants in the study

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Farm Group (n = 121)</th>
<th>Town Group (n = 90)</th>
<th>Total (n = 211)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic characteristics: (Median, IQR)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years) (n = 207)</td>
<td>33.0(27.0 - 40.0)</td>
<td>40.5(31.0 - 49.0)</td>
<td>37.0(28.3 - 45.0)</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>61.0(51.0 - 72.1)</td>
<td>70.0(58.3 - 81.1)</td>
<td>65.0(54.0 - 75.1)</td>
</tr>
<tr>
<td>Home language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>0(0%)</td>
<td>1(1.1%)</td>
<td>1(0.5%)</td>
</tr>
<tr>
<td>Afrikaans</td>
<td>119(98%)</td>
<td>79(88%)</td>
<td>198(94%)</td>
</tr>
<tr>
<td>Isixhosa</td>
<td>2(2%)*</td>
<td>10(11%)</td>
<td>12(6%)</td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No schooling</td>
<td>4(3%)</td>
<td>4(4%)</td>
<td>8(4%)</td>
</tr>
<tr>
<td>Matriculated</td>
<td>1(1%)*</td>
<td>3(3%)</td>
<td>4(2%)</td>
</tr>
<tr>
<td>Length of stay in current residence</td>
<td>15.0(8-24)</td>
<td>21.5(12-41)</td>
<td>17(9-29)</td>
</tr>
<tr>
<td>Born on a farm</td>
<td>83(69)</td>
<td>13(14)</td>
<td>96(46)</td>
</tr>
<tr>
<td>History of ever? living or working on</td>
<td>121(100)*</td>
<td>26(29)</td>
<td>147(70)</td>
</tr>
<tr>
<td>farms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Socio economic status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment: n (%)</td>
<td>20(17)</td>
<td>65(71)</td>
<td>85(40)</td>
</tr>
<tr>
<td>Household income/month (SUS) (Median, IQR)</td>
<td>270.0(188-500)*</td>
<td>378.7(221-744)</td>
<td>324.0(199-600)</td>
</tr>
<tr>
<td><strong>Lifestyle factors (n %)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current cigarette smoker</td>
<td>69(57)</td>
<td>36(40)</td>
<td>105(50)</td>
</tr>
<tr>
<td>Current alcohol consumption</td>
<td>79(65)</td>
<td>39(43)</td>
<td>118(56)</td>
</tr>
<tr>
<td>Use drugs</td>
<td>0(0)</td>
<td>2(2)</td>
<td>2 (0.01)</td>
</tr>
</tbody>
</table>

Abbreviations: IQR- Inter quartile range, Kg- kilograms, SUS- United states dollar, n- number, % -percentage
Current cigarette smoker: having smoked at least 20 packs of cigarettes or 30 grams of tobacco in a lifetime or at least one cigarette per day for one year AND having smoked tobacco in the last month or more.
P<=0.05 is said to be significant and denoted by *
Statistical Tests: t-test (for normally distributed data) or Wilcoxon rank sum test (for data not normally distributed) was used for one dichotomous and one continuous variable, and Chi-square testing for 2 dichotomous variables.
Alcohol consumption and smoking was more prevalent in the Farm Group. Household pesticides usage was prevalent in both groups although slightly higher in the Farm Group. Household pesticide exposures were higher in the Farm Group including 10 (8%) who uses empty containers. As expected, past pesticide poisoning events diagnosed by a doctor were more prevalent in the Farm Group but low in both groups. On spraying days, about two thirds (67%) of the Farm Dwellers reported that they re-entered the field on the same day after pesticide spraying. Workers were employed for an average of five years on the farms and about a third of Farm dwellers were seasonal farm workers (Table 2).
Table 2: Household pesticide exposure, pesticide poisoning and agricultural pesticide exposure of participants

<table>
<thead>
<tr>
<th>Pesticide Exposure</th>
<th>Farm Group N (%)</th>
<th>Town Group N(%)</th>
<th>Total N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use pesticides at home</td>
<td>67(55)</td>
<td>56(62)</td>
<td>123(58)</td>
</tr>
<tr>
<td>Member of the family works as a pesticide applicator</td>
<td>36(30)</td>
<td>1(1)</td>
<td>37(18)</td>
</tr>
<tr>
<td>Pesticide contaminated clothing washed at home</td>
<td>58(48)</td>
<td>1 (1.1)</td>
<td>59(28)</td>
</tr>
<tr>
<td>Clothing washed with rest of washing</td>
<td>39(32)</td>
<td>0(0.0)</td>
<td>39(18)</td>
</tr>
<tr>
<td>Use of empty pesticide containers at home for drinking</td>
<td>10(8)</td>
<td>0 (0.0)</td>
<td>10(5)</td>
</tr>
</tbody>
</table>

**Pesticide poisoning**
- Pesticide poisoning Confirmed by a doctor? 6(5) 1(1) 7(3)

**Farm worker status (n=208)**
- Permanent 53(45)* 0(0) 53(25)
- Seasonal 40(34)* 4(4) 44(21)

**Re-entry into sprayed fields**
- Delayed re-entry\(^a\) 33(27)* 1(1) 34(16)
- Immediate re-entry\(^b\) 81(67)* 0(0) 81(38)

Abbreviations: n- number, % percentage
\(P<0.05\)*
\(^a\) re-entry into field on the same day after pesticide spraying
\(^b\) re-entry into field 1 to 7 days after pesticide spraying

### 3.3 Urinary pesticide metabolite results

Table 4 below gives a summary of the urinary pesticides metabolites measured among the study participants. A total of 186 urine samples were collected from the participants from which 18 had a creatinine concentration which was outside the WHO recommended range.

For seven of the participants (4%) the collected urine sample were not enough for measuring TCPY, for the dialkyl phosphates 15(8%) and for pyrethroid 10(5%).
Most of the urinary organophosphate and pyrethroid metabolites were not significantly different between the two groups with only TCPY and trans-DCCA levels significantly higher in the Farm Group.
Table 3: Pesticide residues levels among the rural female workers

<table>
<thead>
<tr>
<th>Pesticide metabolites</th>
<th>Farm Group</th>
<th>Town Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (IQR)</td>
<td>Corrected for creatinine (µg/g creatinine)</td>
<td></td>
</tr>
<tr>
<td><strong>Organophosphate metabolites</strong></td>
<td><strong>n = 101</strong></td>
<td><strong>n = 77</strong></td>
<td><strong>n = 178</strong></td>
</tr>
<tr>
<td>∑DAP</td>
<td>141.42(37.4-249.83)</td>
<td>132(45.64-204.45)</td>
<td>133.59(41.86-229.09)</td>
</tr>
<tr>
<td>DMP</td>
<td>32.91(13.50-55.75)</td>
<td>26.19(14.33-52.36)</td>
<td>29.63(14.06-53.22)</td>
</tr>
<tr>
<td>DMTP</td>
<td>13.41(3.05-62.45)</td>
<td>36.44(6.11-71.85)</td>
<td>21.87(4.03-65.85)</td>
</tr>
<tr>
<td>DMTP</td>
<td>5.70(0.83-51.51)</td>
<td>9.57(0.87-66.22)</td>
<td>6.87(0.85-61.77)</td>
</tr>
<tr>
<td>DEP</td>
<td>5.01(1.37-12.90)</td>
<td>4.13(0.59-9.47)</td>
<td>4.27(1.08-10.04)</td>
</tr>
<tr>
<td>DETP</td>
<td>3.70(1.15-26.98)</td>
<td>3.94(1.35-26.18)</td>
<td>3.87(1.20-26.98)</td>
</tr>
<tr>
<td>DEDTP</td>
<td>1.99(0.55-5.10)</td>
<td>1.70(0.60-8.02)</td>
<td>1.89(0.58-6.44)</td>
</tr>
<tr>
<td><strong>Chlorpyrifos metabolite n = 104</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TCPY</td>
<td>6.15(3.50-10.64)*</td>
<td>4.14(2.70-7.57)</td>
<td>5.16(2.84-9.24)</td>
</tr>
<tr>
<td><strong>Pyrethroid metabolites n=101</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>∑Pyrethroids</td>
<td>6.60(3.61-9.96)</td>
<td>5.26(2.74-8.42)</td>
<td>6.01(3.24-9.67)</td>
</tr>
<tr>
<td>cis-DCCA</td>
<td>0.71(0.27-1.28)</td>
<td>0.56(0.23-1.13)</td>
<td>0.62(0.26-1.24)</td>
</tr>
<tr>
<td>trans-DCCA</td>
<td>0.85(0.47-1.29)*</td>
<td>0.59(0.28-1.02)</td>
<td>0.70(0.37-1.22)</td>
</tr>
<tr>
<td>DBCA</td>
<td>0.31(0.05-0.63)</td>
<td>0.30(0.04-0.60)</td>
<td>0.30(0.04-0.62)</td>
</tr>
<tr>
<td>4F3PBA</td>
<td>0.73(0.31-1.32)</td>
<td>0.70(0.33-1.30)</td>
<td>0.73(0.32-1.32)</td>
</tr>
<tr>
<td>3PBA</td>
<td>3.61(2.11-6.25)</td>
<td>3.34(2.27-5.92)</td>
<td>3.40(2.18-6.00)</td>
</tr>
</tbody>
</table>

*p < 0.05; TCPY: 3,5,6- trichloropyridinol; DAP: sum of the 6 dialkyl phosphate metabolites; DMP: dimethyl phosphate; DMTP: dimethyl thiophosphate; DMDTP: dimethyl dithiophosphate; DEP: diethyl phosphate; DETP: diethyl thiophosphate; DEDTP: diethyl dithiophosphate; Pyrethroids: sum of the 5 pyrethroid metabolites; cis-DCCA: cis-2,2-dichlorovinyl-2,2- dimethylcyclopropane-1-carboxylic acid; trans-DCCA: trans-2,2-dichlorovinyl-2,2- dimethylcyclopropane-1-carboxylic acid; DBCA: cis-2,2-dibromovinyl-2,2-dimethylcyclopropane-1-carboxylic acid; 4F3PBA: 4-fluoro-3-phenoxybenzoic acid; 3PA: 3- phenoxybenzoic acid

Values below LOD were substituted by LOD divided by square root of 2

Σ: total sum
3.5 Response to Q16 questionnaire
Positive responses to individual items in the Q16 questionnaire were all more prevalent in the Farm Group with 10(63%) items statistically significantly higher in this group. The total score was therefore also statistically significantly higher in the Farm Group.
Table 4: Responses to Q16

<table>
<thead>
<tr>
<th>Question</th>
<th>Farm group N=121(57)</th>
<th>Town group N=90(43)</th>
<th>Total N=211(100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you abnormally tired? (tired)</td>
<td>81(77)*</td>
<td>37(41)</td>
<td>118(56)</td>
</tr>
<tr>
<td>Do you have palpitations of the heart when you do not exert yourself? (heart palpitations)</td>
<td>60(50)*</td>
<td>26(29)</td>
<td>86(41)</td>
</tr>
<tr>
<td>Do you often have painful tingling in some part of your body? (tingling)</td>
<td>55(46)*</td>
<td>24(27)</td>
<td>79(37)</td>
</tr>
<tr>
<td>Do you often feel irritated without any particular reason? (irritated)</td>
<td>59(49)*</td>
<td>22(24)</td>
<td>81(38)</td>
</tr>
<tr>
<td>Do you often feel depressed without any particular reason? (depressed)</td>
<td>62(51)*</td>
<td>30(33)</td>
<td>92(44)</td>
</tr>
<tr>
<td>Do you often have problems concentrating? (poor concentration)</td>
<td>34(28)</td>
<td>20(22)</td>
<td>54(26)</td>
</tr>
<tr>
<td>Do you have a short memory? (short memory)</td>
<td>59(49)*</td>
<td>28(31)</td>
<td>87(41)</td>
</tr>
<tr>
<td>Do you often perspire without any particular reason? (perspire)</td>
<td>30(25)</td>
<td>15(17)</td>
<td>45(21)</td>
</tr>
<tr>
<td>Do you have any problems with buttoning and unbuttoning? (button)</td>
<td>6(5)</td>
<td>4(4)</td>
<td>10(5)</td>
</tr>
<tr>
<td>Have your relatives told you that you have a short memory? (fam mem)</td>
<td>32(26)</td>
<td>16(18)</td>
<td>48(22)</td>
</tr>
<tr>
<td>Do you sometimes feel a heavy feeling on your chest? (chest) (reading)</td>
<td>48(40)*</td>
<td>17(19)</td>
<td>65(31)</td>
</tr>
<tr>
<td>Do you often have to make notes about what you must remember? (notes)</td>
<td>36(30)*</td>
<td>14(16)</td>
<td>50(24)</td>
</tr>
<tr>
<td>Do you often have to go back and check things you have done such as locking the door? (check door)</td>
<td>64(53)*</td>
<td>26(29)</td>
<td>90(43)</td>
</tr>
<tr>
<td>Do you have a headache at least once a week? (headache)</td>
<td>105(87)*</td>
<td>42(47)</td>
<td>147(70)</td>
</tr>
<tr>
<td>Do you think that you have less sex than most persons of your age? (less-sex)</td>
<td>53(44)</td>
<td>35(39)</td>
<td>88(42)</td>
</tr>
<tr>
<td>Total Score (median, range) (q16 score)</td>
<td>7 (0-16)*</td>
<td>2.5(0-15)</td>
<td>5(0-16)</td>
</tr>
</tbody>
</table>

* P < 0.05 comparing Farm group to Town group

* * shows that there is a significant difference between the two groups.
3.6 Multivariate associations between pesticides exposure indices and Q16 questionnaire items.

Tables 5a, b, c below gives details of the multivariate association between Q16 outcomes and pesticides exposure indices (farm group, history of ever living on a farm, born on a farm and pesticide residue levels) among the women who live on farms and neighbouring towns in the rural Western Cape areas. The prevalence of fifteen Q16 symptoms was higher in the Farm Group compared to the Town Group with 10 statistically significantly higher (tired, heart palpitations, tingling, irritated, depressed, short memory, chest, notes, check door and headache). All the Q16 symptoms were positively associated with history of ever living on a farm of which 8 were statistically significant (tired, heart palpitation, irritated, tingling, poor concentration, short memory, perspire and chest). The sum of Q16 score was also positively significantly associated with Farm Group and history of living on a farm. Eight Q16 symptoms were positively associated with born on farm and 6 symptoms were positively associated with household pesticides of which 1 (button) was significant.

Three pyrethroids metabolites (cis- DCCA, trans DCCA, DBCA) were positively associated with at least 12 of the Q16 symptoms. The strongest associations was between DBCA and Q16 outcome “Button” \( [(OR(95\%CI)=8.93(1.71-46.5)] \) (Table 5c). “Button” and “Reading” were significantly positively associated with, trans DCCA, DBCA and “Notes” was positively significantly associated with and DBCA.

There was no significant association between any Q16 symptom and any of the dialkyl phosphate and chlorpyrifos metabolites (Table 5b). Excluding those previously poisoned from the analysis did not make a difference to the results.
Table 5a: Adjusted models for the association between pesticide exposures and neurotoxic outcomes among rural women in Western Cape.

<table>
<thead>
<tr>
<th>Pesticide exposure</th>
<th>Odds Ratio/ Regression Coefficient (95% Confidence Interval)</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of ever living and/or working on farm</td>
<td>Born on farm</td>
<td>Household pesticides</td>
</tr>
<tr>
<td>Tired</td>
<td>3.3(1.46-7.36)</td>
<td>0.95(0.50-1.78)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>4.73(1.98-11.31)</td>
<td>1.29(0.66-2.41)</td>
</tr>
<tr>
<td>Tingling</td>
<td>4.72(1.94-11.50)</td>
<td>0.85(0.44-1.62)</td>
</tr>
<tr>
<td>Irritated</td>
<td>4.25(1.82-9.95)</td>
<td>0.77(0.41-1.45)</td>
</tr>
<tr>
<td>Depressed</td>
<td>1.89(0.87-4.11)</td>
<td>0.91(0.49-1.69)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>4.15(1.59-10.80)</td>
<td>1.36(0.67-2.77)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>2.94(1.34-6.45)</td>
<td>1.48(0.78-2.79)</td>
</tr>
<tr>
<td>Perspire</td>
<td>4.35(1.42-13.31)</td>
<td>1.05(0.49-2.29)</td>
</tr>
<tr>
<td>Button</td>
<td>5.83(0.56-60.74)</td>
<td>1.17(0.28-4.94)</td>
</tr>
<tr>
<td>Reading</td>
<td>2.16(0.79-5.86)</td>
<td>1.05(0.51-2.32)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>1.54(0.54-3.96)</td>
<td>1.93(0.88-4.25)</td>
</tr>
<tr>
<td>Chest</td>
<td>5.21(1.90-14.25)</td>
<td>0.63(0.31-1.29)</td>
</tr>
<tr>
<td>Notes</td>
<td>1.55(0.64-3.77)</td>
<td>1.03(0.49-2.19)</td>
</tr>
<tr>
<td>Check door</td>
<td>1.46(0.85-2.3)</td>
<td>1.34(0.71-2.54)</td>
</tr>
<tr>
<td>Headache</td>
<td>2.13(0.91-5.00)</td>
<td>0.79(0.40-1.56)</td>
</tr>
<tr>
<td>Less sex</td>
<td>1.70(0.78-3.73)</td>
<td>0.71(0.38-1.32)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>2.69(1.71-10.14)</td>
<td>2.10(0.72-6.10)</td>
</tr>
<tr>
<td>Q16 score50</td>
<td>5.3(2.22-12.69)</td>
<td>0.79(0.42-1.51)</td>
</tr>
<tr>
<td>Q16 score75</td>
<td>5.01(1.76-14.25)</td>
<td>1.68(0.77-3.54)</td>
</tr>
</tbody>
</table>

Confounder: Age, level of education, drugs, current smoking, alcohol consumption, household income, language, past pesticide poisoning.
Table 5b: Adjusted models for the association between OP metabolites and Q16 outcomes among rural women in Western Cape

<table>
<thead>
<tr>
<th>Q16 outcomes</th>
<th>Dialyil phosphates</th>
<th>Odds Ratio</th>
<th>Regression Coefficient (95% Confidence Interval)</th>
<th>Chlorpyrifos metabolite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DMP</td>
<td>DMTP</td>
<td>DMDTP</td>
<td>DEP</td>
</tr>
<tr>
<td>Tired</td>
<td>0.998(0.985-1.009)</td>
<td>1.001(0.996-1.005)</td>
<td>0.998(0.995-1.005)</td>
<td>1.006(0.995-1.022)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>0.999(0.977-1.002)</td>
<td>0.999(0.995-1.009)</td>
<td>1.002(0.998-1.006)</td>
<td>1.003(0.998-1.019)</td>
</tr>
<tr>
<td>Tingling</td>
<td>1.003(0.989-1.009)</td>
<td>0.999(0.995-1.003)</td>
<td>0.999(0.995-1.004)</td>
<td>1.002(0.978-1.017)</td>
</tr>
<tr>
<td>Irritated</td>
<td>0.997(0.985-1.008)</td>
<td>1.001(0.997-1.005)</td>
<td>1.000(0.996-1.005)</td>
<td>1.002(0.986-1.016)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.002(0.991-1.013)</td>
<td>1.000(0.996-1.004)</td>
<td>0.999(0.996-1.003)</td>
<td>0.999(0.985-1.013)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>1.009(0.9971-1.0022)</td>
<td>1.000(0.996-1.005)</td>
<td>0.996(0.995-1.003)</td>
<td>0.994(0.976-1.012)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>1.005(0.994-1.014)</td>
<td>1.006(0.996-1.005)</td>
<td>1.000(0.997-1.005)</td>
<td>0.996(0.976-1.010)</td>
</tr>
<tr>
<td>Perspire</td>
<td>0.999(0.985-1.014)</td>
<td>1.003(0.998-1.007)</td>
<td>0.999(0.984-1.004)</td>
<td>0.985(0.959-1.011)</td>
</tr>
<tr>
<td>Button</td>
<td>1.010(0.984-1.035)</td>
<td>1.003(0.996-1.007)</td>
<td>0.994(0.980-1.007)</td>
<td>0.972(0.907-1.045)</td>
</tr>
<tr>
<td>Reading</td>
<td>0.997(0.983-1.100)</td>
<td>1.005(1.001-1.100)</td>
<td>0.999(0.995-1.005)</td>
<td>0.986(0.966-1.007)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>0.997(0.983-1.101)</td>
<td>0.996(0.991-1.002)</td>
<td>1.002(0.998-1.006)</td>
<td>0.995(0.976-1.015)</td>
</tr>
<tr>
<td>Chest</td>
<td>0.993(0.979-1.006)</td>
<td>1.001(0.997-1.006)</td>
<td>1.004(0.999-1.009)</td>
<td>0.998(0.978-1.010)</td>
</tr>
<tr>
<td>Notes</td>
<td>1.009(0.995-1.022)</td>
<td>1.004(0.999-1.009)</td>
<td>0.999(0.993-1.005)</td>
<td>0.991(0.967-1.014)</td>
</tr>
<tr>
<td>Check door</td>
<td>1.006(0.995-1.018)</td>
<td>0.999(0.996-1.004)</td>
<td>1.997(0.993-1.001)</td>
<td>0.992(0.978-1.020)</td>
</tr>
<tr>
<td>Headache</td>
<td>0.995(0.983-1.007)</td>
<td>1.001(0.997-1.006)</td>
<td>0.999(0.995-1.004)</td>
<td>0.993(0.983-1.015)</td>
</tr>
<tr>
<td>Less sex</td>
<td>0.994(0.982-1.005)</td>
<td>0.999(0.995-1.007)</td>
<td>0.996(0.995-1.000)</td>
<td>1.008(0.993-1.024)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>1.002(0.984-1.020)</td>
<td>1.002(0.997-1.006)</td>
<td>0.999(0.993-1.006)</td>
<td>1.007(0.981-1.032)</td>
</tr>
<tr>
<td>Q16 score75</td>
<td>1.000(0.989-1.012)</td>
<td>1.001(0.997-1.005)</td>
<td>0.999(0.996-1.005)</td>
<td>0.995(0.975-1.007)</td>
</tr>
</tbody>
</table>

Confounder: Age, level of education, drugs, current smoking, alcohol consumption, household income, language, past pesticide poisoning
<table>
<thead>
<tr>
<th>Neurotoxic outcomes</th>
<th>cis-DCCA</th>
<th>trans-DCCA</th>
<th>DBCA</th>
<th>4F3PBA</th>
<th>3PBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tired</td>
<td>1.22(0.74-2.00)</td>
<td>1.44(0.81-2.56)</td>
<td>1.91(0.80-4.55)</td>
<td>1.16(0.80-1.68)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>1.03(0.63-1.66)</td>
<td>1.17(0.72-1.89)</td>
<td>1.14(0.49-2.64)</td>
<td>0.92(0.65-1.32)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Tingling</td>
<td>0.81(0.488-1.34)</td>
<td>0.92(0.56-1.54)</td>
<td>0.82(0.34-1.95)</td>
<td>0.73(0.46-1.14)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Irritated</td>
<td>1.02(0.63-1.65)</td>
<td>1.18(0.73-1.90)</td>
<td>1.34(0.58-3.07)</td>
<td>0.94(0.66-1.34)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.05(0.67-1.66)</td>
<td>1.10(0.69-1.76)</td>
<td>1.54(0.69-3.42)</td>
<td>0.96(0.68-1.34)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>1.06(0.63-1.78)</td>
<td>0.93(0.55-1.59)</td>
<td>1.49(0.61-3.65)</td>
<td>0.82(0.52-1.28)</td>
<td>0.97(0.91-1.03)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>1.00(0.61-1.62)</td>
<td>1.14(0.70-1.85)</td>
<td>1.35(0.58-3.13)</td>
<td>0.78(0.51-1.18)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Perspire</td>
<td>1.00(0.55-1.74)</td>
<td>1.11(0.65-1.90)</td>
<td>1.22(0.46-3.29)</td>
<td>0.72(0.42-1.23)</td>
<td>1.01(0.99-1.03)</td>
</tr>
<tr>
<td>Button</td>
<td>3.03(1.22-7.50)</td>
<td>2.47(0.94-6.45)</td>
<td>8.93(1.71-46.5)</td>
<td>1.47(0.85-2.54)</td>
<td>1.02(0.99-1.05)</td>
</tr>
<tr>
<td>Reading</td>
<td>1.57(0.92-2.67)</td>
<td>1.63(0.94-2.83)</td>
<td>2.95(1.16-7.54)</td>
<td>1.08(0.74-1.57)</td>
<td>1.01(0.99-1.03)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>1.08(0.63-1.87)</td>
<td>1.01(0.59-1.73)</td>
<td>1.45(0.56-3.78)</td>
<td>0.90(0.56-1.45)</td>
<td>1.00(0.97-1.03)</td>
</tr>
<tr>
<td>Chest</td>
<td>0.96(0.57-1.60)</td>
<td>0.94(0.57-1.57)</td>
<td>1.12(0.46-2.76)</td>
<td>0.62(0.38-1.04)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Notes</td>
<td>1.54(0.88-2.71)</td>
<td><strong>1.82(1.00-3.32)</strong></td>
<td><strong>2.82(1.04-7.63)</strong></td>
<td><strong>1.19(0.81-1.75)</strong></td>
<td>1.00(0.97-1.02)</td>
</tr>
<tr>
<td>Check door</td>
<td>1.17(0.74-1.86)</td>
<td>1.43(0.85-2.39)</td>
<td>1.53(0.68-3.48)</td>
<td>1.09(0.77-1.53)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Headache</td>
<td>1.11(0.66-1.85)</td>
<td>1.03(0.60-1.77)</td>
<td>1.04(0.43-2.52)</td>
<td>0.97(0.67-1.39)</td>
<td>0.98(0.96-1.01)</td>
</tr>
<tr>
<td>Less sex</td>
<td>0.85(0.53-1.38)</td>
<td>0.88(0.54-1.43)</td>
<td>0.66(0.28-1.54)</td>
<td>0.77(0.51-1.15)</td>
<td>0.99(0.96-1.02)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>1.32(0.60-2.92)</td>
<td>1.35(0.53-3.42)</td>
<td>1.46(0.38-3.63)</td>
<td>0.93(0.55-1.56)</td>
<td>0.98(0.96-1.01)</td>
</tr>
<tr>
<td>Q16 score50</td>
<td>1.06(0.66-1.71)</td>
<td>1.10(0.68-1.79)</td>
<td>1.56(0.68-3.59)</td>
<td>0.82(0.56-1.20)</td>
<td>1.00(0.98-1.02)</td>
</tr>
<tr>
<td>Q16 score75</td>
<td>1.12(0.65-1.92)</td>
<td>1.29(0.76-2.20)</td>
<td>2.06(0.80-5.25)</td>
<td>0.87(0.55-1.37)</td>
<td>1.01(0.99-1.03)</td>
</tr>
</tbody>
</table>

Confounder: Age, level of education, drugs, current smoking, alcohol consumption, household income, language, past pesticide poisoning
4. Discussion

This study showed that Q16 symptoms used as the neurotoxic outcome in the study, are more prevalent among women currently living or working on farms compared to those living in nearby towns and, those who have a history of living on farms compared to those who have lived in nearby towns. This suggests that women living and working on farms are showing neurotoxic effects likely due to pesticides exposure on farms. The neurotoxic effect of pesticide exposure was found even when controlling for pesticide poisoning which have not previously been demonstrated with the Q16 questionnaire. Previous studies in Nicaragua and California have shown significantly higher positive symptoms responses in those that experienced poisoning compared to a non-poisoned group (Rosenstock et al 1991, Steenland et al 1994, Wesseling et al 2002). This is also the first study that has found an association between neurotoxicity and pesticide exposure only in women.

The study results showed no significant association between urinary metabolite levels of organophosphates, the most commonly used neurotoxic pesticides worldwide (Van der Schans et al 2013, Barr et al 2006) and in South Africa and the Q16 outcomes. The median levels of DAP metabolites in this study (134 µg/g of creatinine) were lower than that measured in a previous study in the Western Cape among farm workers (1587.5 µg/g creatinine (Dalvie et al 2011). In this study median DAP levels were also at the low end of the spectrum when compared to those of the Netherlands farm workers in another setting (296.0 µg/g creatinine) (Ye et al 2008). The reason for no positive associations of DAP metabolites with Q16 outcomes could be therefore due to low levels of total organophosphate pesticide exposure of the female participants in this study. The low level OP exposure is
probably due to the fact that only two of the farm workers reported that they were applicators. Another reason for the lack of association between OP metabolites can be due to the lack of specificity and sensitivity of the Q16 questionnaire. (Bast-Pettersen et al 2006) and that more sensitive neurotoxic test are required to explore this association.

Cis and trans-DCCA are metabolites for permethrin, cypermethrin and cyfluthrin that are commonly used on farms in the Western Cape crop farming; DBCA, is the metabolite of deltamethrin and 4F3PBA, a metabolite of cyfluthrin which are also both commonly used on Western Cape farms. 3PBA is a non-specific metabolite for common synthetic pyrethroids (Barr et al 2008). The median PYR metabolites measured in this study in both the Farm and Town Groups (6.60 μg/g creatinine and 5.26 μg/g creatinine respectively) was higher than those measured in the general population in other settings such as the Mexican study, MICASA (Trunnelle et al 2014), and the two USA population based studies NHANES data set 1999-2002 and CHAMACOS cohort with U.S. National Health and Nutrition Examination Survey data set 1999–2002.

We could not find another epidemiological study that have investigated the relationship between pyrethroid levels and neurotoxic outcomes but altered nerve functioning has been found in rats dosed with pyrethroid compounds through intracerebral dosing experiment (Soderlund et al 2002).

The consistent positive associations between PYR metabolites, cis- DCCA, trans DCCA , DBCA and Q16 symptoms should be studied further using sensitive neurotoxic outcomes
such as World Health Organisation Neurobehavioral Core Test Battery, The Brief Symptom Inventory and vibration sense threshold testing. With most of the positive associations with the three PYR metabolites not significant, this also indicates lack of statistical power in the current study and that a bigger sample size would be required for future studies.

It is interesting that the levels of OP and PYR metabolites amongst women in the Town Group were also substantially higher than those in general populations (Trunnelle et al 2014). This indicates that those residents who live in towns are also exposed to pesticides. The most likely pesticide exposures in rural towns include household pesticide and environmental exposure to agricultural pesticides.

A key limitation in this study is the cross-sectional design; consequently it cannot be established with certainty if the associations are the result of a temporal relationship between pesticide exposure and outcomes. The short half-lives (< 48 hours) of the pesticides in the body (Roberts and Reigart, 1999) is particularly relevant here as exposures would be variable and one spot urinary sample is not an ideal indicator of exposure. A longitudinal design whereby pesticide exposure especially urinary pesticide metabolites and neurotoxic outcomes are measured repeatedly over time would be more powerful. With respect to the comparison of Q16 symptoms between the Farm Group and Town Group, the healthy worker effect commonly observed in cross-sectional studies may have resulted in farm workers affected by pesticides to move to towns and thereby reducing the level of neurotoxicity in the Farm Group. However, the study results show Q16 symptoms were significantly higher in the Farm Group (Table 5 a) despite a possible Health Worker Effect. Additionally, Q16 symptoms were
significantly higher among women with a history of ever living and/or working on farm compared to those not. (Table 5a). Furthermore sub-analyses excluding town women who had previously lived or worked on farm from the analyses did not change the results found. Another important limitation in the study is the fact that age, income and employment status in the Farm Group and Town Group were different. These variables were not found to have strong associations with the Q16 symptoms in bivariate analysis and age and income were controlled for in multivariate analysis as they were included apriori. There might, however, have been residual confounding especially with income as the only indicator of socio-economic status. The most important limitations in the study was a lack of a sensitive outcomes due to a low budget, and the cross-sectional design which precludes the determination of the temporal effects and also a lack of statistical power due to a too small sample size. With a bigger budget, a larger study cohort study incorporating sensitive neurotoxic outcomes and multiple pesticide bio-monitoring measurements could have been conducted.

5. Conclusion

This study found that urinary levels of DAP metabolites of rural women in the Western Cape to be lower than those in other settings, but PYR metabolites to be higher than those in other settings. The prevalence of all Q16 symptoms was higher amongst farm women compared to non-farm women. Three urinary pyrethroids metabolites (cis- DCCA, trans DCCA , DBCA) were positively associated with at least 12 of the Q16 symptoms adjusting for confounders. These results should be explored further in a bigger longitudinal study using more sensitive neurotoxic measures. The study results highlight the need to develop strategies to reduce pesticide exposure among women farm workers and residents.
6. Acknowledgment

This study was supported by the Women on Farms Project and the University of Cape Town. Motsoeneng Portia Mamonyowe is sponsored by the Centre for International Health of the Ludwig-Maximilian-University, Munich, Germany (CIHLMU) and Department of Health/Education Free State.

7. Reference


Supplementary material to the journal manuscript
**Supplementary Table 1**: Participation of rural women participants in the study

<table>
<thead>
<tr>
<th>Area</th>
<th>Farm group</th>
<th>Town group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceres</td>
<td>23 (19)</td>
<td>19 (21)</td>
<td>42 (20)</td>
</tr>
<tr>
<td>Grabouw</td>
<td>35 (29)</td>
<td>3 (3)</td>
<td>38 (18)</td>
</tr>
<tr>
<td>Paarl</td>
<td>16 (13)</td>
<td>23 (26)</td>
<td>39 (19)</td>
</tr>
<tr>
<td>Stellenbosch</td>
<td>25 (21)</td>
<td>22 (24)</td>
<td>47 (22)</td>
</tr>
<tr>
<td>Worcester</td>
<td>22 (18)</td>
<td>23 (26)</td>
<td>45 (21)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>121 (100)</td>
<td>98 (100)</td>
<td>211 (100)</td>
</tr>
</tbody>
</table>
**Supplementary table 2a, b:** Unadjusted odd ratios for associations between Q16 outcomes and possible confounders.

<table>
<thead>
<tr>
<th>Confounder variables</th>
<th>Prevalence, (%) (n=211)</th>
<th>Age (years)</th>
<th>Education</th>
<th>Alcohol</th>
<th>Household income</th>
<th>Poisoning</th>
<th>Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tired</td>
<td>55%</td>
<td>1.00(0.98-1.00)</td>
<td>1.00(0.95-1.07)</td>
<td>0.92(0.64-1.33)</td>
<td>0.99(0.99-1.00)</td>
<td>0.99(0.40-2.43)</td>
<td>1.57(0.38-6.40)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>41%</td>
<td>0.98(0.96-1.00)</td>
<td>1.02(0.95-1.10)</td>
<td>0.93(0.61-1.42)</td>
<td>1.00(0.99-1.00)</td>
<td>1.09(0.40-2.98)</td>
<td>2.17(0.53-8.89)</td>
</tr>
<tr>
<td>Irritated</td>
<td>38%</td>
<td>0.99(0.97-1.01)</td>
<td>1.05(0.97-1.14)</td>
<td>1.02(0.65-1.59)</td>
<td>0.99(0.99-1.00)</td>
<td>1.19(0.44-3.28)</td>
<td>2.37(0.58-9.72)</td>
</tr>
<tr>
<td>Depression</td>
<td>44%</td>
<td>0.99(0.98-1.01)</td>
<td>1.01(0.94-1.09)</td>
<td>0.96(0.62-1.49)</td>
<td>0.99(0.99-1.00)</td>
<td>1.16(0.43-3.19)</td>
<td>2.31(0.57-9.45)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>26%</td>
<td>0.99(0.95-1.00)</td>
<td>1.03(0.94-1.13)</td>
<td>1.18(0.68-2.03)</td>
<td>1.00(0.99-1.00)</td>
<td>0.86(0.21-3.54)</td>
<td>1.72(0.24-12.49)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>41%</td>
<td>0.98(0.97-1.00)</td>
<td>1.04(0.97-1.12)</td>
<td>1.04(0.68-1.60)</td>
<td>1.00(0.99-1.00)</td>
<td>1.08(0.40-2.95)</td>
<td>2.15(0.53-8.79)</td>
</tr>
<tr>
<td>Perspire</td>
<td>21%</td>
<td>0.97(0.94-1.00)</td>
<td>1.10(0.99-1.22)</td>
<td>1.21(0.67-2.21)</td>
<td>1.00(0.99-1.00)</td>
<td>1.04(0.25-4.31)</td>
<td>§</td>
</tr>
<tr>
<td>Button</td>
<td>5%</td>
<td>0.98(0.93-1.03)</td>
<td>1.16(0.90-1.48)</td>
<td>1.10(0.73-1.67)</td>
<td>1.00(0.99-1.00)</td>
<td>1.02(0.37-2.78)</td>
<td>1.00(0.14-7.20)</td>
</tr>
<tr>
<td>Reading</td>
<td>22%</td>
<td>0.97(0.94-0.99)</td>
<td>1.00(0.91-1.10)</td>
<td>1.10(0.61-1.95)</td>
<td>1.00(0.99-1.00)</td>
<td>0.49(0.07-3.53)</td>
<td>1.98(0.27-14.42)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>24%</td>
<td>0.98(0.96-1.00)</td>
<td>1.13(1.01-1.26)</td>
<td>0.87(0.50-1.53)</td>
<td>1.00(0.99-1.00)</td>
<td>0.93(0.23-3.85)</td>
<td>1.86(0.26-13.53)</td>
</tr>
<tr>
<td>Chest</td>
<td>31%</td>
<td>0.98(0.96-1.00)</td>
<td>1.05(0.97-1.15)</td>
<td>1.30(0.79-2.14)</td>
<td>1.00(0.99-1.00)</td>
<td>1.87(0.75-4.67)</td>
<td>1.42(0.20-10.30)</td>
</tr>
<tr>
<td>Notes</td>
<td>24%</td>
<td>0.98(0.96-1.00)</td>
<td>1.01(0.92-1.10)</td>
<td>0.95(0.54-1.66)</td>
<td>1.00(0.99-1.00)</td>
<td>1.95(0.70-5.43)</td>
<td>¥</td>
</tr>
<tr>
<td>Check door</td>
<td>43%</td>
<td>1.00(0.97-1.00)</td>
<td>1.03(0.96-1.10)</td>
<td>1.40(0.91-2.15)</td>
<td>1.00(0.99-1.00)</td>
<td>1.90(0.87-4.11)</td>
<td>1.02(0.14-7.37)</td>
</tr>
<tr>
<td>Headache</td>
<td>70%</td>
<td>0.99(0.97-1.00)</td>
<td>1.00(0.95-1.06)</td>
<td>1.14(0.82-1.59)</td>
<td>1.00(0.99-1.00)</td>
<td>0.95(0.42-2.16)</td>
<td>1.25(0.31-5.10)</td>
</tr>
<tr>
<td>Less sex</td>
<td>53%</td>
<td>0.99(0.97-1.00)</td>
<td>1.02(0.95-1.10)</td>
<td>1.12(0.73-1.71)</td>
<td>1.00(0.99-1.00)</td>
<td>0.83(0.30-2.27)</td>
<td>1.67(0.41-6.83)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>38%</td>
<td>0.98(0.98-0.99)</td>
<td>1.02(1.00-1.04)</td>
<td>1.07(0.95-1.20)</td>
<td>1.00(1.00-1.00)</td>
<td>1.22(0.93-1.60)</td>
<td>1.66(1.04-2.64)</td>
</tr>
</tbody>
</table>

**Coefficient 95% Confidence Interval**

| Q16 score 50         | -0.00(-0.10-0.00) | 0.02(-0.01-0.04) | 0.04(-0.05-0.18) | -0.00(-0.00-0.00) | 0.55(0.18-0.93) | -0.00(-0.00-0.00) |
| Q16 score 75         | -0.01(-0.10-0.00) | 0.02(-0.01-0.04) | 0.09(-0.03-0.20) | -0.00(-0.00-0.16) | 0.34(0.18-0.66) | -0.00(-0.00-0.00) |

*p<0.1
**Supplementary table 2b: Unadjusted odd ratios for association between Q16 outcomes and possible confounders.**

<table>
<thead>
<tr>
<th>Confounder variables. Odd’s Ratio (95% Confidence Interval)</th>
<th>Current smoke</th>
<th>Language</th>
<th>Farm vs. town dwellers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurotoxic outcomes</td>
<td>Current smoke</td>
<td>Language</td>
<td>Farm vs. town dwellers</td>
</tr>
<tr>
<td>Tired</td>
<td>0.90 (0.64-1.29)</td>
<td>0.93 (0.71-1.24)</td>
<td>1.58 (1.07-2.34)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>0.79 (0.52-1.21)</td>
<td>0.87 (0.65-1.15)</td>
<td>1.67 (1.05-2.65)</td>
</tr>
<tr>
<td>Tingling</td>
<td>0.79 (0.49-1.19)</td>
<td>0.86 (0.65-1.52)</td>
<td>1.66 (1.02-2.67)</td>
</tr>
<tr>
<td>Irritated</td>
<td>0.69 (0.45-1.07)</td>
<td>0.96 (0.72-1.27)</td>
<td>1.94 (1.19-3.17)</td>
</tr>
<tr>
<td>depression</td>
<td>0.94 (0.63-1.42)</td>
<td>0.97 (0.74-1.30)</td>
<td>1.50 (0.97-2.31)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>1.17 (0.68-2.00)</td>
<td>1.01 (0.74-1.39)</td>
<td>1.22 (0.71-2.04)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>0.93 (0.61-1.41)</td>
<td>0.97 (0.73-1.29)</td>
<td>1.52 (0.97-2.39)</td>
</tr>
<tr>
<td>perspire</td>
<td>1.00 (0.56-1.78)</td>
<td>1.00 (0.70-1.40)</td>
<td>1.44 (0.78-2.69)</td>
</tr>
<tr>
<td>button</td>
<td>2.02 (0.52-7.83)</td>
<td>1.24 (0.66-2.36)</td>
<td>1.08 (0.31-3.84)</td>
</tr>
<tr>
<td>reading</td>
<td>0.76 (0.43-1.35)</td>
<td>1.00 (0.71-1.39)</td>
<td>1.40 (0.76-2.56)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>0.80 (0.46-1.39)</td>
<td>0.92 (0.67-1.29)</td>
<td>1.28 (0.72-2.29)</td>
</tr>
<tr>
<td>Chest</td>
<td>0.70 (0.43-1.14)</td>
<td>0.86 (0.64-1.16)</td>
<td>2.04 (1.17-3.55)</td>
</tr>
<tr>
<td>Notes</td>
<td>0.80 (0.46-1.39)</td>
<td>1.04 (0.74-1.45)</td>
<td>1.86 (1.00-3.45)</td>
</tr>
<tr>
<td>Check door</td>
<td>0.95 (0.63-1.43)</td>
<td>1.08 (0.81-1.43)</td>
<td>1.78 (1.13-2.81)</td>
</tr>
<tr>
<td>Headache</td>
<td>0.93 (0.67-1.28)</td>
<td>0.95 (0.70-1.28)</td>
<td>1.81 (1.26-2.59)</td>
</tr>
<tr>
<td>Less sex</td>
<td>0.80 (0.53-1.21)</td>
<td>1.12 (0.81-1.53)</td>
<td>0.88 (0.58-1.36)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>0.83 (0.74-0.94)</td>
<td>0.99 (0.96-1.03)</td>
<td>1.53 (1.37-1.75)</td>
</tr>
<tr>
<td>Q16 score 50</td>
<td>-0.004 (-0.14-0.13)</td>
<td>-0.15 (-0.43-0.13)</td>
<td>-0.00 (-0.00-0.00)</td>
</tr>
<tr>
<td>Q16 score 75</td>
<td>0.007 (-0.10-0.12)</td>
<td>-0.11 (-0.35-0.13)</td>
<td>0.00 (-0.00-0.00)</td>
</tr>
</tbody>
</table>

*p<0.1
**Metabolites Distribution between Farm and Town Group**

*Figure 1* OPs metabolites
Figure 2 PYR metabolites

dcca Vs Town and Farm Group

cis_dcca_cr

dcca Vs Town and Farm Group

trans_dcca_cr

dcca Vs Town and Farm Group

cis_dbva_cr

cis_dbva Vs Town and Farm Group

fpba_cr

fpba Vs Town and Farm Group

pba_cr

pba Vs Town and Farm Group
Part D Appendices
English Questionnaire

Health effects due to pesticide exposure amongst rural women in the Western Cape

UNIVERSITY OF CAPE TOWN

Study Number

Date

Area

Farm Name

Name of Interviewer

GENERAL INSTRUCTIONS

Thank you for agreeing to take part in this study.

We will work through the questionnaire as follows: I will ask the questions and give you the answer choices and tick or circle the answers you give me in the questionnaire. Choose the answer that is the closest to how you feel.

Please note that there are no right or wrong answers to the questions asked. Please feel free to answer just what you think. You may stop at any time if you do not want to carry on with these questions. Your answers are
Section 1: DEMOGRAPHIC CHARACTERISTICS

We would like to ask you a few questions about yourself.

1.1 How old are you? _________ (years)
   Date of birth ____/_____/_____

1.2 What is the highest level of education you have passed?

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one year completed</td>
<td>1</td>
</tr>
<tr>
<td>Sub A/Class 1/Grade 1</td>
<td>2</td>
</tr>
<tr>
<td>Sub B/Class 2/Grade 2</td>
<td>3</td>
</tr>
<tr>
<td>Standard 1/Grade 3</td>
<td>4</td>
</tr>
<tr>
<td>Standard 2/Grade 4</td>
<td>5</td>
</tr>
<tr>
<td>Standard 3/Grade 5</td>
<td>6</td>
</tr>
<tr>
<td>Standard 4/Grade 6</td>
<td>7</td>
</tr>
<tr>
<td>Standard 5/Grade 7</td>
<td>8</td>
</tr>
<tr>
<td>Standard 6/Grade 8</td>
<td>9</td>
</tr>
<tr>
<td>Standard 7/Grade 9</td>
<td>10</td>
</tr>
<tr>
<td>Standard 8/Grade 10</td>
<td>11</td>
</tr>
<tr>
<td>Standard 9/Grade 11</td>
<td>12</td>
</tr>
<tr>
<td>Standard 10/Grade 12</td>
<td>13</td>
</tr>
<tr>
<td>Further studies – incomplete</td>
<td>14</td>
</tr>
<tr>
<td>Diploma/other post school – complete</td>
<td>15</td>
</tr>
<tr>
<td>Degree</td>
<td>16</td>
</tr>
</tbody>
</table>

1.3 Which main language do you speak at home? ____________________

Section 2: HOUSEHOLD FACTORS

105
2.1 Is the house you live in:

- Owned by your family 1
- Rented 2
- Owned by the owner of the farm 3
- Other (please specify) 4

Specify _________________________________

2.2 Does your house have:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Electricity</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>A radio</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>A television</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>A landline telephone</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A fridge</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>A computer</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>A washing machine</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>A cell phone (anybody)</td>
<td></td>
</tr>
</tbody>
</table>

2.3 How many people usually live and sleep in your household?

<table>
<thead>
<tr>
<th>Number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Section 3: ECONOMIC FACTORS

Now we would like to ask a few questions about you and the work that you do.

3.1 What kind of work do you do? (If working, please tell me your occupation. For example, Farmer, Street Trader, Primary School Teacher, Domestic Worker)

<table>
<thead>
<tr>
<th>Not working</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working</td>
<td>Yes</td>
</tr>
</tbody>
</table>
If working, specify

3.2 Please indicate which of the following are your sources of income. Please answer this question whether or not you are working.

<table>
<thead>
<tr>
<th>Source</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Spouse/partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D Brothers and/or sisters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Child Support Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G State Old Age Pensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H Disability Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I Care Dependency Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J Foster Care Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K Grants-in-Aid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L Workman’s Compensation Fund</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M Other (Please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 What is your household income? ________________

3.4 How often do the people in your family go hungry or have no food to eat?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>0</td>
</tr>
<tr>
<td>Seldom</td>
<td>1</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2</td>
</tr>
<tr>
<td>Often</td>
<td>3</td>
</tr>
</tbody>
</table>

3.5 During which months of the year do you go hungry? ________________ (months of year).

Section 4. RESIDENTIAL HISTORY

Now I’d like to ask you a few questions about the places where you have lived in your lifetime:

4.1 Where do you currently live (Town, city, farm)? ____________

How long have you lived here? ________________ (Years/Months)
If on a farm,

4.2 What kind of farm is this? (what is grown here?) _______________________

4.2.1 Is this an export farm? _______ (Yes, No)
   If yes, where are crops exported to? _______________________ (countries)

4.2.2 Is this a Tesco farm ________ (Yes, No)

4.3 How far from your house is the nearest vineyard/orchard? _______________ (meters)

4.4 Are pesticides sprayed on the vineyard/orchard during the year?  ____ (Yes/No)

4.5 When last was pesticides applied in the vineyard/orchard? ________ (number of days)

**IF YES, complete the following:**

4.5  How many months a year are pesticides applied on the farm ______

   How many days per month are pesticides applied during the spraying months? _____

   Number of days per year ________
4.6 Does the pesticides spraying come into the house? ________ (Yes/No)

4.7 Do you come into contact with pesticides outside the house while spraying occurs (e.g. hanging your washing)? ________ (Yes/No)

4.8 Who apply pesticides on this farm ______________ (Men, Women, Both)

4.9 Does the farmer provide you with protective clothes and equipment (including gloves, masks, overalls, etc)? ________
   If yes, is it free of charge? ________ (Yes, No)

4.10 Are shower/washing rooms provided for workers coming into contact with pesticides? ________ (Yes, No)

4.11 When spraying happens, are workers expected to work in sprayed blocks? ___(Yes, No)

4.12 How soon after spraying/application of pesticides do you return to the vineyard/orchard? ________ (number of days)

4.13 What is the method of pesticide application? ________ (Tractor, backpack or other methods)

4.14 What are the sources of drinking water at your house? __________________
   (municipal water, storage dam on mountain, borehole/spring, river water, farm
4.15 What are the sources of water for recreational use (bathing, washing of clothes) at your house? ____________________ (municipal water, storage dam on mountain, borehole/spring, river water, farm dam, rain water tank, etc)

4.16 Did you live elsewhere before? _____ (Yes/No)

If YES,

Please provide the details about the places where you have lived PREVIOUSLY in the following table:

<table>
<thead>
<tr>
<th>Places lived previously</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was pesticides</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

4.12 Were you born on a farm where pesticides were applied? ___ (Yes/No)

Section 5. WORK HISTORY

Current job

5.1 What is your current occupation? ________________

5.2 What is your job title? ________________________
5.3 For how many years have you worked in this job? __________ (years)

5.4 Do you currently work on a farm? ___ (Yes/No)

If you work on a farm,

5.5 Are you a permanent or seasonal farm worker? ________________

5.6 If you do not live on the farm you work at:

5.6.1 Which crops are produced on the farm _____________________________

5.6.2 Is the farm you work on an export farm? ________ (Yes, No)

If yes, where are crops exported to? _____________________________ (countries)

5.6.3 Is the farm you work on a Tesco farm? ________ (Yes, No)

5.7.1 Do you work in the field? ________ (Yes/No)

5.7.2 Do you apply (spray/mix) pesticides ________ (Yes/No)

5.7.3 If YES which pesticides do you use _____________________________

______________________________________________________________

5.7.4 When last did you apply pesticides? ________ (number of days)
5.7.5 How many months a year do you apply pesticides? _________

How many days per month do you apply pesticides in the spraying months? _______

Total number of days per year _____

5.7.6 Do you drive a tractor while others spray pesticide? _______(Yes/No)

If yes, how many times per year? __________

5.7.7 Which Personal Protective Equipment do you use? ____________

(Indicate with A = Apron, B = Boots, G = Gloves, M = Mask, O = Overalls, Gls = Goggles)

5.7.8 Is PPE provided free of charge? __________ (Yes, No)

Previous jobs

Please provide the details about your PREVIOUS work in the following table

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of years</td>
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</tr>
<tr>
<td>Work on a farm (Yes, no)</td>
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<td></td>
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<tr>
<td>Occupation</td>
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<tr>
<td>Job</td>
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<tr>
<td>If on farm: Do you work in the field? (Yes, No)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do/did you apply (spray or mix) pesticides (Yes, No)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many days per year do/did you apply pesticides?</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Were you the tractor driver? (Yes, No)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>How many days per year were you the tractor driver?</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Which PPE did you use?*</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>*Indicate with A = Apron, B = Boots, G = Gloves, M = Mask, O = Overalls, Gls = Goggles</td>
<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

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Section 6. ALCOHOL USE

6.1 Do you drink alcohol or did you drink before ___________? (Yes/No)

If yes,

6.2 Have you ever felt that you should drink less alcohol? ____ (Yes/No)

6.3 Have people ever angered you by criticising your drinking habits? ____ (Yes/No)

6.4 Have you ever felt guilty or bad because you drink alcohol? ____ (Yes/No)

6.5 Have you ever had a drink early in the morning to make you
feel better or to get over a ‘babalaas’? ____ (Yes/No)

Section 7. SMOKING AND OTHER DRUG USE

7.1 Have you ever smoked tobacco (cigarettes or pipe) for as long as a year? ____ (Yes/No)

(‘Yes’ means at least 20 packs of cigarettes or 30 grams of tobacco in a lifetime or at least one cigarette per day for one year)

If Yes,

7.1.1 How old were you when you started smoking? ____ (years)

7.1.2 Do you smoke currently? ____ (Yes/No)

(‘Yes’ means smoking tobacco in the last month or more)
7.1.3 If no, how old were you when you stopped smoking? _________

7.1.4 How much do/did you now smoke on average?

   Number of cigarettes per day ____

   Pipe tobacco in grams/week ______

7.1.5 Do you or did you inhale the smoke? ____ (Yes/No)

7.2 Have you been regularly exposed to tobacco smoke from other people smoking cigarettes or pipe in the last 12 months?

   (‘Regularly’ means on most days or nights)

7.3 Do you take drugs or have taken drugs before? _______ (Yes/No)

   7.3.1 If YES, please state for how many years ________ (years)

Section 8. HOUSEHOLD PESTICIDE USAGE

8.1 Do you or any one in your house use pesticides in the garden

   or in your home?_____ (Yes/ No)

   If yes, what do you use? ________________________________

8.2 Do pesticide contaminated clothes get washed at home? ____ (Yes/ No)
8.4 If yes, does it get washed with the rest of the washing? _____ (Yes/ No)

8.5 Do you eat fruit or vegetables from your garden? _____ (Yes / No)

8.6 Do you use empty pesticide containers at home for domestic purposes? ____ (Yes/ No)

8.7 If yes, what do you use them for? ________________________________

Section 9 MEDICAL, REPRODUCTIVE AND RESPIRATORY HISTORY

9.1 Do you suffer from:
   Asthma  ____ (Yes/No)
   Bronchitis  ____ (Yes/No)
   TB  ____ (Yes/No)
   Eczema  ____ (Yes/No)
   Hayfever  ____ (Yes/No)
   Farmers Lung  ____ (Yes/No)
   Other diseases: ____ (Yes/No)  if yes, specify _________________________

9.2 What was your weight at birth ________________

9.3 At what age did you reach puberty? ______

9.4 Did you ever experience pesticide poisoning that was confirmed by a doctor? ____ (Yes, No)

   If yes, how many times__________
9.5 Do you frequently feel/have:

Dizzy _______ (Yes/No)
Nauseas _______ (Yes/No)
Headaches _______ (Yes/No)
Skin, nose and/or eye irritation ______ (Yes/No)
Skin rashes ______ (Yes, No)
Nauseas and want to vomit (Yes, No)
Cold or open sores ______ (Yes, No)

Section 10 (Q16)

10.1. Are you abnormally tired? _____ (Yes / No)

10.2. Do you have palpitations of the heart when you do not exert yourself? _____ (Yes/No)

10.3. Do you often have painful tingling in some part of your body? _____ (Yes/No)

10.4. Do you often feel irritated without any particular reason? _____ (Yes/No)

10.5. Do you often feel depressed without any particular reason? _____ (Yes/No)

10.6. Do you often have problems concentrating? _____ (Yes/No)

10.7. Do you have a short memory? _____ (Yes/No)

10.8. Do you often perspire without any particular reason? _____ (Yes/No)

10.9. Do you have any problems with buttoning and unbuttoning? _____ (Yes/No)

10.10 Do you generally find it hard to get the meaning from reading newspapers and books? _____ (Yes/No)

10.11 Have your relatives told you that you have a short memory? _____ (Yes/No)
10. 12. Do you sometimes feel a heavy feeling on your chest? _____ (Yes/No)

10. 13. Do you often have to make notes about what you must remember? _____ (Yes/No)

10. 14. Do you often have to go back and check things you have done such as locking the door? _____ (Yes/No)

10. 15. Do you have a headache at least once a week? _____ (Yes/No)

10. 16. How many times do you have sex per week? _____ (Yes/No)

10. 16a. Do you think that this is less than most persons of your age? _____ (Yes, No)

Section 11. Time to pregnancy

11. 1. Have you ever been pregnant? _________ (Yes/No)

11. 2. If yes, how many times? ______

11. 3. List how many pregnancies ended in

   Live birth _____
   Stillbirth _____
   Miscarriage _____
   Ectopic/Tubal pregnancy _____
   Other _____

11.4 FOR LIVE BIRTHS AND STILLBIRTHS ONLY (omit twins) Fill in the following
   Table:

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Section 12. ALLERGIC HEALTH PROBLEMS

12.1 Have you had wheezing or whistling in your chest at any time

in the last 12 months? _____ (Yes/No)

If yes, go on to Question 12.2

If no, go on to Question 12.4

12.2 Have you been short of breath when the wheezing noise was present? _____ (Yes/No)

12.3 Have you had this wheezing or whistling when you did not have a cold or flu? ___ (Yes/No)

12.4 Have you been woken up with a feeling of tightness in your chest at any

time in the last 12 months? _____ (Yes/No)

12.5 Have you had an attack of shortness of breath that came on during the daytime when you were at

rest at any time in the last 12 months? _____ (Yes/No)

12.6 Have you been woken by an attack of coughing at any time in the last 12

months? _____ (Yes/No)
12.7 Have you ever had asthma? ____ (Yes/No)

If Yes, go on to Question 12.
If No, skip to next Question

12.8 If yes, was this confirmed by a doctor?

12.9 How old were you when you were told you have asthma? ______ (years)

12.10 Have you had an attack of asthma in the last 12 months? _____ (Yes/No)

12.11 Are you using any medicines, including inhalers/pumps, nebulizers, syrups or tablets, for asthma or breathing problems? ____ (Yes/No)

12.12 When you are near animals, feather or in a dusty part of the house, do you ever get a feeling of tightness in your chest? ____ (Yes/No)

12.13 Do you get a tight chest or wheeze when you work in the:
   12.13.1 Vineyard/Orchard ____ (Yes/No)
   12.13.2 Packing room ____ (Yes/No)
   12.13.3 Other ____ (Yes/No) If yes, specify _____________________________

12.14 Have you had any nasal allergies including hay fever or itchy and watery eyes/nose in the last 12 months? ____ (Yes/No)

12.15 Do you get itchy/watery eyes or nose when you work in the:
   12.14.1 Vineyard/Orchard ____ (Yes/No)
   12.14.2 Packing room ____ (Yes/No)
12.14.3 Other (Yes/No) If yes, specify ______________________________

12.16 Have you had any skin problems in the last 12 months? (Yes/No)

12.17 Do you get red, itchy pimples when you work in the:

12.17.1 Vineyard/Orchard (Yes/No)

12.17.2 Packing room (Yes/No)

12.17.3 Other (Yes/No) If yes, specify ______________________________

Thank you for taking part in this study
Afrikaans Questionnaire
Gesondheids gevolge weens blootstelling aan gifstowwe op landlike vrouens in die Weskaap

UNIVERSITEIT VAN KAAPSTAD

Vraelysnommer  ______

Datum  ________________

Area  _______________________________

Naam van plaas  _______________________________

Naam van
Onderhoudvoerder  _______________________________

ALGEMENE INSTRUKSIES

Dankie dat jy ingestem het om aan hierdie studie deel te neem.

Ons gaan soos volg deur die vraelys werk: Ek sal die vrae vra en aan jou die moontlike antwoordkeuses gee en ek sal jou antwoorde merk en omsirkel in die vraelys. Kies die antwoord wat die naaste is aan hoe jy voel.

Let asseblief op dat daar geen regte of verkeerde antwoorde op die vrae is nie. Antwoord asseblief soos jy voel. Jy kan enige tyd ophou as jy nie wil voortgaan met die vrae nie. Jou antwoorde is vertroulik en sal aan niemand anders bekend gemaak word nie. Slegs die navorsings personeel sal toegang tot die vraelys hê nadat dit voltooi is.
Afdeling 1: DEMOGRAFIESE BESONDERHEDE

Ons wil jou graag ‘n paar vroe oor jouself vra.

1.1 Hoe oud is u? ________ (jaar)
   Geboortedatum ___/_____/_____

1.2 Wat is die hoogste vlak van onderrig wat jy geslaag het?

- Minder as een jaar voltooi: 1
- Sub A/Klas 1/Graad 1: 2
- Sub B/Klas 2/Graad 2: 3
- Standerd 1/Graad 3: 4
- Standerd 2/Graad 4: 5
- Standerd 3/Graad 5: 6
- Standerd 4/Graad 6: 7
- Standerd 5/Graad 7: 8
- Standerd 6/Graad 8: 9
- Standerd 7/Graad 9: 10
- Standerd 8/Graad 10: 11
- Standerd 9/Graad 11: 12
- Standerd 10/Graad 12: 13
- Verdere onderrig – onvoltooid: 14
- Diploma/ander naskools – voltooid: 15
- Graad: 16

1.3 Wat is die taal wat die meeste tuis gepraat word? ________________________

Afdeling 2: INLIGTING OOR HUISHOUDING

2.2 Is die huis waarin jy woon:

- Die eiendom van jou gesin: 1

- Gehuur: 2

122
2.2  Is die volgende in jou huis:

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<th>Ja</th>
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2.3  Hoeveel mense woon en slaap gewoonlik in jou huishouding?

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Afdeling 3: EKONOMIESE FAKTORE

Nou wil ons graag ’n paar vrae oor jou en die werk wat jy doen, vra.

3.2  Watter soort werk doen jy? (Indien jy werk, wat is jou beroep? Byvoorbeeld boer, straathandelaar, laerskoolonderwyser, huishulp)

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<td>Werk</td>
<td>Ja</td>
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Indien u werk, spesifiseer
3.2 Dui asseblief aan watter van die volgende is jou bronne van inkomste. Antwoord asseblief hierdie vraag – of jy werk of nie.

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Indien ander, spesifiseer asseblief ________________________________________

3.3 Wat is u totaal huishoudelike inkomste? ____________________

3.4 Hoe gereeld ly die mense hier honger of het nie kos om te eet nie?(please tick)

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<td>Dikwels</td>
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3.5 Gedurend watter maande van die jaar, ly u honger? ____________________________

________________________________________________________ (maande van die jaar)

Afdeling 4. LEWENSGESKIEDENIS

Nou wil ek jou graag ’n paar vrae vra oor die plekke waar u al in jou leeftyd gewoon het:
4.1 Waar woon jy nou? (Dorp, stad, plaas)? ___________

Hoe lank woon jy al hier? _______________________(jare/maande)

**Indien op ’n plaas woon nie, skip na vraag 4.15**

4.2 Watter soort plaas is hierdie (waarmee word hier geboer)? ________________

4.2.1 Is hierdie plaas ’n uitvoerplaas? ____ (Ja/Nee)

Indien ja, waarnatoe uitvoer hierdie plaas hul gewasse? ______________________

_______________________________ (lande)

4.2.2 Is hierdie ’n Tesco plaas? ____ (Ja/Nee)

4.3 Hoe ver is jou huis van die naaste wingerd/lande? ________________ (meters)

4.4 Word gifstowwe gedurende die jaar op die wingerd/lande gespuit? ____ (Ja/Neee)

4.5 Wanneer laas was daar gifstowwe aangewend op die wingerd/boord. ____________ (aantal dae)

**Indien Ja, Voltooi die volgende:**

4.6 Hoeveel maande ’n jaar word gifstowwe op die plaas aangewend? ___________
Hoeveel dae in die maand word gifstowwe aangewend gedurende die bespuiting maande? ________________

Aantal dae in ’n jaar ______

4.7 Kom die gifstowwe in die huis in? ____ (Ja, Nee)

4.8 Kom u in kontak met gifstowwe buite die huis terwyl daar gespuit word?
   (b.v. wanneer u wasgoed buitekant gaan op hang)? ____ (Ja, Nee)

4.9 Wie wend gifstowwe aan op die plaas? _________________ (Mans, vrouens, albei)

4.10 Voorsien die plaas eienaar/bestuurder u vir klere van beskerming en Toerusting?(b.v. handskoene, oorpakke en maskers ens.) ____ (Ja/Nee)
    Indien ja, is dit gratis? ____ (Ja/Nee)

4.11 Het die plaas ’n stort vir plaaswerkers wie in aanraking kom met gifstowwe ____ (Ja/Nee)

4.12 Wanneer bespuiting plaasvind, word dit verwag van die werkers om in hierdie blokke te werk wat kortliks gespuit was? ____ (Ja/Nee)

4.13 Nadat hulle die gifstowwe aangewend het, hoeveel dae daarna gaan u terug wingerd/boorde toe? _______________ (aantal dae)

4.14 Dui aan hoe u die gifstowwe aanwend:
Trekker met balkspuit _____ (Ja/Nee)
Trekker sonder balkspuit _____ (Ja/nee)
Rugsak _____ (Ja/Nee)
Quad bike _____ (Ja/Nee)
Ander _____ (Ja/Nee) Indien ja, spesifiseer ___________________

4.15 Waar kom die drinkwater in jou huis vandaan? ____________________
(Munisipale water, opgaardam op berg, boorgat/fontein, rivierwater, plaasdam,
reënwatertenk, ens.)

4.16 Waar kom die water vir gebruiksdoeleindes in jou huis vandaan (b.v. bad of klere
was)?____________________________ (munisipale water, opgaardam op berg,
boorgat/fontein, rivierwater, plaasdam, reënwatertenk, ens.)

4.17 Het u in die verlede erens anders gewoon? _____ (Ja/Nee)

Indien Ja,

Gee asseblief besonderhede van die plekke waar u IN DIE VERLEDE gewoon het in die volgende tafel

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4.18 Was u gebore op ’n plaas waar hulle gifstowwe aangwend het? _____ (Ja/Nee)
Afdeling 5. WERKGESKIEDINIS

Huidige werk

5.1 Wat is u huidige beroep? ________________________________

5.2 Wat is u werkstitel? _____________________________

5.3 Hoeveel jare doen u die werk? _______ (jare)

5.4 Is u ’n lid van ’n vakbond? ____ (Ja/Nee)

5.5 Werk u huidiglik op ’n plaas? ____ (Ja/Nee)

Indien u op’n plaas werk, gaan voort van vraag 5.6 af

Indien u nie op ’n plaas werk nie, skip na vraag 5.12

5.6 Is u ’n permanent of seisoen plaaswerker? ____________________________

5.7 Indien u nie op die plaas woon waar u werk:

5.7.1 Met watter soort gewasse boer hierdie plaas ____________________________

5.7.2 Is hierdie plaas ’n uitvoerplaas? ____ (Ja/Nee)

Indien ja, waarnatoe uitvoer hierdie plaas hul gewasse? _________________

__________________________________________ (lande)
5.7.3 Die plaas waar u werk, is dit ’n Tesco plaas? ____ (Ja/Nee)

5.8 Werk u in die wingerd/boord? ___ (Ja/Nee)

5.9 Wend u gifstowwe aan? (mend/spuit) ___ (Ja/Nee)

5.9.1 Indien Ja, watter gifstowwe gebruik u? _______________________________

_______________________________ (name van die gifstowwe)

5.9.2 Wanneer laas het u gifstowwe aangewend? ________ (aantal dae)

5.9.3 Hoeveel maande ’n jaar wend u gifstowwe aan? _______ (aantal maande)

Hoeveel dae in die maand word gifstowwe aangewend gedurend die
bespuiting maande? ______________

Aantal dae in ’n jaar _______

5.10 Ry u ’n trekker terwyl anders, van agter die trekker, spuit? ____ (Ja/Nee)

Indien ja, hoeveel keer in ’n jaar? ____________________________

5.11 Watter klere van beskerming dra u? _______________________ (Dui aan met V = Voorskoot, S =

Steuwels, H = Handskoene, M = Masker, GM = Gasmasker, O = Oorpak, SB = Skermbril)

5.12 U klere van beskerming en toerusting, is dit gratis? ___ (Ja/Nee)
Vorige werk

Gee asseblief die besonderhede oor jou VORIGE werk met gifstowwe in die volgende tabel

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*Dui aan

Afdeling 6. ALKOHOLGEBRUIK

6.1 Drink jy alkohol of het u al voorheen alkohol gedrink? ____ (Ja/Nee)

Indien Ja,

6.2 Het jy al gevoel dat jy minder alkohol moet gebruik? ____ (Ja/Nee)

6.3 Het jy al kwaad geword as mense jou drinkgewoontes kritiseer? ____ (Ja/Nee)

6.4 Het jy al ooit sleg of skuldig gevoel oor jy alkohol gebruik? ____ (Ja/Nee)

6.5 Het jy al ooit vroeg in die oggend gedrink om beter te voel of om jou babelas beter te maak? ____ (Ja/Nee)
Afdeling 7. ROOK EN ANDER DWELM MIDDEL GEBRUIK

7.1 Het u al ooit al oor ’n jaar tabak, sigarette of pyp gerook ? ____ (Ja/Nee)

(‘Ja’ beteken ten minste 20 pakke sigarette of 30 gramme van tabak in ‘n leeftyd of ten minste een sigaret ‘n dag vir een jaar)

Indien Ja,

7.1.1 Hoe oud was u toe u begin rook? ____ (jaar oud)

7.1.2 Rook u op die huidige oomblik? ___ (Ja/Nee)

(‘Ja’ beteken rook in die afgelope maand of meer)

7.1.3 Indien nee, hoe oud was u toe u ophou? _______ (jaar oud)

7.1.4 Hoeveel rook u of het u ongeveer gerook?

Aantal sigarette ‘n dag ____

Pyp tabak in gramme/week ______

7.1.5 Haal u of het u die rook ingehaal? ____ (Ja/Nee)

7.2 In die afgelope 12 maande, was u gereeld bloedgestel aan tabak rook van ander mense wie sigarette en pyp rook? ____ (Ja/Nee)

(‘Gereeld’ beteken op meeste dae en aande)

7.3 Neem u dwelmmiddels of het enige dwelmmiddels voorheen gebruik? ____ (Ja/Nee)

7.3.1 Indien Ja, dui asseblief aan vir hoeveel jare _____ (jare)
Afdeling 8. GEBRUIK VAN HUISHOUDELIKE GIFSTOWWE

8.1 Gebruik jy enige gifstowwe in jou tuin of in jou huis? ____ (Ja / Nee)

(bv. Target of Doom )

Indien JA – watter gifstowwe gebruik u? ________________________________

____________________________________________________________________

8.2 Werk enige ander persoon in die huis met gifstowwe? ____ (Ja/Nee)

8.3 Word klere wat met gifstowwe besmet is, by die huis gewas? ____ (Ja/Nee)

8.4 Indien JA, word dit saam met ander wasgoed gewas? _____ (Ja/ Nee)

8.5 Eet jy vrugte of groente uit jou tuin? _____ (Ja/ Nee)

8.6 Gebruik jy leë plaagdoderhouers tuis vir huishoudelijke doeleinde? ____ (Ja/Nee)

8.7 Indien JA, waarvoor gebruik jy dit? ________________________________

Afdeling 9. MEDIESE, VOORPLANTING EN ASEMHALING GESKIEDINIS

9.6 Lei u aan:
Asma ______ (Ja/Nee)
Brongitis ______ (Ja/Nee)
TB ______ (Ja/Nee)
Ekseem ______ (Ja/Nee)
Hooikoors ______ (Ja/Nee)
Boer se longe ______ (Ja/Nee)
Ander siekte: ______ (Ja/Nee) indien ja, spesifiseer _____________________

_________________________________________________________________

9.7 Wat was u geboorte gewig? _______________
9.8 Op watter ouderdom het u puberteit bereik? _______
9.9 Was u al ooit vergif deur gifstowwe wat bevestig was deur ‘n dokter? ___(Ja, Nee)

Indien ja, hoeveel keer__________

9.10 Het u of voel u dikwels:

Duiselig ____ (Ja/Nee)
Mislik(naar) ___(Ja/Nee)
Hoofpyn ____ (Ja/Nee)

Prikkeling in u vel, neus of/en oog ______ (Ja/Nee)

Vel uitslag ______ (Ja/Nee)

Mislik (naar) en u wil opgooi ____ (Ja/Nee)

Verkoue of wonde wat oop is _____ (Ja/Nee)

Adeling 10 (Q16)
10.1 Voel u buitengewoon moeg?

10.2 Het u hartkloppens al het u nie geoefen nie?

10.3 Het u dikwels pynvolle prikkel sensasies in ’n gedeelte van jou liggaam?

10.4 Voel u dikwels geirriteerd sonder enige rede?

10.5 Voel u dikwels teneergedruk sonder enige rede?

10.6 Het u dikwels probleme met konsentrasie?

10.7 Is u kort van gedagte?

10.8 Sweet u dikwels sonder enige rede?

10.9 Het u enige probleme om u knope vas en los te maak?

10.10 Vind u dit oor die algemeen moeilik om koerante en boeke te verstaan?

10.11 Het u familie al vir u gese dat u kort van gedagte is?

10.12 Voel u soms ’n swaar drukking op u bors?

10.13 Moet u dikwels notas maak oor dinge wat u moet onthou?

10.14 Moet u dikwels teruggaan om seker te maak dat u sekere dinge gedoen het bv. Of die deur gesluit is?

10.15 Het u ’n hoofpyn ten minste een keer per week?
10.16a. Dink u dat dit minder is as ander persone van u ouerdom? (Ja/nee)

Afdeling 11. TYD VAN SWANGERSKAP

11.1 Was u al ooit swanger? ________ (Ja/Nee)

11.2 Indien ja, hoeveel keer? ______

11.3 Lys hoeveel keer toe u swanger was, het u swangerskap op ge-eindig in:

Lewendige geboortes _____
Dood geboortes _____
Miskraam _____
Ectopic/Swangerskap in die eierstok _____
Ander _____

11.4 VIR LEWENDIGE GEBOORTES EN DOOD GEBORTES ALLENLIK(nie tweelings nie) Voltooi die volgende tafel: (gee 'n antwoord vir elke baba)

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*mondeling(die pil), gekronkel of lissie, Kondome, diafragma (kap), ritme of ontrekking, ander

11.5 Is gesonheidsdienste toeganklik vir u om die volgende by te woon:

Swangerskap _____ (Ja/Nee)
Indien ja, watter dienste (hospitaal, kliniek) ___________________

Geboorte aan u kinders ____ (Ja/Nee)
Indien ja, watter dienste (hospitaal, kliniek) ___________________

Ginekologiesesorg ____ (Ja/Nee)
Indien ja, watter dienste (hospitaal, kliniek) ___________________

Seksuele oorsending siekte ____ (Ja/Nee)
Indien ja, watter dienste (hospitaal, kliniek) ___________________

Ander voorplantingsdienste ____ (Ja/Nee)
Indien ja, spesifiseer watter probleeme en watter dienste (hospitaal, kliniek)

______________________________________________________________

Adeling 12. ALLERGIESE GESONDHEIDSPROBLEEME

12.1 In die afgelope 12 maande, het u ‘n asemfluit of ‘n fluit van keel op u bors al ooit gehad al? ______ (Ja/Nee)

Indien ja, gaan voort met 12.2
Indien nee, gaan voort met 12.4

12.2 Was u kort van asem toe die geluid van die asemfluit teenwoordig was? ____ (Ja/Nee)
12.3 Het u die asemfluit/semhyg gehad terwyl u nie griep of verkoue gehad het nie ____ (Ja/Nee)

12.4 Het u al ooit wakker kom word deur 'n gevoel van u bors wat toe trek? _____ (Ja/Nee)

12.5 In die afgelope 12 maande, het u al ooit 'n aanval gehad deur kort van asem wees gedurende die dag terwyl u rustig gewees het? ____ (Ja/Nee)

12.6 In die afgelope 12 maande, het u al ooit wakker kom word deur 'n aanval van hoes? _____ (Yes/No)

12.7 Het u al ooit aan asma gelei? ____ (Ja/Nee)

**Indien ja, gaan voort met 12.7.1**

**Indien nee, skip na vraag 12.8**

12.7.1 Indien ja, was dit bevestig deur 'n dokter?

12.7.2 Hoew oud was u toe u ingelig was dat u aan asma lei? _____ (jare oud)

12.7.3 In die afgelope 12 maande, het u 'n aanval van asma gehad? ____ (Ja/Nee)

12.7.4 Gebruik u enige medisyne, ingesluit met pompe/opsnuifers, nebulizers, stroop of pille vir asma of asemhalingsprobleeme? ____ (Ja/Nee)

12.8 Wanneer u naby diere of in stowwewige gedeeltes is van die huis, kry u ooit 'n gevoel van toetrek in u bors? _____ (Ja/Nee)
12.9 As u op 'n plaas werk, trek u bors toe of 'n asemfluit wanneer u in die:

12.9.1 Wingerd/boord werk ____ (Ja/Nee)

12.9.2 Pakstoor werk ____ (Ja/Nee)

12.9.3 Ander ____ (Ja/Nee) Indien ja, spesifiseer asseblief ________________

12.10 In die afgelope 12 maande, het u al ooit nasaal allergies probleeme saam met hooikoors of kraperige en waterige oe en neus gehad? ____ (Ja/Nee)

12.11 As u op 'n plaas werk, kry u kraperige/waterige oe of neus wanneer u in die:

12.11.1 Wingerd/boord werk ____ (Ja/Nee)

12.11.2 Pakstoor werk ____ (Ja/Nee)

12.11.3 Ander ____ (Ja/Nee) Indien ja, spesifiseer asseblief ________________

12.12 In die afgelope 12 maande, het u enige vel probleeme gehad? ____ (Yes/No)

12.13 As u op 'n plaas werk, kry u rooi kraperige puisies wanneer u in die:

12.13.1 Wingerd/boord werk ____ (Ja/Nee)

12.13.2 Pakstoor werk ____ (Ja/Nee)

12.13.3 Ander ____ (Ja/Nee) Indien ja, spesifiseer asseblief ________________

12.14 In die afgelope 12 maande, apart van u werk, was u blootgestel aan enige gifstowwe? ____ (Ja/Nee)

DANKIE DAT U AAN HIERDIE STUDIE DEELGENEEM HET
B Consent Form
Consent to participate in a survey investigating health effects due to pesticide exposures on women from the rural Western Cape

1. Title of research project

Health effects due to pesticide exposure amongst rural women residents in the Western Cape

2. Names of the researchers
Mohamed Aqiel Dalvie (BSc, Honours, MSc, PhD)
Algernon Africa (BTech)
Vicky Major (MSc)
Lungiswa Giwane
Jean May

3. Purpose of research

This study is being conducted by The University of Cape Town to investigate the health effects of pesticides on women in the Western Cape. We would like to conduct measurements on you. The study will be of benefit to women living in farming areas and who are exposed to pesticides in the environment.

4. Description of the research project

Your son will be required to produce a urine and 2 blood samples and undergo a respiratory test and you will complete a questionnaire.

a) Questionnaire: A member of our study team will interview you in privacy to complete the questionnaire. You will be asked questions about general personal information, your general medical health, and lifetime environmental exposure to pesticides.

b) Urine sample: You will produce a urine sample (in privacy) in a plastic container and give it to the nurse. The sample will be analysed for pesticides.
c) **Blood sample:** A nurse will draw 14 ml blood from a vein on your arm. The blood will be analysed for to test your allergy status and for pesticide residues.

d) **Respiratory test:** A nurse will perform a respiratory test.

5. **Risks and discomforts of the research**

   a) **From the blood tests.** A single needle stick will be felt when the blood is taken. Sometimes a small bruise may occur from the needle stick, but this is minor and will heal quickly. The total amount of blood taken is quite small and the body will quickly replace it. Blood samples will be used only to measure allergy and will be destroyed at the end of the study.

   b) **From the questionnaire.**

   There are minimal risks associated with completing the questionnaire. The only risk is a loss of confidentiality about personal information but the data will be seen only by study personnel. All reports will present aggregate data in which individuals will not be identifiable.

6. **Expected benefits to you and others**

   Your health will be assessed for free.

   Refreshments will be provided as compensation for time in participating in the study.

   This study on the health effects of pesticides will benefit women living in farming areas and who are exposed to pesticides in the environment. Steps can be taken to reduce or prevent exposure to the pesticides or the pesticide can be banned. The blood and urine results can be used to develop ways in which the amount of pesticides in your body can be monitored.

7. **Costs to you resulting form participation in the study**
The study is offered at no cost to you.

8. Confidentiality of information collected

Study participants will not be personally identified in any reports on this study. The records will be kept confidential to the extent provided by law. The records, including any identification information, will be destroyed after the results have been fully analysed.

9. Documentation of the consent

One copy of this document will be kept together with our research records on this study. A second copy will be given to you to keep.

10. Contact person.

You may contact the following person for answers to further questions about the research, your rights, or any injury you may feel is related to the study.

Name of person: MA Dalvie (The principal investigator) telephone 021 4066610
Name of person: Lamees Emjedi (Ethics administrator) telephone 021 4066492

11. Voluntary nature of participation

Your participation in this project is voluntary. Subsequent to your consent, you may refuse to participate in or withdraw from the study at any time without penalty or loss of benefits to which you may otherwise be entitled.

12. Consent of the participant

I have read the information given above. I understand the meaning of this information. I hereby consent to participate in the study.

____________________________  _______________________
Printed name of participant    signature
Letter of Approval from Research Ethics Committee

31 October 2009

REC REF: 295/2009

Dr. M. J. Doble
Professor

Dear Dr. C. Calleja,

I am pleased to inform you that the Research Ethics Committee has formally approved the above-mentioned study.

The project title is "Health effects due to pesticide exposure amongst rural women in the Western Cape.

Approval is granted for one year, until 31 October 2010.

Please ensure that all ethical requirements are met and that the study is conducted in accordance with the guidelines provided.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please sign the REC REF on all your correspondence.

Yours sincerely,

[Signature]

Professor M. J. Doble
Chairperson, Research Ethics Committee

P.O. Box 12000, Cape Town 8000, South Africa

Tel: +27 (0) 21 408 1777
Fax: +27 (0) 21 408 1776

Letter of Approval from Research Ethics Committee
Annual Progress Report

Date: 25/2/2013
HREC REF Number: A9212009

Protocol number (if applicable) & Protocol title:
- Title of full study: Health effects due to pesticide exposure amongst rural women residents in the Western Cape
- Title of sub-study: Asthma and allergy due to pesticide exposure amongst rural women residents in the Western Cape/ Relationship between pesticide residues and asthma outcomes among women farm workers

Principal Investigator: M A Dalvie

Department / Office / Institutional Mail Address:
School of Public Health and Family Medicine

List of documentation:

N/A

HREC office use only (FWA00001637; IRB00001938)

☐ Approved
☐ Not approved
☐ Expedited
☐ Full committee

Type of review:
- Expiration date: 15 March 2014

Signature:

Date: 27/...
E. Authors instruction

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Reference to a book:
Reference to a chapter in an edited book:
Mettam, G.R., Adams, L.B., 2009. How to prepare an electronic version of your article, in: Jones, B.S.,

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The effects of previous pesticide poisoning on the results

Table 1  Analysis including Pest- poisoning

<table>
<thead>
<tr>
<th>Pesticide exposure</th>
<th>Odds Ratio/ Regression Coefficient (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>History of ever living and/or working on farm</td>
</tr>
<tr>
<td>Q16 Outcomes</td>
<td></td>
</tr>
<tr>
<td>Tired</td>
<td>3.31(1.64-7.36)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>4.73(1.98-11.31)</td>
</tr>
<tr>
<td>Tingling</td>
<td>4.72(1.94-11.50)</td>
</tr>
<tr>
<td>Irritated</td>
<td>4.25(1.82-9.95)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.89(0.87-4.11)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>4.15(1.59-10.80)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>2.94(1.34-6.45)</td>
</tr>
<tr>
<td>Perspire</td>
<td>4.35(1.42-13.31)</td>
</tr>
<tr>
<td>Button</td>
<td>5.83(0.56-60.74)</td>
</tr>
<tr>
<td>Reading</td>
<td>2.16(0.79-5.86)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>1.34(0.54-3.36)</td>
</tr>
<tr>
<td>Chest</td>
<td>5.21(1.90-14.25)</td>
</tr>
<tr>
<td>Notes</td>
<td>1.55(0.64-3.77)</td>
</tr>
<tr>
<td>Check door</td>
<td>1.90(0.85-4.23)</td>
</tr>
<tr>
<td>Headache</td>
<td>2.13(0.91-5.00)</td>
</tr>
<tr>
<td>Less sex</td>
<td>1.70(0.78-3.73)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>2.69(1.71-10.14)</td>
</tr>
<tr>
<td>Q16 score50</td>
<td>5.31(2.22-12.69)</td>
</tr>
<tr>
<td>Q16 score75</td>
<td>5.01(1.76-14.25)</td>
</tr>
</tbody>
</table>

Confounder: Age, level of education, drugs, current smoking, alcohol consumption, household income, language, past pesticide poisoning
Table 2 Example of Analysis excluding past pesticide poisoning

<table>
<thead>
<tr>
<th></th>
<th>History of ever living and/or working on farm</th>
<th>Born on farm</th>
<th>Household pesticides</th>
<th>Farm vs. Town Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tired</td>
<td>3.3 (1.46-7.36)</td>
<td>0.93 (0.50-1.78)</td>
<td>0.59 (0.07-4.77)</td>
<td>4.04 (2.07-7.76)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>4.35 (1.87-10.14)</td>
<td>1.24 (0.66-2.41)</td>
<td>0.42 (0.04-4.59)</td>
<td>3.590 (1.70-6.78)</td>
</tr>
<tr>
<td>Tingling</td>
<td>4.39 (1.85-10.4)</td>
<td>0.83 (0.49-1.62)</td>
<td>0.44 (0.04-5.07)</td>
<td>3.71 (1.88-7.74)</td>
</tr>
<tr>
<td>Irritated</td>
<td>3.98 (1.74-9.12)</td>
<td>0.76 (0.48-1.45)</td>
<td>1 (omitted)</td>
<td>4.17 (2.09-8.36)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.87 (0.87-4.04)</td>
<td>0.90 (0.59-1.69)</td>
<td>0.39 (0.04-4.10)</td>
<td>2.60 (1.38-4.88)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>4.08 (1.59-10.80)</td>
<td>1.36 (0.67-2.77)</td>
<td>0.93 (0.09-9.95)</td>
<td>1.80 (0.91-4.12)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>2.91 (1.34-6.45)</td>
<td>1.46 (0.78-2.79)</td>
<td>1.50 (0.20-11.73)</td>
<td>3.02 (1.56-5.80)</td>
</tr>
<tr>
<td>Perspire</td>
<td>4.33 (1.42-13.31)</td>
<td>1.05 (0.49-2.29)</td>
<td>0.75 (0.07-8.20)</td>
<td>1.79 (0.98-3.66)</td>
</tr>
<tr>
<td>Button</td>
<td>5.01 (0.56-60.74)</td>
<td>1.18 (0.08-4.94)</td>
<td>10.07 (1.73-146.18)</td>
<td>0.88 (0.19-3.25)</td>
</tr>
<tr>
<td>Reading</td>
<td>2.15 (0.79-5.86)</td>
<td>1.05 (0.51-2.32)</td>
<td>2.70 (0.34-21.37)</td>
<td>1.57 (0.76-3.65)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>1.33 (0.54-3.36)</td>
<td>1.92 (0.68-4.25)</td>
<td>4.55 (0.58-35.88)</td>
<td>2.02 (0.98-4.16)</td>
</tr>
<tr>
<td>Chest</td>
<td>4.65 (1.90-14.25)</td>
<td>0.62 (0.32-1.29)</td>
<td>2.34 (0.30-18.91)</td>
<td>3.74 (1.97-8.33)</td>
</tr>
<tr>
<td>Notes</td>
<td>1.50 (0.64-3.77)</td>
<td>1.01 (0.49-2.19)</td>
<td>0.78 (0.08-9.05)</td>
<td>2.97 (1.92-5.48)</td>
</tr>
<tr>
<td>Check door</td>
<td>1.75 (0.85-4.23)</td>
<td>1.27 (0.81-2.54)</td>
<td>1.11 (0.16-9.30)</td>
<td>3.10 (1.60-6.00)</td>
</tr>
<tr>
<td>Headache</td>
<td>2.10 (0.91-5.00)</td>
<td>0.78 (0.40-1.56)</td>
<td>0.38 (0.05-3.03)</td>
<td>9.45 (4.36-20.40)</td>
</tr>
<tr>
<td>Less sex</td>
<td>1.70 (0.78-3.73)</td>
<td>0.70 (0.98-1.32)</td>
<td>0.48 (0.05-5.02)</td>
<td>1.45 (0.50-2.40)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>2.64 (1.71-10.14)</td>
<td>2.02 (0.72-6.10)</td>
<td>0.07 (0.01-0.60)</td>
<td>58.41 (6.96-524.51)</td>
</tr>
<tr>
<td>Q16 score50</td>
<td>4.46 (2.22-12.69)</td>
<td>0.77 (0.32-1.51)</td>
<td>0.66 (0.13-7.92)</td>
<td>5.65 (2.62-10.59)</td>
</tr>
<tr>
<td>Q16 score75</td>
<td>4.46 (1.76-14.25)</td>
<td>1.59 (0.77-3.54)</td>
<td>2.41 (0.32-19.72)</td>
<td>3.25 (1.39-6.87)</td>
</tr>
</tbody>
</table>

Confounder: Age, level of education, drugs, current smoking, alcohol consumption, household income, language

Conclusion

The inclusion or exclusion of previous pest- poisoning does not affect the study results substantially
Table 3: Example of Multivariate analysis excluding participants who are 50 years and older

<table>
<thead>
<tr>
<th>Organophosphate metabolites</th>
<th>Dialkyl phosphates. Odds Ratio</th>
<th>Regression Coefficient (95% Confidence Interval)</th>
<th>Chlorpyrifos metabolite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DMP</td>
<td>DMTP</td>
<td>DMDTP</td>
</tr>
<tr>
<td>Q16 outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tired</td>
<td>0.997(0.985-1.009)</td>
<td>1.001(0.996-1.005)</td>
<td>0.998(0.995-1.005)</td>
</tr>
<tr>
<td>Heart palpitations</td>
<td>0.995(0.977-1.002)</td>
<td>0.987(0.995-1.009)</td>
<td>1.002(0.998-1.006)</td>
</tr>
<tr>
<td>Tingling</td>
<td>1.003(0.989-1.009)</td>
<td>0.982(0.995-1.003)</td>
<td>0.999(0.995-1.004)</td>
</tr>
<tr>
<td>Irritated</td>
<td>0.997(0.985-1.008)</td>
<td>1.001(0.997-1.005)</td>
<td>1.000(0.996-1.005)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.002(0.991-1.013)</td>
<td>1.000(0.996-1.004)</td>
<td>0.999(0.996-1.003)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>1.009(0.997-1.022)</td>
<td>1.000(0.996-1.005)</td>
<td>0.997(0.995-1.003)</td>
</tr>
<tr>
<td>Short term memory</td>
<td>1.005(0.994-1.014)</td>
<td>1.000(0.996-1.005)</td>
<td>1.000(0.997-1.005)</td>
</tr>
<tr>
<td>Perspire</td>
<td>0.956(0.985-1.014)</td>
<td>1.001(0.996-1.007)</td>
<td>0.998(0.994-1.004)</td>
</tr>
<tr>
<td>Button</td>
<td>1.010(0.984-1.035)</td>
<td>1.003(0.996-1.010)</td>
<td>0.994(0.980-1.007)</td>
</tr>
<tr>
<td>Reading</td>
<td>0.985(0.983-1.100)</td>
<td>1.005(1.001-1.010)</td>
<td>0.999(0.995-1.005)</td>
</tr>
<tr>
<td>Fam mem</td>
<td>0.996(0.983-1.101)</td>
<td>0.992(0.991-1.002)</td>
<td>1.002(0.998-1.006)</td>
</tr>
<tr>
<td>Chest</td>
<td>0.995(0.979-1.006)</td>
<td>1.001(0.997-1.006)</td>
<td>1.004(0.999-1.009)</td>
</tr>
<tr>
<td>Notes</td>
<td>1.001(0.995-1.022)</td>
<td>1.004(0.999-1.009)</td>
<td>0.997(0.993-1.005)</td>
</tr>
<tr>
<td>Check door</td>
<td>1.006(0.995-1.018)</td>
<td>1.000(0.996-1.004)</td>
<td>1.999(0.993-1.001)</td>
</tr>
<tr>
<td>Headache</td>
<td>0.994(0.983-1.007)</td>
<td>1.001(0.997-1.006)</td>
<td>0.998(0.995-1.004)</td>
</tr>
<tr>
<td>Less sex</td>
<td>0.991(0.982-1.005)</td>
<td>0.989(0.995-1.007)</td>
<td>0.996(0.995-1.000)</td>
</tr>
<tr>
<td>Q16 score</td>
<td>1.002(0.984-1.020)</td>
<td>1.002(0.996-1.006)</td>
<td>0.999(0.993-1.006)</td>
</tr>
<tr>
<td>Q16 score50</td>
<td>1.000(0.989-1.012)</td>
<td>1.001(0.997-1.005)</td>
<td>0.987(0.996-1.005)</td>
</tr>
<tr>
<td>Q16 score75</td>
<td>1.006(0.992-1.019)</td>
<td>1.002(0.997-1.007)</td>
<td>1.000(0.995-1.005)</td>
</tr>
</tbody>
</table>

Confounder: Age, level of education, drugs, current smoking, alcohol consumption, household income, language, past pesticide poisoning. N = 177

**Summary** - Exclusion of women over 49 years of age does not change the results substantially.
### Template for submission of dissertation corrections/revisions

**Candidate:** Motsoeneng Mamonyowe Portia  
**Degree:** Master Public health  
**Department:** Public health and family medicine  
**Title:** Relationship between urinary pesticide residue levels and neurotoxicity among women on farms in the Western Cape  
**Supervisors:** Mahomed Aqiel Dalvie  

### Examiner 1 - (Give name of examiner if known)

<table>
<thead>
<tr>
<th>Original dissertation</th>
<th>Corrected/Revised dissertation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Comment 1, pg 63</td>
<td>In what?</td>
</tr>
<tr>
<td></td>
<td>Now on pg 62 Changes made, Paragraph1 line 1</td>
</tr>
<tr>
<td>2 Comment 2, pg 64</td>
<td>Not clear what you mean here</td>
</tr>
<tr>
<td></td>
<td>Now on pg 63 Changes made, Paragraph1 line 3-4</td>
</tr>
<tr>
<td>3 Comment 3, pg 64</td>
<td>In blood?</td>
</tr>
<tr>
<td></td>
<td>Now on pg 63 Changes made Paragraph 2, Line 1</td>
</tr>
<tr>
<td>4 Comment 5, pg 64</td>
<td>Split into the two groups</td>
</tr>
<tr>
<td></td>
<td>Now on pg 63 Changes made Paragraph 4, Line 1</td>
</tr>
<tr>
<td>5 Comment 5-10, pg 64</td>
<td>In which group. Univariate results of Farm Group and Town Group in Abstract to be split.</td>
</tr>
<tr>
<td></td>
<td>Now on pg 63 Changes made Paragraph 4, Line 5-8</td>
</tr>
<tr>
<td>6 Comment 11, pg 65</td>
<td>Be specific, individual Q 16 item, if so please specify!!</td>
</tr>
<tr>
<td></td>
<td>Now on pg 64 Changes made Paragraph1, Line 4</td>
</tr>
<tr>
<td>7 Comment 12, pg 65</td>
<td>What about the lack of association with OP shouldn’t that be mentioned either?</td>
</tr>
<tr>
<td></td>
<td>Now on pg 64 Changes made Paragraph2, Line 2-3</td>
</tr>
<tr>
<td>8 Comment 13, pg65</td>
<td>Like which? List Neurotests</td>
</tr>
<tr>
<td></td>
<td>Now on pg 64 Changes made Paragraph2, Line 4-5</td>
</tr>
<tr>
<td>9 Comment 14, pg66</td>
<td>Unclear what is meant here, brain damage of any cause or specifically from pesticide exposures?</td>
</tr>
<tr>
<td></td>
<td>Now on pg 65 Changes made Paragraph 1, Line 4</td>
</tr>
<tr>
<td>10 Comment 15, pg67</td>
<td>You are just presenting one and there seems to be at least another one (Bouchard et al. 2010)</td>
</tr>
<tr>
<td></td>
<td>Now on pg 66 Details of both studies investigating the relationship between biological levels of pesticides and neurotoxic outcomes were included in the text on paragraph 1, line</td>
</tr>
<tr>
<td>Comment, pg</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>11 Comment 16, pg67</td>
<td>This should go to materials and methods</td>
</tr>
<tr>
<td>12 Comment 17, pg67</td>
<td>Any evidence, references for this rather sweeping statement?</td>
</tr>
<tr>
<td>Comment 18, pg67</td>
<td>Please make clear what this analysis entails. Which part of the larger study are you addressing and what exactly is your aim and which research questions will you try to answer!</td>
</tr>
<tr>
<td>Comment 19, pg68</td>
<td>Any selection criteria use. E.g. age criteria, etc.</td>
</tr>
<tr>
<td>Comment 20, pg68</td>
<td>So was the actual grouping based on being a female agricultural worker or based on residence: farm versus town?</td>
</tr>
<tr>
<td>Comment 21, pg69</td>
<td>This is hard to follow. A diagram showing the different groups and color coding the nto show how they were</td>
</tr>
<tr>
<td>Comment 22, pg69</td>
<td>One could argue to leave out the farm workers not living on farms and similarly exclude the people living on farms but not working on farms. In order to create more contrast in exposure between the groups.</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Comment 23, pg69</td>
<td>why not more specific items on pesticide related work? E.g. being an applicator, re-entry work etc.</td>
</tr>
<tr>
<td>Comment 24, pg70</td>
<td>Sentence is not correct</td>
</tr>
<tr>
<td>Comment 25, pg71</td>
<td>Why, how many??, please be more specific</td>
</tr>
<tr>
<td>Comment 26, pg72</td>
<td>Again be more specific present the actual LOD and indicate how many samples were below LOD</td>
</tr>
<tr>
<td>Comment 27, pg73</td>
<td>Unclear sentence</td>
</tr>
<tr>
<td>Comment 28, pg73</td>
<td>Unclear what you exactly have been testing here</td>
</tr>
<tr>
<td>Comment 29, pg73</td>
<td>Previous poisoning ?? and why not excluded?? If you are looking at environmental exposure</td>
</tr>
<tr>
<td>Comment 30, pg73</td>
<td>Interactions ...?? What exactly do you mean?</td>
</tr>
</tbody>
</table>
These were the products between each exposure variable and a suspected effect modifier. For all the outcomes, an interaction term between the variable and the exposure variable of interest was included in the model. If this interaction term was significant (p<0.05), the variable would be an effect modifier. None of the interaction terms were significant so all were not retained in the models.

| Comment 31, pg74 | Why just this fact? | Now on pg 73 | More details on participation were added to the text and in Table1. Most of the details has already been described in the methods section on sampling. |
| Comment 32, pg74 | Provide percentages! | Now on pg 73 | Change made paragraph3 line1 |
| Comment 33, pg74 | Why (age higher in Town Group) | Now on pg 74 and 166 | The reason for the higher median age of the Town Group was given and also that excluding women > 50 years did not change the results. |
| Comment 34, pg74 | What matters is whether the groups were different. | Now on pg 74 | The text now state if the results in the two groups were different. |
| Comment 35, pg75 | Provide percentages, significant or not? | Now on pg 74 | Changes made paragraph 2. |
| Comment 36, pg75 | Why only this one with one decimal? | Now on pg 75 | All the results in Table 1 were rounded to 1 decimal |
| Comment 37, pg76 | Which test have you used for this? | Now on pg 75 | Described in Table 1 |
| Comment 38, pg76 | What about exposures at work? | Now on pg 77 | Occupational exposures were added to Table 2 and described in the text in the first paragraph of page 76. |
| Comment 39, pg76 | There are also symptoms in this table..... | Now on pg 77 | Symptoms were deleted from the Table2. |
| Comment 40, pg77 | Only discuss the ones that are statistically significant | Now on pg 77 | Changes made paragraph 1 -2 |
different between the two groups. The others should be seen as not being different between the two groups of individuals.

<table>
<thead>
<tr>
<th>Comment 41, pg 77-8</th>
<th>Add numbers of samples within each group</th>
<th>Now on pg 79</th>
<th>Requested changes were made to Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comment 42, pg 78</td>
<td>These * are hard to see, maybe place them after the percentage of the farm group?</td>
<td>Now on pg 81</td>
<td>Requested changes were made to Table 4</td>
</tr>
<tr>
<td>Comment 43, pg 79</td>
<td>So do I understand this correctly that you’ve lumped the two groups together for this analysis?</td>
<td>Now on pg 82</td>
<td>For multivariate analysis various exposure indices were used to investigate the relationship between pesticide exposures and outcomes including farm group, history of ever living on a farm, born on a farm. This has now been stated more clearly in the text.</td>
</tr>
<tr>
<td>Comment 44, pg 79</td>
<td>Please focus on the ones that are really statically significantly different from</td>
<td>Now on pg 82</td>
<td>Changes made paragraph 1-2; The associations not exceeding 1 were deleted from the text which now only list the significant associations.</td>
</tr>
<tr>
<td>Comment 45, pg 81</td>
<td>Please use bold to indicate the significant ones</td>
<td>Now on pg 83-5</td>
<td>Changes made table 5a,b,c</td>
</tr>
<tr>
<td>Comment 46, pg 81</td>
<td>I don’t understand how the ORs can be so different between the first column and the last. These classifications must be almost the same??</td>
<td>Now on pg 84</td>
<td>The classifications are not the same – Farm Group/Town group refers to current residence which is different to history of ever living on a farm. Table 1 shows that 26 women (29%) in the Town Group actually previously lived on a farm. The results was checked and confirmed to be correct. The results are now presented to 3 decimals rather than rounded to 1 as done previously for many of the associations.</td>
</tr>
<tr>
<td>Comment 47, pg 85</td>
<td>What kind of models are we looking at? And why are they all so close to 1.00? Especially the chlorpyrifos results are unexpected, because we saw the biggest differences between the groups for this metabolite see table 3. These ORs should be presented per standard amount of increase in conc of the metabolite</td>
<td>Now on pg 84-85</td>
<td>The results presented in the table are ODs from logistic regression analysis where the outcomes were dichotomous (individual symptoms and dichotomous categories) and regression coefficients for linear regression analysis for continuous outcomes (symptom score). We agree that the results are strange in that they are all close to one but these results have been checked several times including by a statistician. The output is attached. The change in outcome per unit increase exposure is actually applicable to linear regression analysis and is applicable when both outcome and exposure are continuous. The latter is only applicable for the symptom score.</td>
</tr>
<tr>
<td>Comment 48, pg 85</td>
<td>You only present one of these groupings? Or am I missing something</td>
<td>Now on pg 83</td>
<td>The results of the relationship between Q16 symptoms and currently living or working on a farm (Farm Group / Non-Farm Group) and history of ever living on a farm (Table 5 a) are presented in the paper.</td>
</tr>
<tr>
<td>Comment 49, pg 85</td>
<td>But you are not testing the effects of poisoning, you use it as a confounder to correct for …???</td>
<td>Now on pg 86</td>
<td>The text in the last part of the 1st paragraph was changed as follows “The neurotoxic effect of pesticide exposure was found even when controlling for pesticide poisoning which have not previously been demonstrated with the Q16 questionnaire.”</td>
</tr>
</tbody>
</table>
Previous studies in Nicaragua and California have shown significantly higher positive symptoms responses in those that experienced poisoning compared to a non-poisoned group (Rosenstock et al 1991) Steenland et al 1994, Wesseling et al 2002). This is also the first study that has found an association between neurotoxicity and pesticide exposure only in women.

<table>
<thead>
<tr>
<th>Comment</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>50, pg 86</td>
<td>But you saw a significant difference between the farm and town group!!??</td>
</tr>
<tr>
<td>51, pg 86</td>
<td>Do you mean the town group? What are acute pesticides? Are these levels comparable to the low levels found in your study</td>
</tr>
<tr>
<td>52, pg 87</td>
<td>Like what? What could you have done better with a bigger budget</td>
</tr>
<tr>
<td>53, pg 87</td>
<td>Than what?</td>
</tr>
<tr>
<td>Comment 54, Examiners report</td>
<td>Discussion of the cross-sectional design of the study and comparing largely different groups (age, income and employment status)</td>
</tr>
</tbody>
</table>

The following sentences were added to the discussion section: paragraph 2 “A key limitation in this study is the cross-sectional design; consequently it cannot be established with certainty if the associations are the result of a temporal relationship between pesticide exposure and outcomes. A longitudinal design whereby pesticide exposure especially urinary pesticide metabolites and neurotoxic outcomes are measured repeatedly over time would be more powerful. With respect to the comparison of Q16 symptoms between the Farm Group and Town Group, the healthy worker commonly observed in cross-sectional studies may have resulted in farm workers affected by pesticides to move to towns and thereby reducing the level of neurotoxicity in the Farm Group. However, the study results show Q16 symptoms were significantly higher in the Farm Group (Table 5a) despite a possible health worker effect. Additionally, Q16 symptoms were significantly higher among women with a history of ever living and/or working on farm compared to those not (Table 5a). Furthermore sub-analyses excluding town women who had
previously lived or worked on farm from the analyses did not change the results found. Another important limitation in the study is the fact that age, income and employment status in the Farm Group and Town Group were different. These variables were not found to have strong associations with the Q16 symptoms in bivariate analysis and age and income were controlled for in multivariate analysis as they were included apriori. There might, however, have been residual confounding especially with income as the only indicator of socio-economic status.”

<table>
<thead>
<tr>
<th>Comment 55, Examiners Report</th>
<th>More structured literature review focussing solely focussing on pesticide exposure of women and neurologic symptoms of women is clearly needed. Addressing reproductive health effects and health effects of children are not relevant to this thesis.</th>
<th>Now on pg 39-60</th>
<th>The literature review in Part B as well as Part C has been revised as suggested by the reviewer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comment 56, Examiners Report</td>
<td>Occupational exposure is hardly addressed at all in the analyses.</td>
<td>Now on pg 69</td>
<td>Please refer to response to Comment 23.</td>
</tr>
<tr>
<td>Comment 57, Examiners Report</td>
<td>Doubts whether logistic regression analysis is correct. Contradictions between bivariate analyses and multivariate analyses.</td>
<td>Now on pg 82</td>
<td>Please refer to response to Comment 44.</td>
</tr>
<tr>
<td>Comment 58, Examiners Report</td>
<td>Why was pesticide poisoning not analysed as an exposure factor rather than as a confounder.</td>
<td>Now on pg 163-5</td>
<td>Pesticide poisoning was not analysed as an exposure factor because this has been studied extensively in the literature and the study focussed on effects after controlling for poisoning. Analysis was conducted excluding previous poisoning, but this did not have any effect on the study.</td>
</tr>
<tr>
<td>Comment, Examiners Report</td>
<td>Original dissertation</td>
<td>Corrected/Revised dissertation</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>-----------------------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td>Comment 59, Examiners Report</td>
<td>It would be insightful to show the distributions of the metabolites in each group graphically (e.g. as box plots)</td>
<td>Box plots of the distributions of the metabolites has been included in an additional appendix.</td>
<td></td>
</tr>
<tr>
<td>Comment 60, Examiners Report</td>
<td>A more critical assessment of the results compared to that of other studies is warranted in the discussion section of the manuscript</td>
<td>A more critical assessment of the results compared to that of other studies has been included in the discussion section.</td>
<td></td>
</tr>
</tbody>
</table>

**Examiner 2 – (Give name of examiner if known)**

<table>
<thead>
<tr>
<th>Original dissertation</th>
<th>Corrected/Revised dissertation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Comment 1, Examiners Report</td>
<td>The literature review would have been more illuminating if it were more on the pesticides tested and not generalise to all pesticides.</td>
</tr>
<tr>
<td>2 Comment 2, Examiners Report</td>
<td>Compare urinary levels of pesticides with recent exposures</td>
</tr>
<tr>
<td>3 Comment 3, Examiners Report</td>
<td>Implications of pesticide half lives and their effect on levels must be included in the discussion.</td>
</tr>
<tr>
<td>Comment 4, Examiners Report</td>
<td>The abstract needs to be revised to make it clearer. More results should be included.</td>
</tr>
<tr>
<td>Comment 5, Examiners Report</td>
<td>Table 5b appears unnecessary.</td>
</tr>
</tbody>
</table>

**Student signature:** _________________________

**Date:** _________________________
. logistic tired dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
ote: drugs != 0 predicts success perfectly
    drugs dropped and 2 obs not used

Logistic regression                          Number of obs =  160
            LR chi2(8)  =   17.05
            Prob > chi2 = 0.0295
Log likelihood = -100.56933                  Pseudo R2  =  0.0782

------------------------------------------------------------------------------
tired | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmp_cr |   .9994092   .0032436    -0.18   0.856     .9930722    1.005787
age |   .9684146   .0172377    -1.80   0.071     .9352118    1.002796
levledu |   1.044191   .0711768     0.63   0.526     .9136047    1.193444
hous_inc |   .9998267   .0000697    -2.49   0.013     .9996902    .9999633
drink |   .4749821   .1935953    -1.83   0.068     .2136686    1.055878
smoke |   1.345191   .5337471     0.75   0.455     .6180772     2.92769
pest_pois |   1.981419   1.760936     0.77   0.442     .3471305    11.30993
lang12 |   .6438085    .477134    -0.59   0.552     .1506334    2.751643
    drugs |  (omitted)
    _cons |    11.6814   15.94855     1.80   0.072     .8041817   169.6819
------------------------------------------------------------------------------

. logistic hart_palp dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
    drugs dropped and 2 obs not used

Logistic regression                          Number of obs =  160
            LR chi2(8)  =   10.52
            Prob > chi2 = 0.2304
Log likelihood = -102.42211                  Pseudo R2  =  0.0488

------------------------------------------------------------------------------
hart_palp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmp_cr |   .9956386   .0036047    -1.21   0.227     .9885999    1.002727
age |   .9615507   .0177479    -2.12   0.034     .9273872    .9969272
levledu |   .9769647   .0662232    -0.34   0.731     .8554222    1.115777
hous_inc |   .9999363   .0000659    -0.97   0.334     .9998071    1.000066
drink |   .6298993   .2478933    -1.17   0.240     .2912632    1.362249
smoke |   .8728359   .3389064    -0.23   0.815     .4077809    1.884265
pest_pois |   3.020262   2.505184     1.33   0.183     .5943026    15.34905
lang12 |   1.636818   1.123830     0.72   0.473     .4261579    6.28681
    drugs |  (omitted)
    _cons |    11.6814   15.94855     1.80   0.072     .8041817   169.6819
------------------------------------------------------------------------------
. logistic tingling dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
               LR chi2(8)      =       9.39
               Prob > chi2     =     0.3102
Log likelihood = -100.07847                       Pseudo R2       =     0.0448

------------------------------------------------------------------------------
tingling | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmp_cr |   .9965023   .0034996    -1.00   0.318     .9896668    1.003385
age |    .987508   .0177975    -0.70   0.485     .9532345    1.023014
levledu |   1.074313   .0769078     1.00   0.317     .9336732    1.236136
hous_inc |   .9999827   .0000637    -0.27   0.786     .9998579    1.000108
drink |   .6581469   .2633639    -1.05   0.296     .3004044    1.441914
smoke |   .9155723   .3653272    -0.22   0.825     .4188421    2.001405
pest_pois |   2.858351   2.364232     1.27   0.204     .5650148     14.4601
lang12 |   .4196463   .2855178    -1.28   0.202     .1105975    1.592288
drugs |          1  (omitted)
   _cons |   1.737909   2.349732     0.41   0.683     .1227902    24.59747
------------------------------------------------------------------------------

. logistic irritated dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
               LR chi2(8)      =       6.44
               Prob > chi2     =     0.5977
Log likelihood = -103.59708                       Pseudo R2       =     0.0302

------------------------------------------------------------------------------
irritated | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+----------------------------------------------------------------
dmp_cr |   .9971822   .0033328    -0.84   0.399     .9906714    1.003736
age |    .9983126   .0173183    -0.10   0.922     .9649398    1.032844
levledu |   .9569714   .0636128    -0.66   0.508     .840073    1.090137
hous_inc |   .9999732   .0000632    -0.42   0.672     .9998493    1.000097
drink |   .8821513   .3420242    -0.32   0.746     .4128821    1.886112
smoke |   .5874192   .2277540    -1.37   0.170     .2747392    1.255962
pest_pois |   2.507793   2.066678     1.12   0.265     .4986716    12.61156
lang12 |   .7040923   .4617478    -0.53   0.593     .1947182    2.545966
drugs |          1  (omitted)
   _cons |    2.30416   2.968101     0.65   0.517     .1845179    28.77311
------------------------------------------------------------------------------

. logistic depress dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression                               Number of obs   =        162
                     LR chi2(9)      =       3.28
                     Prob > chi2     =     0.9521
Log likelihood = -109.85811                       Pseudo R2       =     0.0147

------------------------------------------------------------------------------
   depress | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   dmp_cr    |   1.002609   .0029371     0.89   0.374     .9968683    1.008382
   age       |   .9996396   .0168741    -0.02   0.983     .967108    1.033265
  levledu    |   .9820903   .0638582    -0.28   0.781     .8645775    1.115575
 hous_inc   |   .9999401   .0000625    -0.96   0.338     .9998177    1.000063
   drink    |   .7590968   .2884107    -0.73   0.468     .3604891    1.598461
   smoke    |   1.092828   .4125738     0.24   0.814     .5214337    2.290365
 pest_pois  |   1.620492   1.319498     0.59   0.553     .3285105    7.993636
  lang12    |   .7737878   .5078362    -0.39   0.696     .2137859    2.800688
   drugs    |   1.178348   1.762643     0.11   0.913     .0628052    22.10812
  _cons     |   1.477462   1.855967     0.31   0.756     .1259647    17.32941
------------------------------------------------------------------------------

. logistic pr_concen dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression                               Number of obs   =        162
                     LR chi2(9)      =       7.48
                     Prob > chi2     =     0.5876
Log likelihood = -87.905238                       Pseudo R2       =     0.0408

------------------------------------------------------------------------------
   pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   dmp_cr    |   1.003778   .0031913     1.19   0.236     .9975423    1.010052
   age       |   .9669799   .0205785    -1.58   0.115     .9274772    1.008165
  levledu    |   .9995171   .0784232    -0.01   0.995     .8570458    1.165672
 hous_inc   |   .9999710   .0000725    -0.40   0.689     .9998288    1.000113
   drink    |   .7881968   .3515724    -0.53   0.594     .3288207    1.88934
   smoke    |   1.636832   .7196314     1.12   0.262     .6914711    3.847663
 pest_pois  |   1.498268   1.367343     0.44   0.658     .2504783    8.962086
  lang12    |   2.049337   1.836090     0.80   0.423     .3539851   11.86429
   drugs    |   2.22638   3.391616     0.53   0.599     .1124341    44.08596
  _cons     |   .4473848   .6899715    -0.52   0.602     .0217736    9.192469
------------------------------------------------------------------------------

. logistic short_mem dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
     drugs dropped and 2 obs not used
Logistic regression                               Number of obs   =        160
                     LR chi2(8)      =       6.58
                     Prob > chi2     =     0.5828
Log likelihood = -102.56135                       Pseudo R2       =     0.0311

------------------------------------------------------------------------------
| Variable   | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|------------|-----------|------|------|---------------------|
| dmp_cr     | 1.000709   | .0031825  | 0.22 | 0.824| .9944909 1.006966   |
| age        | .9803461   | .0176814  | -1.10| 0.271| .9462965 1.015621   |
| levledu    | 1.072287   | .0755665  | 0.99 | 0.322| .9339527 1.231111   |
| hous_inc   | .9999199   | .0000668  | -1.20| 0.230| .999789 1.000051    |
| drink      | .7589887   | .3004193  | -0.70| 0.486| .3493951 1.648746   |
| smoke      | 1.168177   | .4577719  | 0.40 | 0.692| .541938 2.51807     |
| pest_pois  | 2.661744   | 2.187669  | 1.19 | 0.234| .5315814 13.32793   |
| lang12     | 1.504862   | 1.031184  | 0.60 | 0.551| .3928467 5.76461    |
| drugs      | 1 (omitted)|          |      |      |                     |
| _cons      | .6145163   | .8136728  | -0.37| 0.713| .0458637 8.233755   |

Logistic regression  
Number of obs = 160  
LR chi2(8) = 9.67  
Prob > chi2 = 0.2888  
Log likelihood = -80.470434  
Pseudo R2 = 0.0567

| Variable   | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|------------|-----------|------|------|---------------------|
| dmp_cr     | .997942    | .004148   | -0.50| 0.620| .9898451 1.006105   |
| age        | .9616775   | .0221082  | -1.70| 0.089| .891908 1.006      |
| levledu    | 1.055135   | .092315   | 0.61 | 0.540| .8888637 1.252508   |
| hous_inc   | .9999496   | .0000805  | -0.63| 0.531| .9997917 1.000107   |
| drink      | .7891342   | .3684949  | -0.51| 0.612| .3159896 1.970738   |
| smoke      | 1.57139    | .739544   | 0.96 | 0.337| .6245519 3.95366    |
| pest_pois  | 1.473725   | 1.373987  | 0.42 | 0.677| .2370403 9.16243    |
| lang12     | .368944    | .2666732  | -1.38| 0.168| .0895064 1.521196   |
| drugs      | 1 (omitted)|          |      |      |                     |
| _cons      | .2113958   | 3.400929  | 0.47 | 0.642| .0902997 49.48877   |

Logistic regression  
Number of obs = 160  
LR chi2(8) = 7.57  
Prob > chi2 = 0.4770  
Log likelihood = -30.860775  
Pseudo R2 = 0.1092

| Variable   | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|------------|-----------|------|------|---------------------|
| dmp_cr     | 1.0008912  | .0056852  | 1.57 | 0.115| .99783 1.020116     |
| age        | .9747042   | .0406124  | -0.61| 0.539| .8982688 1.057644   |
levledu |  1.123532  1.913711  0.68  0.494  0.8046379  1.568811
hous_inc |  0.9998224  0.001671 -1.06  0.288  0.9994949  1.00015
drink |  1.285418  1.201543  0.27  0.788  0.2057713  8.029784
smoke |  2.851127  2.6491  1.13  0.259  0.4614585  17.61583
pest_pois |  2.851893  3.695752  0.81  0.419  0.2249396  36.15768
lang12 |  8.366935  24.17418  0.74  0.462  0.2057713  2409.362
drugs |  1 (omitted)
_cons |  0.0028127  0.0108463 -1.52  0.128 1.47e-06  5.389854

logistic reading dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 162
LR chi2(9) = 7.07
Prob > chi2 = 0.6294
Log likelihood = -82.275204 Pseudo R2 = 0.0412

| reading   | Odds Ratio | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|-----------|------------|-----------|------|-------|----------------------|
| dmp_cr    | 1.001956   | 0.0034076 | 0.57 | 0.566 | 0.9952993 1.008657   |
| age       | 0.949237   | 0.0220071 | -2.25| 0.025 | 0.9070691 0.9933653 |
| levledu   | 0.9201265  | 0.0738417 | -1.04| 0.300 | 0.7862076 1.076857  |
| hous_inc  | 0.9999791  | 0.0000767 | -0.27| 0.786 | 0.9998287 1.00013   |
| drink     | 0.7638852  | 0.3477434 | -0.59| 0.554 | 0.3129938 1.86432   |
| smoke     | 0.8839617  | 0.3968123 | -0.27| 0.783 | 0.3667138 2.130785  |
| pest_pois | 0.8811789  | 1.007656  | -0.11| 0.912 | 0.0936889 8.287816  |
| lang12    | 0.9983451  | 0.7993881 | -0.00| 0.998 | 0.207832  4.795667  |
| drugs     | 2.182979   | 3.28295   | 0.52 | 0.604 | 0.1145355 41.60629  |
| _cons     | 4.509165   | 7.127702  | 0.95 | 0.341 | 0.2035118 99.90856  |

logistic fam_mem dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 162
LR chi2(9) = 10.81
Prob > chi2 = 0.2888
Log likelihood = -84.006979 Pseudo R2 = 0.0605

| fam_mem   | Odds Ratio | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|-----------|------------|-----------|------|-------|----------------------|
| dmp_cr    | 0.996974   | 0.0040299 | -0.75| 0.453 | 0.9891066 1.004904  |
| age       | 1.018893   | 0.0207553 | 0.92 | 0.358 | 0.9790147 1.060396  |
| levledu   | 1.220087   | 0.080562  | 2.25 | 0.025 | 1.025663  1.451365  |
| hous_inc  | 0.9998664  | 0.0000849 | -1.57| 0.116 | 0.9996999 1.000033 |
| drink     | 0.6663702  | 0.3063327 | -0.88| 0.377 | 0.2706545 1.64065  |
| smoke     | 2.062276   | 0.97868   | 1.53 | 0.127 | 0.8135759 5.227519 |
| pest_pois | 0.9106319  | 0.8347579 | -0.10| 0.919 | 0.1510301 5.490629 |
| lang12    | 0.753186   | 0.5561633 | -0.38| 0.701 | 0.1771589 3.20215  |
| drugs     | 5.475342   | 8.399141  | 1.11 | 0.268 | 0.2708135 110.7004 |
| _cons     | 0.054361   | 0.0851098 | -1.86| 0.063 | 0.002527  1.169401 |

Logistic regression

Number of obs = 162

LR chi2(9) = 20.27
Prob > chi2 = 0.0163

Log likelihood = -92.271632  Pseudo R2 = 0.0990

|        | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|--------|------------|-----------|-------|------|----------------------|
| chest  | .9968391   | .003829   | -0.82| 0.410| .9893626 1.004372    |
| dmp_cr |            |           |       |      |                      |
| age    | .989076    | .0189896  | -0.57| 0.567| .9525486 1.027004    |
| levledu| 1.08662    | .0811041  | 1.11  | 0.266| .9387398 1.257797    |
| hous_inc| .9997263  | .0009049  | -2.88 | 0.004| .9995403 .9999124   |
| drink  | 1.386896   | .5871781  | 0.77  | 0.440| .6048754 3.179962    |
| smoke  | .6649762   | .2792158  | -0.97 | 0.331| .2920091 1.514313    |
| pest_pois| 5.089879 | 4.571155  | 1.81  | 0.070| .875496 29.59107    |
| lang12 | 1.158573   | .8251837  | 0.21  | 0.836| .2868531 4.679368    |
| drugs  | 1.164263   | 1.770137  | 0.10  | 0.920| .0591412 22.91986    |
| _cons  | .8017411   | 1.157096  | -0.15 | 0.878| .0473757 13.5679     |

Logistic regression

Number of obs = 160

LR chi2(8) = 13.62
Prob > chi2 = 0.0923

Log likelihood = -78.49718  Pseudo R2 = 0.0798

|        | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|--------|------------|-----------|-------|------|----------------------|
| notes  | .9968391   | .003829   | -0.82| 0.410| .9893626 1.004372    |
| dmp_cr |            |           |       |      |                      |
| age    | .989076    | .0189896  | -0.57| 0.567| .9525486 1.027004    |
| levledu| 1.08662    | .0811041  | 1.11  | 0.266| .9387398 1.257797    |
| hous_inc| .9997263  | .0009049  | -2.88 | 0.004| .9995403 .9999124   |
| drink  | 1.386896   | .5871781  | 0.77  | 0.440| .6048754 3.179962    |
| smoke  | .6649762   | .2792158  | -0.97 | 0.331| .2920091 1.514313    |
| pest_pois| 8.919122 | 7.760794  | 2.51  | 0.012| 1.620565 49.08829    |
| lang12 | 1.164263   | 1.770137  | 0.10  | 0.920| .0591412 22.91986    |
| drugs  | 1 (omitted)|          |      |      |                      |
| _cons  | .8017411   | 1.157096  | -0.15 | 0.878| .0473757 13.5679     |

Logistic regression

Number of obs = 155

LR chi2(8) = 3.65
Logistic regression                               Number of obs =  160
                           LR chi2(8) = 6.90
                     Prob > chi2 = 0.5475
Log likelihood = -94.288273                       Pseudo R2 = 0.0353
------------------------------------------------------------------------------
q16_head | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmp_cr |    .999052    .003184   -0.30   0.766     .992831    1.005312
  age |    .989621    .018128   -0.57   0.569     .954722    1.025798
levledu |    1.0565    .074601    0.78   0.436     .919971    1.213336
hous_inc |    .999874    .000065   -1.94   0.052     .999748    1.000001
  drink |    1.2278    .509567    0.49   0.621     .544355    2.769489
  smoke |    1.0258    .426491    0.06   0.951     .456649    2.309222
pest_pois |    2.3219    2.60891    0.75   0.453     .256722    21.00138
lang12 |    1.5577    1.07569    0.64   0.521     .402435    6.029607
  drugs |          1 (omitted)
  _cons |    2.0341    2.75315    0.52   0.600     .143304     28.8721
------------------------------------------------------------------------------

. logistic less_sex dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
      drugs dropped and 2 obs not used

Logistic regression                               Number of obs =  160
                           LR chi2(8) = 8.46
                     Prob > chi2 = 0.3898
Log likelihood = -103.03303                       Pseudo R2 = 0.0394
------------------------------------------------------------------------------
```
less_sex | Odds Ratio   Std. Err.      z    P>|z|   [95% Conf. Interval]
         +------------------------------------------------------
     dmp_cr |   .9929399   .0039203 -1.79  0.073  .985286   1.000653
       age |   1.002142  .0176624  0.12  0.903  .997697   1.006584
   levledu |   1.074021  .0735817  1.04  0.297  .939071   1.228374
  hous_inc |   .999916   .000066  -1.27  0.204  .999786   1.000045
      drink |   1.246853  .4935172  0.56  0.577  .573958   2.708504
      smoke |   1.063023  .4147327  0.16  0.876  .494824   2.283675
    pest_pois |   1.762409  1.445656  0.69  0.490  .353093   8.796785
     lang12 |   1.552782  1.076175  0.63  0.525  .399185   6.040133
         drugs |    1 (omitted)
      _cons |   .3251761  .4348127 -0.84  0.401  .023655   4.470047
------------------------------------------------------

. logistic q16_score dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: pest_pois != 0 predicts success perfectly
       pest_pois dropped and 7 obs not used

  note: drugs != 0 predicts success perfectly
     drugs dropped and 2 obs not used

Logistic regression
     Number of obs =        153
                   LR chi2(7) =       5.68
                  Prob > chi2 = 0.5780
Log likelihood = -52.580074    Pseudo R2 = 0.0512

------------------------------------------------------
q16_score | Odds Ratio   Std. Err.      z    P>|z|   [95% Conf. Interval]
         +------------------------------------------------------
     dmp_cr |   1.003378   .0051623  0.66  0.512  .993310   1.013547
       age |   .9544364  .0243007 -1.83  0.067  .907976   1.003273
   levledu |   .9656486  .0979435 -0.34  0.730  .791559   1.178025
  hous_inc |   .9999034  .0000797 -1.21  0.226  .999747   1.000060
      drink |   .6348214  .3938882 -0.73  0.464  .188150   2.141891
      smoke |   1.109438  .6778448  0.17  0.865  .334927   3.674265
    pest_pois |    1 (omitted)
     lang12 |   1.189704  1.236063  0.17  0.867  .155263   9.116117
         drugs |    1 (omitted)
      _cons |   80.56078  163.684  2.16  0.031  1.501917  4321.17
------------------------------------------------------

. logistic q16_score50 dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: pest_pois != 0 predicts success perfectly
         pest_pois dropped and 7 obs not used

  note: drugs != 0 predicts success perfectly
     drugs dropped and 2 obs not used

Logistic regression
     Number of obs =        153
                   LR chi2(7) =       6.89
                  Prob > chi2 = 0.4405
Log likelihood = -101.66059    Pseudo R2 = 0.0328
```
. logistic q16_score75 dmp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        162
LR chi2(9)      =      13.50
Prob > chi2     =     0.1411
Log likelihood = -83.793093                       Pseudo R2       =     0.0746

------------------------------------------------------------------
q16_score75 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
   dmp_cr |   1.000803    .003641     0.22   0.825     .9936918    1.007964
   age |   .9813106   .0209173    -0.89   0.376      .941158    1.023176
  levledu |    1.11092   .0954915     1.22   0.221     .9386761    1.314769
 hous_inc |   .9998488     .00009    -1.68   0.093     .9996723    1.000025
   drink |   1.252558   .5785353     0.49   0.626     .5065733    3.097087
   smoke |   1.311436    .600925     0.59   0.554     .5342082    3.219466
 pest_pois |   3.921039   3.322226     1.61   0.107     .7450638    20.63521
   lang12 |   .5224755   .3796597    -0.89   0.372      .125758     2.170682
   drugs |   2.037153   3.088126     0.47   0.639     .1043963     39.7523
     _cons |   .5141825   .7973292    -0.43   0.668      .024614    10.74121
------------------------------------------------------------------

. logistic tired dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
LR chi2(8)      =      17.32
Prob > chi2     =     0.0269
Log likelihood = -100.43703                       Pseudo R2       =     0.0794

------------------------------------------------------------------
tired | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
    dmtp_cr |   1.001182   .0021672     0.55   0.585     .9969431    1.005438
     age |   .9675488   .0172593    -1.85   0.064     .9343057    1.001975
  levledu |   1.043902   .0712333     0.63   0.529     .9132207    1.193283
------------------------------------------------------------------
hous_inc | .999821   .0000698   -2.56   0.010     .9996841    .9999579  
drink | .4569583   .1879043   -1.90   0.057     .2041065    1.023049  
smoke | 1.349314   .5347699    0.76   0.450     .6205244    2.934049  
pest_pois | 1.991945   1.775198   -0.77   0.439     .3472934    11.42505  
lang12 | .6245403   .4660822   -0.63   0.528     .1446523     2.69647  
drugs | 1 (omitted)  
_cons | 11.87137   16.20007   1.81   0.070     .8183175    172.2184

------------------------------------------------------------------------------
.logistic hart_palp dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression                     Number of obs =     160
       LR chi2(8) =      9.07
       Prob > chi2 =    0.3361
Log likelihood = -103.14521             Pseudo R2 =   0.0421

__________________________________________________________________________
hart_palp |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+-----------------------------------------------------------------
   dmtp_cr |  .9991241   .0022861    -0.38   0.702     .9946535    1.003615  
    age |  .9617703   .0176956    -2.12   0.034     .9277056    .9970859  
  levledu |  .9813947   .0664955    -0.28   0.782     .8593491    1.120773  
 hous_inc |  .9999293   .0000655    -1.08   0.280     .9998009    1.000058  
   drink |  .6242005   .2467393   -1.19   0.233     .2876431    1.354548  
  smoke |  .890561   .3437554    -0.30   0.764     .4179275    1.897695  
pest_pois |  3.160736   2.622843   -1.39   0.165     .6215039    16.07431  
 lang12 |  1.735433   1.194398     0.80   0.423     .4503764    6.687138  
   drugs | 1 (omitted)  
   _cons |  3.447986   4.527163     0.94   0.346     .2629956     45.2046
__________________________________________________________________________
. logistic irritated dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs ! = 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs =      160
LR chi2(8)      =       5.92
Prob > chi2     =     0.6562
Log likelihood = -103.85852                       Pseudo R2       =     0.0277

irritated | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmtp_cr |   1.001002    .002093     0.48   0.632     .9969082    1.005113
age |   .9974505    .017275    -0.15   0.883     .9641603    1.03189
levledu |   .9575181   .0636641    -0.65   0.514     .8405271    1.097073
hous_inc |   .9999637   .0000634    -0.57   0.566     .9998394    1.000088
drink |   .8395775    .328419    -0.45   0.655     .3900271    1.807285
smoke |   .5927357    .229337    -1.35   0.176     .2776645    1.265324
pest_pois |   2.54543   2.094879     1.14   0.256     .5072543    12.77311
lang12 |   .7017326   .4601115    -0.54   0.589     .1941138    2.536804
drugs |          1  (omitted)
_cons |   2.096153   2.675069     0.58   0.562     .1718449    25.56874

. logistic depress dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =      162
LR chi2(9)      =       2.49
Prob > chi2     =     0.9812
Log likelihood = -110.25384                       Pseudo R2       =     0.0112

depress | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmtp_cr |   1.000068   .0020551    0.03   0.973     .9960486    1.004104
age |   1.000299   .0168749    0.02   0.986     .9677656    1.033926
levledu |   .9821246   .0636946    -0.28   0.778     .8648939    1.115245
hous_inc |   .999484   .0000614    -0.85   0.397     .9998276    1.000682
drink |   .7742091   .2963965    -0.67   0.504     .3655831    1.639572
smoke |   1.086011  .4089445     0.22   0.827     .5191679    2.271745
pest_pois |   1.571939  1.277054     0.56   0.578     .3198262    7.726054
lang12 |   .7602157   .4981242    -0.41   0.683     .3098763   19.39237
drugs |   1.437441  2.115065     0.65   0.517     .0803752    25.70734
_cons |   1.594497  1.993047     0.37   0.709     .1376138   18.47505

. logistic pr_concen dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression
Number of obs = 162
LR chi2(9) = 6.28
Prob > chi2 = 0.7113
Log likelihood = -88.501875 Pseudo R2 = 0.0343

| pr_concen | Odds Ratio | Std. Err. | z     | P>|z|    | [95% Conf. Interval] |
|-----------|------------|-----------|-------|--------|---------------------|
| dmtp_cr   | 1.000935   | .0023552  | 0.40  | 0.691  | .99633 1.005562     |
| age       | .9685427   | .020413   | -1.52 | 0.129  | .9293491 1.009389   |
| levledu   | .9986937   | .0778707  | -0.02 | 0.987  | .8571601 1.163597   |
| hous_inc  | .9999807   | .0000711  | -0.27 | 0.786  | .9998414 1.00012    |
| drink     | .7952436   | .3581522  | -0.51 | 0.611  | .3289624 1.922446   |
| smoke     | 1.600425   | .7017033  | 1.07  | 0.283  | .6776846 3.779575   |
| pest_pois | 1.40989    | 1.280224  | 0.38  | 0.705  | .2378306 8.358008   |
| lang12    | 1.900935   | .1687107  | 0.72  | 0.469  | .3338213 10.82482   |
| drugs     | 3.10082    | .4629575  | 0.76  | 0.448  | .1661954 57.85412   |
| _cons     | .51012     | .7864778  | -0.44 | 0.662  | .0248503 10.4716    |

Logistic regression
Number of obs = 160
LR chi2(8) = 6.61
Prob > chi2 = 0.5792
Log likelihood = -102.54478 Pseudo R2 = 0.0312

| short_mem | Odds Ratio | Std. Err. | z     | P>|z|    | [95% Conf. Interval] |
|-----------|------------|-----------|-------|--------|---------------------|
| dmtp_cr   | 1.000624   | .002163   | 0.29  | 0.773  | .9963934 1.004872   |
| age       | .9802278   | .0176708  | -1.11 | 0.268  | .9461983 1.015481   |
| levledu   | 1.071166   | .0754093  | 0.98  | 0.329  | .9331096 1.229648   |
| hous_inc  | .9999203   | .0000664  | -1.20 | 0.230  | .9997902 1.00005    |
| drink     | .7500252   | .3000255  | -0.72 | 0.472  | .5407674 2.512709   |
| smoke     | 1.165672   | .4567994  | 0.39  | 0.696  | .5047674 2.512709   |
| pest_pois | 2.623458   | 2.154191  | 1.17  | 0.240  | .5247224 13.11652   |
| lang12    | 1.473609   | 1.010068  | 0.57  | 0.735  | .3845351 5.647138   |
| drugs     | 1 (omitted)|           |       |        |                     |
| _cons     | .6399214   | .8431724  | -0.34 | 0.735  | .0483691 8.466145   |

Logistic regression
Number of obs = 160
LR chi2(8) = 10.68
Prob > chi2 = 0.2203
Log likelihood = -79.964912 Pseudo R2 = 0.0626

.L logistic short_mem dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

.Logistic regression
Number of obs = 160
LR chi2(8) = 6.61
Prob > chi2 = 0.5792
Log likelihood = -102.54478 Pseudo R2 = 0.0312

.Logistic regression
Number of obs = 160
LR chi2(8) = 10.68
Prob > chi2 = 0.2203
Log likelihood = -79.964912 Pseudo R2 = 0.0626
| perspire | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
|-------------+----------------------------------------------------------------|
| dmtp_cr     | 1.002806   .0024237     1.16   0.246     .9980666    1.007567 |
| age         | 0.9609802 .0219137   -1.75   0.081     .9189757    1.004905 |
| levledu     | 1.057631   .0937178     0.63   0.527     .8890133    1.25823  |
| hous_inc    | 0.9999372 .0000824   -0.76   0.445     .9997758    1.000099 |
| drink       | 0.7133716 .3408599   -0.71   0.480     .2796396    1.819839 |
| smoke       | 1.589904   .7537032    0.98   0.328     .6278469    4.026131 |
| pest_pois   | 1.413158   1.342655    0.63   0.527     .8890133    1.25823  |
| lang12      | 0.3614068 .2607534   -0.76   0.445     .2796396    1.819839 |
| drugs       | 1 (omitted) |
| _cons       | 1.866678   2.966618    0.39   0.695     .0828509    42.05732 |

.logistic button dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

| button | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
|-------------+----------------------------------------------------------------|
| dmtp_cr     | 1.00311   .0036067     0.86   0.388     .9960661    1.010204 |
| age         | 0.980657  .0399423    -0.48   0.632     .9054434    1.062181 |
| levledu     | 1.106257  .1829878    -0.61   0.542     .7699398    1.52987 |
| hous_inc    | 0.999851  .0001649   -0.90   0.366     .9995279    1.000174 |
| drink       | 1.301341  1.255255     0.97   0.328     .2008799    29.7505 |
| smoke       | 2.53738   2.375677    0.99   0.320     .4049762    15.89797 |
| pest_pois   | 2.444643  3.116911    0.70   0.480     .2008799    29.7505 |
| lang12      | 6.027506  15.50833     0.70   0.480     .1548908    331.7186 |
| drugs       | 1 (omitted) |
| _cons       | 0.0048067 .0174508   -1.47   0.142     3.90e-06    5.924939 |

.logistic reading dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

| reading | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
|-------------+----------------------------------------------------------------|
| dmtp_cr     | 1.005925  .0023671     2.51   0.012     1.001296    1.010575 |
| age         | 0.943051  .0222965    -2.48   0.013     .9003477    .9877797 |
| levledu     | 0.9060327 .0752255   -1.19   0.235     .7699647    1.066147 |

Logistic regression

| button | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
|-------------+----------------------------------------------------------------|
| dmtp_cr     | 1.00311   .0036067     0.86   0.388     .9960661    1.010204 |
| age         | 0.980657  .0399423    -0.48   0.632     .9054434    1.062181 |
| levledu     | 1.106257  .1829878    -0.61   0.542     .7699398    1.52987 |
| hous_inc    | 0.999851  .0001649   -0.90   0.366     .9995279    1.000174 |
| drink       | 1.301341  1.255255     0.97   0.328     .2008799    29.7505 |
| smoke       | 2.53738   2.375677    0.99   0.320     .4049762    15.89797 |
| pest_pois   | 2.444643  3.116911    0.70   0.480     .2008799    29.7505 |
| lang12      | 6.027506  15.50833     0.70   0.480     .1548908    331.7186 |
| drugs       | 1 (omitted) |
| _cons       | 0.0048067 .0174508   -1.47   0.142     3.90e-06    5.924939 |

.logistic reading dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

| reading | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
|-------------+----------------------------------------------------------------|
| dmtp_cr     | 1.005925  .0023671     2.51   0.012     1.001296    1.010575 |
| age         | 0.943051  .0222965    -2.48   0.013     .9003477    .9877797 |
| levledu     | 0.9060327 .0752255   -1.19   0.235     .7699647    1.066147 |
. logistic fam_mem dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                          Number of obs =     162
LR chi2(9) =  11.45
Prob > chi2 =  0.2464
Log likelihood = -83.690016                  Pseudo R2 =  0.0640

                        | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+--------------------------------------------------
  fam_mem | .9968106   .0030833   -1.03   0.302    .9907857    1.002872
  dmtp_cr | 1.001168   .0023402    0.50   0.618    .9965916    1.005765
  age     | 1.017952   .0208456    0.87   0.385    .9779041    1.059639
  levledu | 1.090058   .0816649    1.15   0.250    .9411944    1.262467
  hous_inc| .9998672   .0000838   -1.59   0.113    .999703    1.000031
  drink   | .7090246    .326998    -0.75   0.456    .287139    1.750776
  smoke   | 2.03405   .9582137    1.51   0.132    .8079264    5.120959
  pest_pois| .9959468   .0156895    1.51   0.132    .8079264    5.120959
  lang12  | .804145   .5985339    -0.29   0.770    .1869717    3.458541
  drugs   | 3.585246   5.45286     0.84   0.401    .1819335    70.65215
  _cons   | .0524652   .0815637   -1.90   0.058    .0024921    1.104513

------------------------------------------------------------------------------

. logistic chest dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                          Number of obs =     162
LR chi2(9) =  19.80
Prob > chi2 =  0.0192
Log likelihood = -92.507256                  Pseudo R2 =  0.0967

                        | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+--------------------------------------------------
  chest | 1.001168   .0023402    0.50   0.618    .9965916    1.005765
  dmtp_cr | .9844446   .0188764   -0.61   0.543    .9521313    1.026143
  age     | 1.090058   .0816649    1.15   0.250    .9411944    1.262467
  levledu | .9997132   .0000957   -3.00   0.003    .9995257    .9999008
  hous_inc| 1.314267   .560777   0.64  0.522    .5694939    3.033038
  drink   | .6699191   .2809037   -0.96   0.339    .2945135    1.523841
  smoke   | 5.25915   4.748987    1.84   0.066    .8959518    30.87069
  pest_pois| 1.180089   .8378786    0.23   0.816    .293461    4.745467
  lang12  | .9737159   1.441411    -0.02   0.986    .0535035    17.72077
  drugs   | .6880886   .9756126   -0.26   0.792    .0427327    11.0797
  _cons   | .0524652   .0815637   -1.90   0.058    .0024921    1.104513

------------------------------------------------------------------------------

. logistic notes dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression

|          | Odds Ratio | Std. Err. | z    | P>|z|  | [95% Conf. Interval] |
|----------|------------|-----------|------|------|---------------------|
| notes    |            |           |      |      |                     |
| dmtp_cr  | 1.004386   | 0.0024821 | 1.77 | 0.077| 0.9995328 1.009263  |
| age      | 0.9466483  | 0.0221346 | -2.34| 0.019| 0.9042444 0.9910408 |
| levledu  | 0.9880828  | 0.0847299 | -0.14| 0.889| 0.8352207 1.168922 |
| hous_inc | 0.9998828  | 0.0009198 | -1.28| 0.202| 0.9997029 1.000063 |
| drink    | 0.4531499  | 0.2198598 | -1.63| 0.103| 0.1750874 1.172813 |
| smoke    | 0.8410973  | 0.3964753 | -0.37| 0.714| 0.5838935 2.118773 |
| pest_pois| 9.006858   | 7.978868  | 2.48 | 0.013| 1.586803 51.12386 |
| lang12   | 0.8576667  | 0.647502  | -0.20| 0.839| 0.1952979 3.766514 |
| drugs    | 1 (omitted)|           |      |      |                     |
| _cons    | 4.578635   | 7.275017  | 0.96 | 0.338| 0.2033563 103.0895 |

. logistic chek_door dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression

|          | Odds Ratio | Std. Err. | z    | P>|z|  | [95% Conf. Interval] |
|----------|------------|-----------|------|------|---------------------|
| chek_door|            |           |      |      |                     |
| dmtp_cr  | 1.000891   | 0.0021534 | -0.05| 0.962| 0.9956866 1.004128 |
| age      | 0.8771466  | 0.0175206 | -1.29| 0.197| 0.9434031 1.012097 |
| levledu  | 0.9758969  | 0.0657352 | -0.36| 0.717| 0.8552008 1.113627 |
| hous_inc | 0.9999596  | 0.000625  | -0.65| 0.518| 0.999837 1.000082 |
| drink    | 1.252208   | 0.48644   | 0.58 | 0.563| 0.5848089 2.681262 |
| smoke    | 0.8180316  | 0.312065  | -0.53| 0.599| 0.387303 1.727784 |
| pest_pois| 1 (omitted)|           |      |      |                     |
| lang12   | 1.273639   | 0.8999122 | 0.34 | 0.732| 0.318871 5.087188 |
| drugs    | 0.8621701  | 1.270545  | -0.10| 0.920| 0.0479968 15.48724 |
| _cons    | 1.856415   | 2.466471  | 0.47 | 0.641| 0.1373255 25.09568 |

. logistic q16_head dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used
Logistic regression                               Number of obs   =        160  
LR chi2(8)      =       7.29  
Prob > chi2     =     0.5058  
Log likelihood = -94.093782                       Pseudo R2       =     0.0373  
------------------------------------------------------------------------------
  q16_head | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]  
-------------+----------------------------------------------------------------
    dmtp_cr  |   1.001594   .0023638     0.68   0.500     .9969721    1.006238  
     age    |   .9882579   .0182369    -0.64   0.522     .9531528    1.024656  
  levledu  |   1.055018   .0743596     0.76   0.447     .9188941    1.211306  
  hous_inc |   .9998681   .0000647    -2.04   0.041     .9997414    .9999949  
     drink  |   1.166517   .4881322     0.37   0.713     .5136932     2.64898  
     smoke  |   1.032901   .4271188     0.08   0.938     .4592777    2.322963  
pest_pois  |   2.329787   2.615438     0.75   0.451     .2580775    21.03208  
  lang12   |   1.495745   1.044216     0.58   0.564     .3807262    5.876275  
      drugs |          1  (omitted)  
     _cons  |   2.082369   2.822932     0.54   0.588     .1460963    29.68083  
------------------------------------------------------------------------------

.logistic less_sex dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160  
LR chi2(8)      =       4.66  
Prob > chi2     =     0.7929  
Log likelihood = -104.93187                       Pseudo R2       =     0.0217  
------------------------------------------------------------------------------
  less_sex | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]  
-------------+----------------------------------------------------------------
    dmtp_cr  |   .9996797     .00212    -0.15   0.880     .9955332    1.003843  
     age    |   1.001401   .0174196     0.08   0.936      .967835    1.036132  
  levledu  |   1.079076   .0737813     1.11   0.266     .9437379    1.233822  
  hous_inc |   .9999034   .0000661    -1.46   0.144     .9997739    1.000033  
     drink  |   1.183116   .4660522     0.43   0.669     .5466666    2.560543  
     smoke  |   1.079803   .4158267     0.20   0.842     .5076344    2.296878  
pest_pois  |   1.874395   1.534507     0.77   0.443     .3767121    9.32637  
  lang12   |   1.603094   1.098264     0.69   0.491     .4186098    6.139155  
     drugs  |          1  (omitted)  
      _cons  |   2.082369   2.822932     0.54   0.588     .1460963    29.68083  
------------------------------------------------------------------------------

.logistic q16_score dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        153
LR chi2(7) = 5.73
Prob > chi2 = 0.5722
Log likelihood = -52.55597  Pseudo R2 = 0.0517

|          | Odds Ratio | Std. Err. | z    | P>|z| |  [95% Conf. Interval] |
|----------|------------|-----------|------|------|-----------------------|
| q16_score |            |           |      |      |                       |
| dmtp_cr   | 1.002355   | .0034239  | 0.69 | 0.491| 0.9956668 - 1.009088 |
| age       | 0.9532578  | .0244154  | -1.87| 0.062| 0.9065858 - 1.002333 |
| levledu   | 0.9666814  | .0974724  | -0.34| 0.737| 0.7933321 - 1.177909 |
| hous_inc  | 0.999071   | .0000787  | -0.18| 0.846| 0.9997529 - 1.000061 |
| drink     | 0.6110807  | .3792769  | -0.79| 0.427| 0.1810451 - 2.062577 |
| smoke     | 1.124638   | .6819914  | 0.19 | 0.846| 0.3426383 - 3.691388 |
| pest_pois | 1.092806   | 1.164806  | 0.08 | 0.934| 0.1352882 - 8.827265 |
| lang12    | 0.7086894  | .5003698  | -0.49| 0.626| 0.1776092 - 3.549075 |
| drugs     | 1.092806   | 1.164806  | 0.08 | 0.934| 0.1352882 - 8.827265 |
| _cons     | 2.561978   | 3.435849  | 0.70 | 0.483| 0.184942 - 35.49075  |

.logistic q16_score50 dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 153
LR chi2(7) = 7.25
Prob > chi2 = 0.4036
Log likelihood = -101.48168  Pseudo R2 = 0.0345

|          | Odds Ratio | Std. Err. | z    | P>|z| |  [95% Conf. Interval] |
|----------|------------|-----------|------|------|-----------------------|
| q16_score |            |           |      |      |                       |
| dmtp_cr   | 1.001581   | .0021406  | 0.74 | 0.460| 0.997394 - 1.005785  |
| age       | 0.9802168  | .0174907  | -1.12| 0.263| 0.9465282 - 1.015104 |
| levledu   | 1.050291   | .0720123  | 0.72 | 0.474| 0.9182217 - 1.201355 |
| hous_inc  | 0.9998918  | .0000669  | -1.62| 0.106| 0.9997607 - 1.00023  |
| drink     | 0.7343125  | .2867239  | -0.79| 0.429| 0.3415994 - 1.578505 |
| smoke     | 0.916197   | .3514207  | -0.23| 0.820| 0.4320143 - 1.94303  |
| pest_pois | 1.092806   | 1.164806  | 0.08 | 0.934| 0.1352882 - 8.827265 |
| lang12    | 0.7086894  | .5003698  | -0.49| 0.626| 0.1776092 - 3.549075 |
| drugs     | 1.092806   | 1.164806  | 0.08 | 0.934| 0.1352882 - 8.827265 |
| _cons     | 2.561978   | 3.435849  | 0.70 | 0.483| 0.184942 - 35.49075  |

.logistic q16_score75 dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression
Number of obs = 162
LR chi2(9) = 14.49
Prob > chi2 = 0.1060
Log likelihood = -83.301289  Pseudo R2 = 0.0800
|               | Odds Ratio   | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|---------------|--------------|-----------|------|-------|----------------------|
| dmtp_cr       | 1.002473     | .0023798  | 1.04 | 0.298 | 0.9978192 1.007148   |
| age           | .9807217     | .0208106  | -0.92| 0.359 | .9407703 1.02237     |
| levledu       | 1.110243     | .0960531  | 1.21 | 0.227 | .9370783 1.315406    |
| hous_inc      | .9998406     | .0000915  | -1.74| 0.082 | .9996613 1.00002     |
| drink         | 1.171955     | .5508215  | 0.34 | 0.736 | .466492 2.94427      |
| smoke         | 1.302225     | .6008241  | 0.57 | 0.567 | .5271766 3.216738    |
| pest_pois     | 3.854555     | 3.301346  | 1.58 | 0.115 | .719346 20.65431     |
| lang12        | .5030088     | .3665805  | -0.94| 0.346 | .1205704 2.098507    |
| drugs         | 2.497215     | 3.729698  | 0.61 | 0.540 | .1337056 46.64039    |
| _cons         | 12.31981     | 16.8596   | 1.84 | 0.067 | .842828 180.0815     |

. logistic tired dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 160
LR chi2(8) = 17.32
Prob > chi2 = 0.0269
Log likelihood = -100.43681
Pseudo R2 = 0.0794

|               | Odds Ratio   | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|---------------|--------------|-----------|------|-------|----------------------|
| dmtp_cr       | .9988272     | .0021344  | -0.55| 0.583 | .9946525 1.003019    |
| age           | .967614      | .192664   | -1.84| 0.065 | .9343575 1.002054    |
| levledu       | 1.043531     | .0710612  | 0.63 | 0.531 | .9131485 1.192531    |
| hous_inc      | .9998198     | .000007   | -1.85| 0.064 | .9996826 0.9999571   |
| drink         | 1.371765     | .5464137  | 0.79 | 0.427 | 1.283784 2.994594    |
| smoke         | 2.036749     | 1.817822  | 0.80 | 0.425 | .354185 11.71237     |
| pest_pois     | 1.664626     | .4956918  | -0.55| 0.584 | .1540764 2.866953    |
| lang12        | 1.000221     | .0021357  | 1.04 | 0.300 | .9980341 1.006406    |

. logistic hart_palp dmtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 160
LR chi2(8) = 10.02
Prob > chi2 = 0.2637
Log likelihood = -102.67238
Pseudo R2 = 0.0465
. logistic tingling dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression  Number of obs =  160
                     LR chi2(8)   =    8.36
                     Prob > chi2 =  0.3995
Log likelihood = -100.59668  Pseudo R2 =  0.0399

------------------------------------------------------------------------------
tingling | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmdtp_cr |   .9996206   .0021906    -0.17   0.863     .9953363    1.003923
age |   .9871093   .0177438    -0.72   0.470     .9529376    1.022506
levledu |   1.07662   .0772357     1.03   0.303     .9354018    1.239159
hous_inc |   .9999725   .0000638    -0.43   0.667     .9998475    1.000098
drink |   .6437062   .2563948    -1.11   0.269       .29488   1.405174
smoke |   .9320019   .3711009    -0.18   0.860     .4270598    2.033972
pest_pois |   2.948191   2.435865     1.31   0.191     .5838119    14.88807
lan12 |   .4367986   .2975624    -1.22   0.224     .1149246    1.660158
drugs |          1  (omitted)
     _cons |   1.507661   2.025677     0.31   0.760     .1083025     20.9879
------------------------------------------------------------------------------

. logistic irritated dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression  Number of obs =  160
                     LR chi2(8)   =     5.85
                    Prob > chi2  =     0.6640
Log likelihood = -103.89374  Pseudo R2 =  0.0274

------------------------------------------------------------------------------
irritated | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmdtp_cr |    1.00084   .0021177     0.40   0.691     .9966984     1.005
age |   .9986113   .0173073    -0.08   0.936     .9652594    1.033116
levledu |   .9592238   .0637142    -0.63   0.531     .8421333    1.092595
hous_inc |   .9999725   .0000638    -0.43   0.667     .9998475    1.000098
drink |   .8676834   .33495     -0.37   0.713     .4071681    1.849051
     _cons |   2.388581   4.410129     0.54   0.588     .1163646    49.98022
------------------------------------------------------------------------------
. logistic depress dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =        162
LR chi2(9)      =       2.66
Prob > chi2     =     0.9761
Log likelihood = -110.16629                       Pseudo R2       =     0.0119
------------------------------------------------------------------------------
    depress | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dmdtp_cr |   .9991247   .0020966    -0.42   0.676     .9950239    1.003242
    age |   .9998429   .0168612    -0.01   0.993     .9673357    1.033443
    levledu |   .9812635   .0636748    -0.29   0.771     .8640735    1.114347
    hous_inc |   .9999449   .0000618    -0.89   0.373     .9998238    1.000066
    drink |   .7723129   .2924357    -0.68   0.495     .3676939    1.622184
    smoke |   1.100431   .4159901     0.25   0.800     .5245511    2.308544
    pest_pois |   1.591751   1.294575     0.57   0.568      .323289    7.837173
    lang12 |   .7792211   .5111027    -0.38   0.704     .2154492     2.81823
    drugs |   1.383517   2.032573     0.22   0.825     .0777061    24.63281
    _cons |   1.676501   2.104422     0.41   0.681     .1431978    19.62779
------------------------------------------------------------------------------

. logistic pr_concen dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =        162
LR chi2(9)      =       7.67
Prob > chi2     =     0.5672
Log likelihood = -87.806134                       Pseudo R2       =     0.0419
------------------------------------------------------------------------------
   pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+----------------------------------------------------------------
    dmdtp_cr |   .9968214   .0027274    -1.16   0.245     .9914901    1.002181
    age |   .9675102   .0204902    -1.56   0.119     .9281723    1.008515
    levledu |   .994448   .0777292    -0.07   0.944     .853229    1.159115
    hous_inc |   .999725   .000072   -3.87   0.159     .9996774    1.000114
    drink |   .7983214   .3568516    -0.68   0.495     .3324211    1.917198
    smoke |   1.671483   .7353756    1.17   0.243     .7056872    3.959054
    pest_pois |   1.477799   1.349088     0.43   0.669     .2469164    8.844648
    lang12 |   2.110405   1.875048     0.84   0.401     .3699069    12.04036
    drugs |   2.642773   3.934706     0.65   0.514     .1428052    48.90752
    _cons |   .6019472   .9361122    -0.33   0.744     .0285641    12.68515
------------------------------------------------------------------------------

. logistic short_mem dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

note: drugs != 0 predicts success perfectly
    drugs dropped and 2 obs not used
Logistic regression                               Number of obs   =        160
LR chi2(8)      =       6.72
Prob > chi2     =     0.5667
Log likelihood = -102.48813                       Pseudo R2       =     0.0318

+-------------------------------------------------------------+
| short_mem | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
|------------|--------------|-----------------|------|--------|---------------------------|
| dmdtp_cr   |   1.000932    .002106     0.44   0.658     .9968125    1.005068 |
| age        |   .9809514   .0177307    -1.06   0.287     .9468082    1.016326 |
| levledu    |   1.072923   .0756574     1.00   0.318     .9344283    1.231945 |
| hous_inc   |   .9999259   .0000661    -1.12   0.262     .9997964    1.000055 |
| drink      |   .7660594    .302604    -0.67   0.500     .3532044    1.661494 |
| smoke      |   1.149339    .451738     0.35   0.723     .5319744    2.483166 |
| pest_pois  |   2.611248   2.142672     1.17   0.242     .5228662    13.04084 |
| lang12     |   1.454614   .9988406     0.55   0.585     .3786629    5.587825 |
| drugs      |          1  (omitted)   |
| _cons      |   .5997955     .79482    -0.39   0.700     .0446717    8.053308 |
+-------------------------------------------------------------+

.logistic perspire dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
LR chi2(8)      =       9.60
Prob > chi2     =     0.2942
Log likelihood = -80.505915                       Pseudo R2       =     0.0563

+-------------------------------------------------------------+
| perspire   | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
|------------|--------------|-----------------|------|--------|---------------------------|
| dmdtp_cr   |   .9989111   .0025642    -0.42   0.671     .9938979    1.00395 |
| age        |   .9613929   .0220414    -1.72   0.086     .9191487    1.005579 |
| levledu    |   1.056809   .0926598     0.63   0.529     .8899467    1.254957 |
| hous_inc   |   .9999407   .0000813    -0.73   0.466     .9997813    1.0001 |
| drink      |   .7759969   .3622019    -0.54   0.587     .3108535    1.937154 |
| smoke      |   1.609131   .7571761     1.01   0.312     .6398212    4.046914 |
| pest_pois  |   1.501279   1.402405     0.43   0.664     .2406136    9.367052 |
| lang12     |   .3900336   .2830256    -1.30   0.194     .0940659    1.617229 |
| drugs      |          1  (omitted)   |
| _cons      |   1.973329   3.139823     0.43   0.669     .0872624    44.62434 |
+-------------------------------------------------------------+

.logistic button dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
LR chi2(8)      =       6.69
### Logistic Regression Output

#### Prob > chi2 = 0.5708
Log likelihood = -31.300135  Pseudo R2 = 0.0965

|         | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|---------|------------|-----------|------|------|----------------------|
| button  |            |           |      |      |                      |
| dmdtp_cr | 0.9937151  | 0.0067532 | -0.93| 0.354| 0.9805668 1.00704    |
| age     | 0.9373298  | 0.040197  | -0.40| 0.688| 0.9080165 1.065754   |
| levledu | 1.106479   | 0.001647  | 0.62 | 0.538| 0.8018821 1.526777   |
| hous_inc| 0.9998366  | 0.0001647 | -0.99| 0.321| 0.999514 1.000159    |
| drink   | 1.470658   | 1.396294  | 0.41 | 0.685| 0.2287449 9.45523    |
| smoke   | 2.69781    | 2.498328  | 1.07 | 0.284| 0.4392884 16.56812   |
| pest_pois | 2.81383    | 3.53076   | 0.82 | 0.410| 0.2405583 32.91359   |
| lang12  | 8.378912   | 22.92395  | 0.78 | 0.437| 0.0392986 1786.481   |
| drugs   | 1 (omitted)|          |      |      |                      |
| _cons   | 0.00442    | 0.0167003 | -1.43| 0.151| 2.69e-06 7.270201    |

Logistic regression, Number of obs = 162
LR chi2(9) = 6.77
Prob > chi2 = 0.6615
Log likelihood = -82.429385  Pseudo R2 = 0.0394

|         | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|---------|------------|-----------|------|------|----------------------|
| reading |            |           |      |      |                      |
| dmdtp_cr | 0.9997408  | 0.0024863 | -0.10| 0.917| 0.9948796 1.004626   |
| age     | 0.9496511  | 0.0220129 | -2.23| 0.026| 0.907472 0.9937908   |
| levledu | 0.9196756  | 0.0736039 | -1.05| 0.295| 0.78616 1.075867    |
| hous_inc| 0.9998366  | 0.0000761 | -0.22| 0.829| 0.9998344 1.000133  |
| drink   | 0.77384    | 0.3518995 | -0.56| 0.573| 0.3173744 1.88682    |
| smoke   | 0.8771501  | 0.3943945 | -0.29| 0.771| 0.363368 2.117391   |
| pest_pois | 0.8640073  | 0.986951  | -0.13| 0.898| 0.0920861 8.106632   |
| lang12  | 0.9829602  | 0.7852692 | -0.02| 0.983| 0.205365 4.704847   |
| drugs   | 2.490443   | 3.729836  | 0.61 | 0.542| 0.1322714 46.89072   |
| _cons   | 4.936632   | 7.830293  | 1.01 | 0.314| 0.2204388 110.5538   |

Logistic regression, Number of obs = 162
LR chi2(9) = 11.19
Prob > chi2 = 0.2630
Log likelihood = -83.818474  Pseudo R2 = 0.0626

|         | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|---------|------------|-----------|------|------|----------------------|
| fam_mem |            |           |      |      |                      |
| dmdtp_cr | 1.002317   | 0.0023308 | 1.00 | 0.320| 0.9977595 1.006896   |
| age     | 1.019252   | 0.0207294 | 0.94 | 0.348| 0.979422 1.060701   |
| levledu | 1.226355   | 0.1091818 | 2.29 | 0.022| 1.029993 1.460153   |
| hous_inc| 0.9998697  | 0.0000847 | -1.54| 0.124| 0.9997036 1.000036  |
. logistic chest dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                                      Number of obs =  162
LR chi2(9)      =  23.20
Prob > chi2     =  0.0058
Log likelihood  = -90.806611                       Pseudo R2       =  0.1133

---------------------------------------------------------------------------
       | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
---+-----------------------------------------------------------------
  dmdtp_cr |  1.004380   .0023679     1.85   0.064     .9997492    1.009031
  age      |  0.991477   .0191619    -0.44   0.658     .9546226    1.029754
  levledu  |  1.097180   .0832991     1.22   0.222     .9454833    1.273216
  hous_inc |  0.999735   .0000954    -2.77   0.006     .9995483    .9999224
  drink    |  1.396365   .5952986     0.78   0.434     .6055004    3.220204
  smoke    |  0.626450   .2672814    -1.10   0.273     .2714643    1.445641
  pest_pois|  5.231603   4.759360     1.82   0.069     .8795670    31.11721
  lang12   |  1.047352   .7448240     0.07   0.948     .2598729    4.221087
  drugs    |  1.089137   1.612297     0.06   0.954     .0598428    19.82227
  _cons    |  0.519411   .7469040    -0.46   0.649     .0310097    8.700107
---------------------------------------------------------------------------

. logistic notes dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
   drugs dropped and 2 obs not used

Logistic regression                                      Number of obs =  160
LR chi2(8)      =  13.90
Prob > chi2     =  0.0845
Log likelihood  = -78.35844                       Pseudo R2       =  0.0814

---------------------------------------------------------------------------
     notes | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
---------+-----------------------------------------------------------------
  dmdtp_cr |  1.008552   .0026658     0.54   0.587     .9993409    1.003791
  age      |  0.948727   .0222149    -2.25   0.025     .9061712    .9932826
  levledu  |  0.991034   .0833908    -0.11   0.915     .8403569    1.168726
  hous_inc |  0.999897   .0000881    -1.17   0.240     .9997237    1.000069
  drink    |  0.519636   .2432735    -1.40   0.162     .2075872    1.300765
  smoke    |  0.866321   .4021170    -0.31   0.757     .3488031    2.151681
  pest_pois|  9.050379   7.933413     2.51   0.012     1.623744    50.44476
  lang12   |  0.961903   .7277476    -0.05   0.959     .2183418    4.237653
  drugs    | (omitted)
  _cons   |  4.438232    7.030289     0.94   0.347     .1990132    98.97786
---------------------------------------------------------------------------
. logistic chek_door dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression                               Number of obs   =        155
                                          LR chi2(8)      =       4.71
                                          Prob > chi2     =     0.7876
Log likelihood = -103.05572                       Pseudo R2       =     0.0224

------------------------------------------------------------------------------
  chek_door  |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dmdtp_cr  |   .9972489   .0022918    -1.20   0.231     .9927671    1.001751
    age       |   .9750305   .0175848    -1.40   0.161      .941167    1.010112
   levledu   |   .9717223   .0657915    -0.42   0.672     .8509629    1.109619
  hous_inc_  |   .9999507   .0000634    -0.78   0.436     .9998264    1.000075
     drink   |   1.225081   .4734801     0.53   0.599     .5743612    2.613032
     smoke   |   .8482386   .3257358    -0.43   0.668     .3996174    1.800494
pest_pois   |          1  (omitted)
     lang12  |   1.346575   .9479551     0.42   0.673     .338849    5.351248
     drugs   |          1  (omitted)
    _cons    |   2.285241   3.064349     0.62   0.538     .1650174    31.64711
------------------------------------------------------------------------------

. logistic q16_head dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
                                          LR chi2(8)      =       6.84
                                          Prob > chi2     =     0.5537
Log likelihood = -94.316976                       Pseudo R2       =     0.0350

------------------------------------------------------------------------------
   q16_head  |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dmdtp_cr  |   .9995904   .0023247    -0.18   0.860     .9950458    1.004156
    age       |   .9891138   .0182127    -0.59   0.552     .9540552    1.025461
   levledu   |   1.055963   .0746130     0.77   0.441     .9193983    1.212812
  hous_inc_  |   .9998703   .0000647    -2.00   0.045     .9997435    .9999971
     drink   |   1.216071   .5040198     0.47   0.637     .5397153    2.740014
     smoke   |   1.034707   .4302682     0.08   0.935     .4579917    2.337639
pest_pois   |   2.363604   2.654862     0.77   0.444     .2615072    21.36318
     lang12  |   1.582942   1.096922     0.66   0.507     .4070172    6.156264
     drugs   |          1  (omitted)
    _cons    |   2.030065   2.763478     0.52   0.603     .1408608     29.257
------------------------------------------------------------------------------

. logistic less_sex dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used
Logistic regression

Number of obs = 160
LR chi2(8) = 7.51
Prob > chi2 = 0.4831

Log likelihood = -103.51031  Pseudo R2 = 0.0350

|              | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|--------------|------------|-----------|-------|-------|---------------------|
| less_sex     |            |           |       |       |                     |
| dmdtp_cr     | 0.9961615  | 0.0024062 | -1.59 | 0.11  | 0.9914565 1.000889  |
| age          | 0.999701   | 0.00174811 | -0.98 | 0.33  | 0.997521 1.000019   |
| levledu      | 0.967648   | 0.074181   | 0.32  | 0.74  | 0.9404668 1.232136  |
| hous_inc     | 0.99986    | 0.0000679  | -0.09 | 0.93  | 0.9997529 1.000009  |
| drink        | 1.163813   | 0.4587408  | 0.04  | 0.96  | .5374826 2.520007   |
| smoke        | 1.138119   | 0.4430038  | 0.33  | 0.74  | 0.5307185 2.440682  |
| pest_pois    | 1.975598   | 1.627954   | 0.83  | 0.40  | 0.3928998 9.933797  |
| lang12       | 1.760839   | 1.2077     | 0.82  | 0.40  | 0.4591025 6.753514  |
| drugs        | 1 (omitted)|           |       |       |                     |
| _cons        | 0.2996904  | 0.3934505  | -0.92 | 0.36  | 0.0228648 3.928063  |

. logistic q16_score dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
  drugs dropped and 2 obs not used

Logistic regression

Number of obs = 153
LR chi2(7) = 5.20
Prob > chi2 = 0.6362

Log likelihood = -52.820668  Pseudo R2 = 0.0469

|              | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|--------------|------------|-----------|-------|-------|---------------------|
| q16_score    |            |           |       |       |                     |
| dmdtp_cr     | 0.9997982  | 0.0035639 | -0.06 | 0.95  | 0.9928374 1.006808  |
| age          | 0.9554464  | 0.0243305 | -1.79 | 0.07  | 0.90893 1.004343   |
| levledu      | 0.9680792  | 0.098802  | -0.32 | 0.75  | 0.7925696 1.182454  |
| hous_inc     | 0.99991    | 0.0000799 | -1.13 | 0.26  | 0.9997533 1.000067  |
| drink        | 1.163813   | 0.4587408 | 0.04  | 0.96  | .5374826 2.520007   |
| smoke        | 1.138119   | 0.4430038 | 0.33  | 0.74  | 0.5307185 2.440682  |
| pest_pois    | 1 (omitted)|           |       |       |                     |
| lang12       | 1.211489   | 1.251131  | 0.19  | 0.85  | .1600535 9.170094   |
| drugs        | 1 (omitted)|           |       |       |                     |
| _cons        | 83.52512   | 169.8704  | 2.18  | 0.03  | 1.551222 4.497.387  |

. logistic q16_score50 dmdtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =      153
LR chi2(7)      =      6.71
Prob > chi2     =     0.4601
Log likelihood = -101.75211                       Pseudo R2       =     0.0319

------------------------------------------------------------------------------
q16_score50 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmdtp_cr |   .9999572   .0021273    -0.02   0.984     .9957964    1.004135
age |   .9812507   .0175182    -1.06   0.289     .9475093    1.016194
levledu |   1.051668   .0719847     0.73   0.463     .9195363    1.202558
hous_inc |   .9998967   .0000663    -1.56   0.119     .9997669    1.000027
drink |   .7682609   .2957256    -0.68   0.493     .3612908    1.633656
smoke |   .9132087   .3507159    -0.24   0.813     .4301975    1.938529
pest_pois |          1  (omitted)
lang12 |   .7483356   .5269222    -0.41   0.681     .1882537    2.974741
drugs |          1  (omitted)
   _cons |   2.419927    3.25905     0.66   0.512     .1727594    33.89712
------------------------------------------------------------------------------

Logistic regression                               Number of obs   =      162
LR chi2(9)      =     13.46
Prob > chi2     =     0.1429
Log likelihood = -83.815763                       Pseudo R2       =     0.0743

------------------------------------------------------------------------------
q16_score75 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dmdtp_cr |   1.000121   .0023717     0.05   0.959     .9954839    1.004781
age |   .9814905   .0209260    -0.88   0.381     .9413214    1.023374
levledu |   1.109932   .0951661     1.22   0.224     .9382396    1.313042
hous_inc |   .9998519   .0000901    -1.64   0.100     .9996753    1.000028
drink |   1.25957   .5809036     0.50   0.617     .5100996     3.11021
smoke |   1.305305   .5995363     0.58   0.562     .5305775    3.211258
pest_pois |   3.879264   3.279812     1.60   0.109     .7397445    20.34309
lang12 |   .5164191   .3768348    -0.91   0.365     .1235594    2.158385
drugs |   2.17663   3.241693     0.52   0.602     .1175101    40.31754
   _cons |   2.419927    3.25905     0.66   0.512     .1727594    33.89712
------------------------------------------------------------------------------

Logistic regression                               Number of obs   =      160
LR chi2(8)      =     17.64
Prob > chi2     =     0.0241
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used
Logistic regression                               Number of obs =        160
LR chi2(8)      =       9.16
Prob > chi2     =     0.3289
Log likelihood = -103.10128                       Pseudo R2       =     0.0425

-----------------------------
hart_palp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dep_cr |   1.003836   .0078564     0.49   0.625     .9885554    1.019353
age |   .9616368   .0176271    -2.13   0.033     .9277015    .9968133
levledu |   .983645   .0669376    -0.24   0.809     .8608224    1.123992
hous_inc |   .9999278   .0000657    -1.10   0.272     .9997989    1.000057
drink |   .5887005   .2347343    -1.33   0.184     .2694588    1.286164
smoke |   .9288852   .3677958    -0.19   0.852     .4274895    2.01836
pest_pois |   3.224858   2.678482     1.41   0.159     .6331768    16.42465
lang12 |   1.760341   1.204871     0.83   0.409     .460245     6.732933
drugs |          1  (omitted)
_cons |   3.100682   4.135111     0.85   0.396     .2271347    42.32831
-----------------------------

Logistic regression                               Number of obs =        160
LR chi2(8)      =       8.42
Prob > chi2     =     0.3934
Log likelihood = -100.56399                       Pseudo R2       =     0.0402

-----------------------------
tingling | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Depressed: 1.002446 0.0078706 0.31 0.756 0.9871383 1.017992
Age: 0.9872211 0.0177356 -0.72 0.474 0.9530649 1.022601
Level of Education: 1.079124 0.0776111 1.06 0.290 0.9372441 1.242483
House Income: 0.9999746 0.0000633 -0.40 0.688 0.9998505 1.000099
Drinks: 0.628472 0.2556707 -1.14 0.254 0.2831431 1.394973
Smokes: 0.9514675 0.3863754 -0.12 0.902 0.4292744 2.108885
Pesticide: 3.005259 2.488725 1.33 0.184 0.5929007 15.23287
Language: 0.4495642 0.3083385 -1.17 0.244 0.1172157 1.724239

Logistic Regression
Number of obs = 160
LR chi2(8) = 5.73
Prob > chi2 = 0.6772
Log likelihood = -103.95238
Pseudo R2 = 0.0268

| Depressed | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|-----------|------------|-----------|-----|-----|-----------------------|
| dep_cr    | 1.0015     | 0.0076259 | 0.20| 0.844| 0.9866644 - 1.016559  
| age       | 0.998119   | 0.0172389 | -0.11| 0.913| 0.9648969 - 1.032485 
| levledu   | 0.9595235  | 0.0639252 | -0.62| 0.535| 0.8420678 - 1.093362 
| hous_inc  | 0.9999666  | 0.0000629 | -0.53| 0.595| 0.9998433 - 1.00009   
| drink     | 0.8503156  | 0.3353033 | -0.41| 0.681| 0.3925794 - 1.841759  
| smoke     | 0.6208262  | 0.2382967 | -1.28| 0.200| 0.277791 - 1.308187   
| pest_pois | 2.605287   | 2.150405  | -0.46| 0.643| 0.2005671 - 2.695942  
| lang12    | 0.7353349  | 0.4874223 | -0.46| 0.631| 0.5167417 - 1.315323  
| drugs     | 1 (omitted)|           |     |     |                       
| _cons     | 1.934966   | 2.516217  | 0.51| 0.612| 0.1512783 - 19.5342   

Logistic Regression
Number of obs = 162
LR chi2(9) = 2.51
Prob > chi2 = 0.9807
Log likelihood = -110.24493
Pseudo R2 = 0.0112

| Depressed | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|-----------|------------|-----------|-----|-----|-----------------------|
| dep_cr    | 0.9990137  | 0.0071767 | -0.20| 0.844| 0.9850462 - 1.013179  
| age       | 1.000386   | 0.0168355 | 0.02| 0.982| 0.9679275 - 1.033933 
| levledu   | 0.9817055  | 0.0637549 | 0.28| 0.776| 0.8643659 - 1.114956  
| hous_inc  | 0.9999478  | 0.000612  | -0.85| 0.394| 0.9998279 - 1.000068 
| drink     | 0.7837949  | 0.3022464 | 0.63| 0.528| 0.3680974 - 1.668945 
| smoke     | 1.074796   | 0.4126248 | 0.19| 0.851| 0.5064555 - 2.280923 
| _cons     | 1.012533   | 0.0172389 | 0.01| 0.995| 0.9877064 - 1.03738  

Note: drugs != 0 predicts success perfectly
Drugs dropped and 2 obs not used.
. logistic pr_concen dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

|                        | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|------------------------|------------|-----------|-------|-----|----------------------|
| pr_concen              | 0.9943844  | 0.0093865 | -0.60 | 0.551 | 0.9761564 1.012953  |
| dep_cr                 | 0.9689345  | 0.0204654 | -1.49 | 0.135 | 0.929642 1.009888  |
| age                    | 0.9977345  | 0.0778623 | -0.03 | 0.977 | 0.856225 1.162631  |
| levledu                | 0.9999818  | 0.0000703 | -0.26 | 0.796 | 0.999844 1.00012  |
| hous_inc               | 0.8505888  | 0.3812745 | -0.36 | 0.718 | 0.353321 2.047712  |
| drink                  | 1.518219   | 0.6746793 | 0.94  | 0.347 | 0.635433 3.627427  |
| smoke                  | 1.367908   | 1.24535   | 0.34  | 0.731 | 0.229677 8.146949  |
| pest_pois              | 1.929127   | 1.768654  | 0.72  | 0.474 | 0.319864 11.63471 |
| lang12                 | 3.725931   | 5.862545  | 0.84  | 0.403 | 0.170575 81.38662 |
| drugs                  | 0.554356   | 0.8658404 | -0.38 | 0.706 | 0.02596 11.83771  |

. logistic short_mem dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

note: drugs != 0 predicts success perfectly

drugs dropped and 2 obs not used

Logistic regression

|                        | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|------------------------|------------|-----------|-------|-----|----------------------|
| short_mem              | 0.9932056  | 0.0087761 | -0.77 | 0.440 | 0.976152 1.010556  |
| dep_cr                 | 0.9802862  | 0.0177316 | -1.10 | 0.271 | 0.946141 1.015663  |
| age                    | 1.066895   | 0.0754708 | 0.92  | 0.360 | 0.928771 1.22556  |
| levledu                | 0.9999209  | 0.0000657 | -1.20 | 0.229 | 0.999792 1.00005  |
| hous_inc               | 0.8042952  | 0.3227172 | -0.54 | 0.587 | 0.366339 1.765823  |
| drink                  | 1.093637   | 0.4369998 | 0.22  | 0.823 | 0.499749 2.393314  |
| smoke                  | 2.500869   | 2.0609    | 1.11  | 0.266 | 0.497323 12.57603 |
| pest_pois              | 1.400137   | 0.985143  | 0.48  | 0.632 | 0.352583 5.560066  |
| lang12                 | 0.7737834  | 1.03982   | -0.19 | 0.849 | 0.05556 10.77647  |
| drugs                  | 1 (omitted) |          |      |     |                     |

. logistic perspire dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression

|            | Odds Ratio | Std. Err. |     z  |   P>|z|   | [95% Conf. Interval] |
|------------|------------|-----------|--------|--------|---------------------|
| dep_cr     | .9851654   | .0130775  | -1.13  | 0.260  | .9598645 1.011133   |
| age        | .9625925   | .0223011  | -1.65  | 0.100  | .9198606 1.00731    |
| levledu    | 1.051893   | .0929681  | 0.57   | 0.567  | .8845872 1.250841   |
| hous_inc   | .9999398   | .0000808  | -0.74  | 0.456  | .9997815 1.000098   |
| drink      | .8757135   | .4184463  | -0.28  | 0.781  | .3432641 2.234064   |
| smoke      | 1.435327   | .6842734  | 0.76   | 0.448  | .5638347 3.653845   |
| pest_pois  | 1.283838   | 1.21783   | 0.26   | 0.792  | .2000195 8.240392   |
| lang12     | .297464    | .2318242  | -1.56  | 0.120  | .0645748 1.370269   |
| drugs      | 1 (omitted)|           |        |        |                     |
| _cons      | 2.845292   | 4.64694   | 0.64   | 0.522  | .1158622 69.8734    |

Logistic regression

|            | Odds Ratio | Std. Err. |     z  |   P>|z|   | [95% Conf. Interval] |
|------------|------------|-----------|--------|--------|---------------------|
| dep_cr     | .9725758   | .0356598  | -0.76  | 0.448  | .9051361 1.04504    |
| age        | .9810872   | .0405496  | -0.46  | 0.644  | .9047453 1.063871   |
| levledu    | 1.098084   | .1799952  | 0.57   | 0.568  | .796359 1.514128    |
| hous_inc   | .9998602   | .0001631  | -0.86  | 0.391  | .9995406 1.00018    |
| drink      | 1.613971   | 1.51218   | 0.51   | 0.609  | .2572637 10.12542   |
| smoke      | 2.275144   | 2.0968    | 0.89   | 0.372  | .3737069 13.85117   |
| pest_pois  | 2.230223   | 2.825557  | 0.63   | 0.527  | .1861777 26.71585   |
| lang12     | 13.41919   | 58.0867   | 0.60   | 0.549  | .0027745 64902.52   |
| drugs      | 1 (omitted)|           |        |        |                     |
| _cons      | .0032006   | .0159601  | -1.15  | 0.249  | 1.82e-07 56.21292   |

Logistic regression

|            | Odds Ratio | Std. Err. |     z  |   P>|z|   | [95% Conf. Interval] |
|------------|------------|-----------|--------|--------|---------------------|
| dep_cr     | .9951654   | .0130775  | -1.13  | 0.260  | .9598645 1.011133   |
| age        | .9625925   | .0223011  | -1.65  | 0.100  | .9198606 1.00731    |
| levledu    | 1.051893   | .0929681  | 0.57   | 0.567  | .8845872 1.250841   |
| hous_inc   | .9999398   | .0000808  | -0.74  | 0.456  | .9997815 1.000098   |
| drink      | .8757135   | .4184463  | -0.28  | 0.781  | .3432641 2.234064   |
| smoke      | 1.435327   | .6842734  | 0.76   | 0.448  | .5638347 3.653845   |
| pest_pois  | 1.283838   | 1.21783   | 0.26   | 0.792  | .2000195 8.240392   |
| lang12     | .297464    | .2318242  | -1.56  | 0.120  | .0645748 1.370269   |
| drugs      | 1 (omitted)|           |        |        |                     |
| _cons      | 2.845292   | 4.64694   | 0.64   | 0.522  | .1158622 69.8734    |

Logistic regression

|            | Odds Ratio | Std. Err. |     z  |   P>|z|   | [95% Conf. Interval] |
|------------|------------|-----------|--------|--------|---------------------|
| dep_cr     | .9725758   | .0356598  | -0.76  | 0.448  | .9051361 1.04504    |
| age        | .9810872   | .0405496  | -0.46  | 0.644  | .9047453 1.063871   |
| levledu    | 1.098084   | .1799952  | 0.57   | 0.568  | .796359 1.514128    |
| hous_inc   | .9998602   | .0001631  | -0.86  | 0.391  | .9995406 1.00018    |
| drink      | 1.613971   | 1.51218   | 0.51   | 0.609  | .2572637 10.12542   |
| smoke      | 2.275144   | 2.0968    | 0.89   | 0.372  | .3737069 13.85117   |
| pest_pois  | 2.230223   | 2.825557  | 0.63   | 0.527  | .1861777 26.71585   |
| lang12     | 13.41919   | 58.0867   | 0.60   | 0.549  | .0027745 64902.52   |
| drugs      | 1 (omitted)|           |        |        |                     |
| _cons      | .0032006   | .0159601  | -1.15  | 0.249  | 1.82e-07 56.21292   |
Log likelihood = -81.493067                       Pseudo R2       =     0.0503

|            | Odds Ratio   | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|-------------|--------------|-----------|-------|------|----------------------|
| reading     |              |           |       |      |                      |
| dep_cr      | .9864515     | .0107762  | -1.25 | 0.212| .965555  1.0078      |
| age         | .9497433     | .0220883  | -2.22 | 0.027| .9074229  .9940375   |
| levledu     | .914625      | .0740548  | -1.10 | 0.270| .7804112  1.071921   |
| hous_inc    | .9999816     | .0000758  | -0.24 | 0.808| .999833   1.00013    |
| drink       | .8587018     | .3974731  | -0.33 | 0.742| .3466099  2.127374   |
| smoke       | .777785      | .3556362  | -0.55 | 0.583| .3174346  1.905745   |
| pest_pois   | .7691987     | .883885   | -0.23 | 0.819| .0808955  7.313964   |
| lang12      | .8717688     | .7362173  | -0.16 | 0.871| .166553   4.562989   |
| drugs       | 4.578994     | 8.138717  | 0.86  | 0.392| .1405536  149.1757   |
| _cons       | 6.764733     | 10.92726  | 1.18  | 0.237| .2852864  160.4059   |

. logistic fam_mem dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =        162
LR chi2(9)      =      10.54
Prob > chi2     =     0.3088
Log likelihood = -84.144963                       Pseudo R2       =     0.0589

|            | Odds Ratio   | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|-------------|--------------|-----------|-------|------|----------------------|
| fam_mem     |              |           |       |      |                      |
| dep_cr      | .9945425     | .0097948  | -0.56 | 0.578| .9755291  1.013926   |
| age         | 1.018973     | .0207667  | 0.92  | 0.356| .9530042  1.060498   |
| levledu     | 1.222935     | .109022   | 2.26  | 0.024| 1.026882  1.456419   |
| hous_inc    | .9998557     | .0000848  | -1.70 | 0.089| .9996895  1.000022   |
| drink       | .6841678     | .3183782  | -0.82 | 0.415| .2748242  1.703218   |
| smoke       | 1.989612     | .9486971  | 1.44  | 0.149| .7814373  5.065738   |
| pest_pois   | .8823898     | .8139936  | -0.14 | 0.892| .1446897  5.381251   |
| lang12      | .7028365     | .5374096  | -0.46 | 0.645| .1570364  3.145634   |
| drugs       | 5.496969     | 8.613129  | 1.09  | 0.277| .2549099  118.5386   |
| _cons       | .0551743     | .086232   | -1.85 | 0.064| .0025787  1.18054    |

. logistic chest dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =        162
LR chi2(9)      =      20.05
Prob > chi2     =     0.0176
Log likelihood = -92.384111                       Pseudo R2       =     0.0979

|            | Odds Ratio   | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|-------------|--------------|-----------|-------|------|----------------------|
| chest       |              |           |       |      |                      |
| dep_cr      | .9944178     | .0081296  | -0.68 | 0.494| .978611   1.01048    |
| age         | .9894707     | .0189572  | -0.55 | 0.581| .9530042  1.027333   |
| levledu     | 1.087046     | .0815703  | 1.11  | 0.266| .9383718  1.259275   |
| hous_inc    | .9997166     | .0000948  | -2.99 | 0.003| .9995308  .9999024   |
| drink       | 1.437154     | .6202209  | 0.84  | 0.401| .6168183  3.348494   |
. logistic notes dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 160
LR chi2(8) = 14.29
Prob > chi2 = 0.0745
Log likelihood = -78.161009 Pseudo R2 = 0.0838

| notes | Odds Ratio | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|-------|------------|-----------|-------|------|----------------------|
| dep_cr | 0.9909111  | 0.0114852 | -0.79 | 0.431 | 0.9686542 - 1.013679 |
| age   | 0.949016   | 0.0223252 | -2.22 | 0.026 | 0.9062528 - 0.993797 |
| levledu | 0.9875082  | 0.083616  | -0.15 | 0.882 | 0.8365007 - 1.165776 |
| hous_inc | 0.9999006  | 0.0000871 | -0.14 | 0.88  | 0.99973 - 1.000071  |
| drink | 0.5618648  | 0.2668215 | -1.21 | 0.225 | 0.2215177 - 1.425132 |
| smoke | 0.7823559  | 0.3696792 | -0.52 | 0.603 | 0.3098805 - 1.425132 |
| pest_pois | 8.272401 | 7.246224 | 2.41 | 0.016 | 1.486005 - 46.05142 |
| lang12 | 1.082769   | 0.7939127 | 0.11  | 0.914 | 0.257285 - 4.556774  |
| drugs | 1 (omitted) |          |      |      |                      |
| _cons | 5.317596   | 8.595639  | 1.03  | 0.301 | 0.2237633 - 126.3694 |

. logistic chek_door dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression
Number of obs = 155
LR chi2(8) = 4.10
Prob > chi2 = 0.8479
Log likelihood = -103.36215 Pseudo R2 = 0.0195

| chek_door | Odds Ratio | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|-----------|------------|-----------|-------|------|----------------------|
| dep_cr    | 0.9928524  | 0.0075634 | -0.94 | 0.346 | 0.9781385 - 1.00788 |
| age       | 0.9770003  | 0.017543  | -1.30 | 0.195 | 0.9432146 - 1.011996 |
| levledu   | 0.9712847  | 0.0657517 | -0.43 | 0.667 | 0.8505971 - 1.109096 |
| hous_inc  | 0.9999577  | 0.0000623 | -0.68 | 0.497 | 0.9998355 - 1.00008 |
| drink     | 1.337011   | 0.5244383 | 0.74  | 0.459 | 0.6198034 - 2.884138 |
| smoke     | 0.7608875  | 0.2966569 | -0.70 | 0.483 | 0.3543657 - 1.633764 |
| pest_pois | 1 (omitted) |          |      |      |                      |
| lang12    | 1.154663   | 0.8371991 | 0.20  | 0.843 | 0.2787942 - 4.78219  |
| drugs     | 1.168933   | 1.815991  | 0.10  | 0.920 | 0.0556429 - 24.5567  |
. logistic q16_head dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
LR chi2(8)      =       6.83
Prob > chi2     =     0.5555
Log likelihood = -94.325007                       Pseudo R2       =     0.0349
------------------------------------------------------------------------------
q16_head | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dep_cr |   .9990153   .0081073    -0.12   0.903      .983251    1.015032
age |   .9894196    .018123    -0.58   0.561     .9545292    1.025585
levledu |   1.055919   .0747606     0.77   0.442     .9191033    1.213101
hous_inc |   .9998715   .0000641    -2.00   0.045      .999746    1.000091
drink |   1.231881   .5214359     0.49   0.622     .5373636    2.824028
smoke |   1.016527   .4315342     0.04   0.969     .4423527    2.335982
pest_pois |    2.33074   2.623684     0.75   0.452       .25663    21.16803
lang12 |   1.545903   1.081917     0.62   0.534      .392157     6.09403
drugs |          1  (omitted)
_cons |   2.035956   2.806363     0.52   0.606     .1366065    30.34348  
------------------------------------------------------------------------------

. logistic less_sex dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
LR chi2(8)      =       5.88
Prob > chi2     =     0.6608
Log likelihood = -104.32388                       Pseudo R2       =     0.0274
------------------------------------------------------------------------------
less_sex | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dep_cr |   1.008527   .0077342    1.11   0.268     .9934814    1.0238
age |   1.001252    .0174337    0.07   0.943     .9676586    1.036011
levledu |   1.086539    .0749717    1.20   0.229     .9491    1.24388
hous_inc |   .9999033   .0000663   -1.46   0.145      .999733    1.00033
drink |   1.079389   .4290685    0.19   0.848     .4952412    2.352554
smoke |   1.187401   .4709817    0.43   0.665     .5457185    2.583603
pest_pois |   2.026568   1.668243    0.86   0.391     .4037047   10.17323
lang12 |   1.796083   1.233379    0.85   0.394     .4675222    6.900026
drugs |          1  (omitted)
_cons |   .1860154   .2484574    -1.26   0.208     .0135711    2.549668
------------------------------------------------------------------------------

. logistic q16_score dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

-----------------------------------------------------------------------------
|     _cons |     2.343374  3.172207    0.63   0.529    .1650352    33.27412
-------------------------------------------------------------
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        153
LR chi2(7)      =       5.47
Prob > chi2     =     0.6033
Log likelihood =  -52.68521                       Pseudo R2       =     0.0493
------------------------------------------------------------------------------
q16_score | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dep_cr |    1.00657   .0132538     0.50   0.619     .9809257    1.032885
age |   .9555184   .0242357    -1.79   0.073     .9091786     1.00422
levledu |   .9722359   .0999229    -0.27   0.784     .7948556      1.1892
hous_inc |   .999912   .0000796    -1.11   0.269     .9997561    1.000068
drink |   .6116158   .3856669    -0.78   0.436     .1771999    2.104851
smoke |   1.179153   .7287463     0.27   0.790     .3511611    3.959444
pest_pois |          1  (omitted)
lang12 |   1.432662   1.597643     0.32   0.747     .1610348    12.74581
drugs |          1  (omitted)
_cons |   62.86685   130.3188     2.00   0.046     1.081279    3655.154
------------------------------------------------------------------------------

. logistic q16_score dep_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        153
LR chi2(7)      =       8.03
Prob > chi2     =     0.3296
Log likelihood = -101.08788                       Pseudo R2       =     0.0382
------------------------------------------------------------------------------
q16_score50 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dep_cr |   .9907546   .0083159    -1.11   0.268     .9745892    1.007188
age |   .9810362   .0175319    -1.07   0.284     .9472691     1.016007
levledu |   1.044025   .0721121     0.62   0.533     .9118377    1.195376
hous_inc |   .9998948   .000066    -1.59   0.111     .9997655    1.000024
drink |   .8376611   .3300222    -0.45   0.653     .3870005    1.813115
smoke |   .8350036   .3274313    -0.46   0.646     .3871732    1.808824
pest_pois |          1  (omitted)
lang12 |   1.432662   1.597643     0.32   0.747     .1610348    12.74581
drugs |          1  (omitted)
_cons |    3.417363   4.749586     0.88   0.377     .2242121    52.08626
-----------------------------------------------------------------------------
Logistic regression

Number of obs = 162
LR chi2(9) = 14.44
Prob > chi2 = 0.1075
Log likelihood = -83.324413  Pseudo R2 = 0.0797

q16_score75  Odds Ratio  Std. Err.  z  P>|z|   [95% Conf. Interval]
-------------+----------------------------------------------------------------
dep_cr |  .9906171  .0099703  -0.94  0.349  .9712672   1.010353
age |  .9831051  .0211008  -0.79  0.427  .9426062   1.025344
levledu |  1.108303  .0958098  1.19  0.234  .9355657   1.312933
hous_inc |  .9998463  .00009   -1.71  0.088  .99967   1.000023
drink |  1.376842  .6503007  0.68  0.498  .5455696   3.474704
smoke |  1.223658  .5679867  0.43  0.664  .4926712   3.474704
pest_pois |  3.50943   2.997283  1.47  0.142  .6580434   18.7124
lang12 |  .4355402  .3331125  -1.09  0.277  .097276   1.950066
drugs |  3.317485  5.307805  0.75  0.454  .1441884   76.3286
_cons |  .6715225  1.050212  -0.25  0.799  .0313216   14.39717
-------------+----------------------------------------------------------------

Logistic regression

Number of obs = 160
LR chi2(8) = 17.82
Prob > chi2 = 0.0226
Log likelihood = -100.18576  Pseudo R2 = 0.0817

tired  Odds Ratio  Std. Err.  z  P>|z|   [95% Conf. Interval]
--------+----------------------------------------------------------------
detp_cr |  .99543   .0052035  -0.88  0.381  .9852834   1.005681
age |  .9696042  .0173181  -1.73  0.084  .9362486   1.004148
levledu |  1.043363  .0713088  0.62  0.535  .9125567   1.192919
hous_inc |  .999824   .0000692  -2.54  0.011  .9996884   0.999597
drink |  1.484747  .1977289  -1.78  0.076  .8179254   1.078259
smoke |  1.345939  .5352193  0.75  0.455  .6173632   2.934336
pest_pois |  1.865023  1.660701  -0.70  0.484  .3256386   10.68151
lang12 |  .5838555  .4391284  -0.72  0.474  .1336906   2.549821
drugs |  1 (omitted)
_cons |  13.10626  18.01047   1.87  0.061  .8866815  193.727
--------+----------------------------------------------------------------

Logistic regression

Number of obs = 160
LR chi2(7) = 17.52
Prob > chi2 = 0.0229
Log likelihood = -100.18576  Pseudo R2 = 0.0817

hart_palp  Odds Ratio  Std. Err.  z  P>|z|   [95% Conf. Interval]
-----------+----------------------------------------------------------------
detp_cr |  .99543   .0052035  -0.88  0.381  .9852834   1.005681
age |  .9696042  .0173181  -1.73  0.084  .9362486   1.004148
levledu |  1.043363  .0713088  0.62  0.535  .9125567   1.192919
hous_inc |  .999824   .0000692  -2.54  0.011  .9996884   0.999597
drink |  1.484747  .1977289  -1.78  0.076  .8179254   1.078259
smoke |  1.345939  .5352193  0.75  0.455  .6173632   2.934336
pest_pois |  1.865023  1.660701  -0.70  0.484  .3256386   10.68151
lang12 |  .5838555  .4391284  -0.72  0.474  .1336906   2.549821
_cons |  13.10626  18.01047   1.87  0.061  .8866815  193.727
-----------+----------------------------------------------------------------

Logistic regression

Number of obs = 160
LR chi2(7) = 17.52
Prob > chi2 = 0.0229
Log likelihood = -100.18576  Pseudo R2 = 0.0817

hart_palp  Odds Ratio  Std. Err.  z  P>|z|   [95% Conf. Interval]
-----------+----------------------------------------------------------------
detp_cr |  .99543   .0052035  -0.88  0.381  .9852834   1.005681
age |  .9696042  .0173181  -1.73  0.084  .9362486   1.004148
levledu |  1.043363  .0713088  0.62  0.535  .9125567   1.192919
hous_inc |  .999824   .0000692  -2.54  0.011  .9996884   0.999597
drink |  1.484747  .1977289  -1.78  0.076  .8179254   1.078259
smoke |  1.345939  .5352193  0.75  0.455  .6173632   2.934336
pest_pois |  1.865023  1.660701  -0.70  0.484  .3256386   10.68151
lang12 |  .5838555  .4391284  -0.72  0.474  .1336906   2.549821
_cons |  13.10626  18.01047   1.87  0.061  .8866815  193.727
-----------+----------------------------------------------------------------
Logistic regression                               Number of obs = 160
LR chi2(8) = 9.07
Prob > chi2 = 0.3364
Log likelihood = -100.23992                       Pseudo R2 = 0.0433

| Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|-----------|------|------|----------------------|
| detp_cr    | .9952911  | 0.0056567 | -0.83 | 0.406 | .9842657 1.00644 |
| age        | .9884261  | 0.0178367 | -0.65 | 0.519 | .9540779 1.024011 |
| levledu    | 1.075917  | 0.0773041 | 1.02  | 0.308 | .9345881 1.238617 |
| hous_inc   | .9999726  | 0.000634 | -0.43 | 0.665 | .9998483 1.000097 |
| drink      | .6564548  | .2616609 | -1.06 | 0.291 | .3005512 1.433809 |
| smoke      | .9262806  | .3688777 | -0.19 | 0.848 | .4243889 2.021721 |
| pest_pois  | 2.76551   | 2.293379 | 1.23  | 0.220 | .5443672 14.04943 |
| lang12     | .384514   | .269056 | -1.37 | 0.172 | .0975652 1.515407 |
| drugs      | 1 (omitted) | | | | |
| _cons      | 1.736332  | 2.361946 | 0.41  | 0.685 | .1207082 24.97635 |

Logistic regression                               Number of obs = 160
LR chi2(8) = 7.00
Prob > chi2 = 0.5361
Log likelihood = -103.31624                       Pseudo R2 = 0.0328

| Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|-----------|------|------|----------------------|
| detp_cr    | .9950533  | 0.0055482 | -0.89 | 0.374 | .9842382 1.005987 |
| age        | .9625083  | 0.0177625 | -2.07 | 0.038 | .9283166 .9979593 |
| levledu    | .9792401  | 0.0665388 | -0.31 | 0.758 | .8571376 1.118736 |
| hous_inc   | .9999261  | 0.0000655 | -1.13 | 0.259 | .9997978 1.000054 |
| drink      | .6239503  | .2446108 | -1.20 | 0.229 | .2893668 1.3454 |
| smoke      | .8804276  | .3408653 | -0.33 | 0.742 | .4122337 1.880372 |
| pest_pois  | 2.932363  | 2.428847 | 1.30  | 0.194 | .5783302 14.86824 |
| lang12     | 1.529379  | 1.070769 | 0.61  | 0.544 | .3877578 6.032112 |
| drugs      | 1 (omitted) | | | | |
| _cons      | 4.119782  | 5.509155 | 1.06  | 0.290 | .299647 56.64201 |

Logistic regression                               Number of obs = 160
LR chi2(8) = 7.00
Prob > chi2 = 0.5361
Log likelihood = -103.31624                       Pseudo R2 = 0.0328

| Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|-----------|------|------|----------------------|
| detp_cr    | .9950533  | 0.0055482 | -0.89 | 0.374 | .9842382 1.005987 |
| age        | .9625083  | 0.0177625 | -2.07 | 0.038 | .9283166 .9979593 |
| levledu    | .9792401  | 0.0665388 | -0.31 | 0.758 | .8571376 1.118736 |
| hous_inc   | .9999261  | 0.0000655 | -1.13 | 0.259 | .9997978 1.000054 |
| drink      | .6239503  | .2446108 | -1.20 | 0.229 | .2893668 1.3454 |
| smoke      | .8804276  | .3408653 | -0.33 | 0.742 | .4122337 1.880372 |
| pest_pois  | 2.932363  | 2.428847 | 1.30  | 0.194 | .5783302 14.86824 |
| lang12     | 1.529379  | 1.070769 | 0.61  | 0.544 | .3877578 6.032112 |
| drugs      | 1 (omitted) | | | | |
| _cons      | 4.119782  | 5.509155 | 1.06  | 0.290 | .299647 56.64201 |

Logistic regression                               Number of obs = 160
LR chi2(8) = 7.00
Prob > chi2 = 0.5361
Log likelihood = -103.31624                       Pseudo R2 = 0.0328

| Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|-----------|------|------|----------------------|
| detp_cr    | .9950533  | 0.0055482 | -0.89 | 0.374 | .9842382 1.005987 |
| age        | .9625083  | 0.0177625 | -2.07 | 0.038 | .9283166 .9979593 |
| levledu    | .9792401  | 0.0665388 | -0.31 | 0.758 | .8571376 1.118736 |
| hous_inc   | .9999261  | 0.0000655 | -1.13 | 0.259 | .9997978 1.000054 |
| drink      | .6239503  | .2446108 | -1.20 | 0.229 | .2893668 1.3454 |
| smoke      | .8804276  | .3408653 | -0.33 | 0.742 | .4122337 1.880372 |
| pest_pois  | 2.932363  | 2.428847 | 1.30  | 0.194 | .5783302 14.86824 |
| lang12     | 1.529379  | 1.070769 | 0.61  | 0.544 | .3877578 6.032112 |
| drugs      | 1 (omitted) | | | | |
| _cons      | 4.119782  | 5.509155 | 1.06  | 0.290 | .299647 56.64201 |
irritated | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
detp_cr |   .9939506   .0055252    -1.09   0.275     .9831802    1.004839
age |   .9994518   .0174284    -0.03   0.975       .96587    1.034201
levledu |   .9567218   .0637508    -0.66   0.507     .8395879    1.090198
hous_inc |   .9999647    .000063    -0.56   0.575     .9998411    1.000088
drink |   .8881142   .3437728    -0.31   0.759     .4158955    1.896502
smoke |   .5881454   .2282883    -1.37   0.171     .2748472    1.258572
pest_pois |    2.37839   1.967688     1.05   0.295     .4699671    12.03645
lang12 |   .6222437    .420775    -0.70   0.483     .1653329    2.341865
_drugs |          1  (omitted)
_cons |   2.521038   3.287565     0.71   0.478       .19569    32.47808

. logistic depress detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression                               Number of obs   =        162
LR chi2(9)      =       3.97
Prob > chi2     =     0.9134
Log likelihood = -109.51381                       Pseudo R2       =     0.0178
------------------------------------------------------------------------------

pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
detp_cr |   .9988802   .0056817    -1.17   0.243     .9840887    1.004067
age |   1.00226   .0170403     0.13   0.894     .9694118    1.036221
levledu |   .982119   .0639746    -0.28   0.782     .8644053    1.115863
hous_inc |   .9999471    .000063    -0.59   0.556     .9998411    1.000088
drink |   1.084708   .410234     0.21   0.830     .5168808    2.27633
smoke |   1.593872   .6970281     1.07   0.286     .6764078    3.755768
pest_pois |   1.407113   1.279085     0.38   0.707     .2369057    8.357619

. logistic pr_concen detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression                               Number of obs   =        162
LR chi2(9)      =       6.17
Prob > chi2     =     0.7229
Log likelihood = -88.559128                       Pseudo R2       =     0.0337
------------------------------------------------------------------------------
. logistic short_mem detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression                               Number of obs =        160
                                LR chi2(8)      =       9.59
                                Prob > chi2     =     0.2952
                                Log likelihood =  -101.0564                       Pseudo R2       =     0.0453
---------------------------------------------------------------------
short_mem |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
detp_cr |   .9897483   .0064052    -1.59   0.111     .9772736    1.002382
age |   .9827916   .0179825    -0.95   0.343     .9481709    1.018676
levledu |   1.070982   .0760454     0.97   0.334     .9318417    1.230897
hous_inc |   .9999202   .0000659    -1.21   0.226     .9997909    1.000049
drink |   .7924221   .3146198    -0.59   0.558     .3639144    1.725496
smoke |   1.152992   .4555978     0.36   0.719     .5314702    2.501344
pest_pois |   2.345357   1.925956     1.04   0.299      .469052    11.72727
lang12 |   1.216851   .8705882     0.27   0.784     .2993991    4.945658
   drugs |          1  (omitted)
   _cons |    .847082    1.15457    -0.12   0.903     .0585788    12.24927
---------------------------------------------------------------------

. logistic perspire detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
   drugs dropped and 2 obs not used

Logistic regression                               Number of obs =        160
                                LR chi2(8)      =      10.94
                                Prob > chi2     =     0.2053
                                Log likelihood = -79.837378                       Pseudo R2       =     0.0641
---------------------------------------------------------------------
perspire |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+----------------------------------------------------------------
detp_cr |   .9912666   .0076967    -1.13   0.259     .9762955    1.006467
age |   .9613372   .0223390    -1.62   0.105     .9203339    1.007931
levledu |   1.056828   .0930406     0.63   0.530     .889337    1.255862
hous_inc |   .9999415   .0000806    -0.73   0.468     .9997835    1.0001
drink |   .7977538   .3718436    -0.48   0.628     .3199725    1.988956
smoke |   1.579586   .7463632     0.97   0.333     .6256709    3.987868
pest_pois |   1.345941   1.274827     0.31   0.754      .2102804    8.614962
lang12 |   .2962215   .2265880    -1.59   0.112     .0661494    1.326499
   drugs |          1  (omitted)
   _cons |   2.627521   4.30323    -0.59   0.555     .1060446    65.10345
---------------------------------------------------------------------
logistic button detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

logistic reading detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

logistic fam_mem detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
| fam_mem | Odds Ratio | Std. Err. | z   | P>|z|  | [95% Conf. Interval] |
|----------|------------|-----------|-----|------|------------------------|
| detp_cr  | 0.99431    | 0.0066881 | -0.85| 0.396| 0.9812876 1.007505     |
| age      | 1.020304   | 0.0209706 | 0.98| 0.328| 1.028937 1.459259     |
| levledu  | 1.225351   | 0.1092216 | 2.28| 0.023| 1.092216 1.459259     |
| hous_inc | 0.9998576  | 0.0000844 | -1.69| 0.092| 0.996922 1.000023     |
| drink    | 0.665154   | 0.3041926 | -0.89| 0.373| 0.271422 1.630044     |
| smoke    | 2.086053   | 0.9895569 | 2.08| 0.023| 0.9895569 1.062245    |
| pest_pois| 0.8633907  | 0.7975312 | -0.16| 0.874| 0.1412328 5.278119    |
| lang12   | 0.6686385  | 0.5092148 | -0.53| 0.597| 0.1503195 2.974583    |
| drugs    | 5.142442   | 7.787403  | 1.08| 0.280| 0.2643391 100.0409    |
| _cons    | 0.0554737  | 0.0872131 | -1.84| 0.066| 0.0025461 1.208664    |

`. logistic chest detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 162
LR chi2(9)     = 20.84
Prob > chi2    = 0.0134

Log likelihood = -91.986704  Pseudo R2 = 0.1018

| chest | Odds Ratio | Std. Err. | z   | P>|z|  | [95% Conf. Interval] |
|-------|------------|-----------|-----|------|------------------------|
| detp_cr | 0.993225   | 0.0062646 | -1.08| 0.281| 0.9810222 1.00558     |
| age    | 0.9903161  | 0.0191027 | -0.50| 0.614| 0.9535745 1.028473    |
| levledu| 1.088339   | 0.0817278 | 1.13| 0.260| 0.9393855 1.260911    |
| hous_inc | 0.9997161 | 0.000095  | -2.99| 0.003| 0.99953 0.9999022     |
| drink  | 1.383156   | 0.5839321 | 0.77| 0.442| 0.6046669 3.163924    |
| smoke  | 0.665823   | 0.2798575 | -2.99| 0.003| 0.99953 0.9999022     |
| pest_pois | 4.815282 | 4.332621  | 1.75| 0.081| 0.6046669 3.163924    |
| lang12 | 1.000998   | 0.7396015 | 0.00| 0.999| 0.0593251 20.87212    |
| drugs  | 1.112762   | 1.664387  | 0.07| 0.943| 0.0593251 20.87212    |
| _cons  | 0.8857067  | 1.295099  | -0.08| 0.934| 0.0593251 20.87212    |

`. logistic notes detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

note: drugs != 0 predicts failure perfectly

Logistics dropped and 2 obs not used

Logistic regression

Number of obs = 160
LR chi2(8)     = 13.86
Prob > chi2    = 0.0854

Log likelihood = -78.374769  Pseudo R2 = 0.0813

| notes | Odds Ratio | Std. Err. | z   | P>|z|  | [95% Conf. Interval] |
|-------|------------|-----------|-----|------|------------------------|
| detp_cr | 0.9964542  | 0.0069282 | -0.51| 0.609| 0.9829674 1.010126    |
| age    | 0.949243   | 0.022344  | -2.20| 0.028| 0.9067253 0.9943434   |
| levledu| 0.9910586  | 0.0834886 | -0.11| 0.915| 0.8402191 1.168977    |
hous_inc | .9999008 .000087 -1.14 0.254 .9997303 1.000071
drink | .5311506 .247966 -1.36 0.175 .212734 1.326168
smoke | .836944 .3886407 -0.38 0.701 .3368489 2.079494
pest_pois | 8.529081 7.431604 2.46 0.014 1.546069 47.05174
lang12 | .8387474 .6523348 -0.23 0.821 .182646 3.851698
drugs | 1 (omitted)
_cons | 4.846877 7.860801 0.97 0.330 .2018165 116.4035

------------------------------------------------------------------------------
.logistic chek_door detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression Number of obs = 155
LR chi2(8) = 3.17
Prob > chi2 = 0.9231
Log likelihood = -103.82703 Pseudo R2 = 0.0150

------------------------------------------------------------------------------
  chek_door | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+--------------------------------------------------
    detp_cr  | .999844   .0047708  -0.03   0.974     .990537    1.009238
     age    | .9771388  .017549    -1.29   0.198     .9433417    1.012147
  levledu   | .9757607  .0656914  -0.36   0.716     .8551409    1.113394
 hous_inc   | .9999593  .0000623  -0.65   0.514     .9998372    1.000082
   drink    | 1.249856  .4812097   0.58   0.562     .5876744    2.658171
   smoke   | .8182215  .3121202  -0.53   0.599     .3874093    1.728111
pest_pois  | 1 (omitted)
 lang12   | 1.263979  .9011931   0.33   0.742     .3124996    5.112466
   drugs   | .8711717  .0483607  -0.09   0.926     .483607    15.69334
   _cons   | 1.871977  2.496316   0.47   0.638     .1371539    25.55014
------------------------------------------------------------------------------

.logistic q16_head detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression Number of obs = 160
LR chi2(8) = 6.82
Prob > chi2 = 0.5560
Log likelihood = -94.32758 Pseudo R2 = 0.0349

------------------------------------------------------------------------------
  q16_head  | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+--------------------------------------------------
    detp_cr  | .9995132  .0047708  -0.03   0.974     .990537    1.009238
     age    | .9771388  .017549    -1.29   0.198     .9433417    1.012147
  levledu   | .9757607  .0656914  -0.36   0.716     .8551409    1.113394
 hous_inc   | .9998717  .0000641  -2.00   0.045     .9997462    .9999973
   drink    | 1.228253  .5081766   0.48   0.628     .5415558    2.761245
   smoke   | 1.028318  .4258524   0.07   0.946     .4566921    2.315429
pest_pois  | 2.332512  2.627395   0.75   0.452     .2564548    21.2147
------------------------------------------------------------------------------
lang12 | 1.550608  1.08473  0.63  0.531   .3935886    6.108876  
drugs | 1 (omitted)  
_cons | 1.994112  2.70374  0.51  0.611   .1398422    28.4355  

.logistic less_sex detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs  
note: drugs != 0 predicts success perfectly  
drugs dropped and 2 obs not used  

Logistic regression  
Number of obs = 160  
LR chi2(8) = 5.26  
Prob > chi2 = 0.7298  
Log likelihood = -104.63488  
Pseudo R2 = 0.0245  

--------------------------------------------------------------------------  
less_sex | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]  
-------------+----------------------------------------------------------------  
detp_cr |   .9960077   .0052321    -0.76   0.446     .9858055    1.006315  
age |   1.002523   .0175323     0.14   0.885     .9687431    1.037482  
levledu |   1.078325   .0738637     1.10   0.271     .9428523    1.233263  
hous_inc |   .9999025   .0000657    -1.48   0.138     .9997736    1.000031  
drink |   1.196331   .4673382     0.46   0.646     .5563338    2.57257  
smoke |   1.079835   .4165808     0.20   0.842     .5069665    2.30004  
pest_pois |          1  (omitted)  
lang12 |   1.466146   1.023554     0.55   0.584     .3731912    5.760004  
_drugs | 1 (omitted)  
_cons |   .2767852   .3650986    -0.97   0.330     .0208617    3.672281  
--------------------------------------------------------------------------  

.logistic q16_score detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs  
note: pest_pois != 0 predicts success perfectly  
pest_pois dropped and 7 obs not used  
note: drugs != 0 predicts success perfectly  
drugs dropped and 2 obs not used  

Logistic regression  
Number of obs = 153  
LR chi2(7) = 5.23  
Prob > chi2 = 0.6313  
Log likelihood = -52.800781  
Pseudo R2 = 0.0472  

--------------------------------------------------------------------------  
q16_score | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]  
-------------+----------------------------------------------------------------  
detp_cr |   .9986158   .0065725    -0.21   0.833     .9858166    1.011581  
age |   .9561864   .0242549    -1.77   0.077     .9098102    1.004927  
levledu |   .968482   .0987121    -0.31   0.753     .7931098    1.182632  
hous_inc |   .9999105   .0000795    -1.13   0.260     .9997546    1.000066  
drink |   .6582365   .4075654    -0.68   0.499     .1955856    2.215272  
smoke |   1.126011   .6881335     0.19   0.846     .3399009    3.730209  
pest_pois |          1  (omitted)  
lang12 |   1.174207   1.211758     0.16   0.876     .1553539    8.874986  
--------------------------------------------------------------------------
. logistic q16_score50 detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: pest_pois != 0 predicts success perfectly
  pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
  drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        153
                                             LR chi2(7)      =       9.25
                                             Prob > chi2     =     0.2355
                                             Log likelihood = -100.48224
                                             Pseudo R2       =     0.0440

             | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   detp_cr    |   .9913503   .0057576   -1.50   0.135     .9801296    1.002699
    age       |   .9831328   .0176739   -0.95   0.344     .9490958     1.01839
   levledu    |   1.048885   .0722338    0.69   0.488     .9164485    1.20046
  hous_inc    |   1.000003   .0021072   -0.48   0.632     .9958384    1.004342
    drink     |   .9998952   .0000662   -1.58   0.113     .9997656    1.000025
     smoke    |    .906263   .3499616   -0.25   0.799     .4251626    1.931761
  pest_pois   |          1  (omitted)
   lang12     |   .5858319    .430764   -0.73   0.467     .1386379    2.475506
     drugs    |          1  (omitted)
     _cons    |   3.381257   4.664929    0.88   0.377     .2263204    50.51645
-------------+----------------------------------------------------------------

. logistic q16_score75 detp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        162
                                             LR chi2(9)      =      14.12
                                             Prob > chi2     =     0.1181
                                             Log likelihood = -83.484783
                                             Pseudo R2       =     0.0780

             | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   detp_cr    |   .9948369   .0066424   -0.78   0.438     .9819028    1.007941
    age       |   .9828263   .0211247   -0.81   0.419     .9422827    1.025114
   levledu    |   1.109293   .0954416    1.21   0.228     .9371529    1.313053
  hous_inc    |   1.000003   .0066424    0.00   0.998     .9934042    1.006621
    drink     |   1.277151   .5886715    0.53   0.596     .5174897    3.151973
     smoke    |   1.310566   .6022169    0.59   0.556     .5325056    3.225475
  pest_pois   |   3.638265   3.089676    1.52   0.128     .6887149    19.21981
   lang12     |   .449871   .3404959   -1.06   0.289     .1020552    1.983082
     drugs    |   2.534493   3.808764    0.62   0.536     .1332691    48.20061
     _cons    |   .6390872   1.008462   -0.28   0.777     .0289993    14.08424
-------------+----------------------------------------------------------------
. logistic tired dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                              Number of obs   =        160
LR chi2(8)      =      17.65
Prob > chi2     =     0.0240
Log likelihood = -100.27367                      Pseudo R2       =     0.0809

------------------------------------------------------------------------------
tired | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   1.004465   .0057329     0.78   0.435      .993291    1.015764
age |   0.9669707   .0173986    -1.87   0.062     .9334643     1.00168
levledu |   1.048998   .0717232     0.70   0.484      .917435    1.199427
hous_inc |   1.048998   .0717232     0.70   0.484      .917435    1.199427
drink |   .9998265   .0000691    -2.51   0.012      .999691     .999962
smoke |   1.401046   .5604091     0.84   0.399     .6397018    3.068509
pest_pois |   2.133732   1.904236     0.85   0.396     .3710995    12.26844
lang12 |   .6903715   .5150425    -0.50   0.619     .1599762    2.979274
drugs |          1  (omitted)
_cons |   10.01072   13.71901     1.68   0.093     .6822626    146.8856
------------------------------------------------------------------------------

. logistic hart_palp dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                              Number of obs   =        160
LR chi2(8)      =       9.21
Prob > chi2     =     0.3252
Log likelihood = -103.07887                      Pseudo R2       =     0.0427

------------------------------------------------------------------------------
hart_palp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   .9969471   .0057329    -0.52   0.600      .985616    1.008408
age |   0.9621953   .0177061    -2.09   0.036     .9281104    0.997532
levledu |   0.9787212   .0666801    -0.32   0.752     .8563805    1.118539
hous_inc |   0.9999261   .0000654    -1.13   0.259     .9997978    1.000054
drink |   0.6162339   .2412818    -1.24   0.216     .2860649    1.327478
smoke |   0.8638129   .3666801    -0.32   0.752     .5863805    1.118539
pest_pois |   2.996763   2.491366     1.32   0.187     .5874946    15.28625
lang12 |   1.641224   1.141323     0.71   0.476     .419985    6.413597
drugs |          1  (omitted)
_cons |   3.798225   5.039842     1.01   0.314     .2819728    51.16279
------------------------------------------------------------------------------

. logistic tingling dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used
Logistic regression                               Number of obs   =        160
LR chi2(8)      =       8.34
Prob > chi2     =     0.4013
Log likelihood = -100.60672                       Pseudo R2       =     0.0398

------------------------------------------------------------------------------
ingling | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   1.000582   .0057634     0.10   0.920      .989349    1.011942
age |   .9871602   .0177748    -0.72   0.473     .952929    1.02262
levledu |   1.077502   .0772674     1.04   0.298     .9362214    1.240102
hous_inc |   1.0000634  .0000634    -0.41   0.684     .9998501    1.000098
drink |   .6437023   .2564881    -1.11   0.269     .2947931    1.405571
smoke |   .9323078   .3738152    -0.17   0.861      .424878    2.045759
pest_pois |   2.95613   2.448861     1.31   0.191     .5828911    14.99201
lang12 |   .4363699   .2983878    -1.21   0.225     .1142371    1.666873
 drugs |          1  (omitted)
_cons |   1.447236    1.95037     0.27   0.784     .1031375    20.30778
------------------------------------------------------------------------------

.logistic irritated dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
LR chi2(8)      =       6.22
Prob > chi2     =     0.6221
Log likelihood = -103.70639                       Pseudo R2       =     0.0291

------------------------------------------------------------------------------
irritated | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   .9959273   .0056798    -0.72   0.474     .9848571    1.007122
age |   .9991353   .0173569    -0.05   0.960      .965689     1.03374
levledu |   .9553204   .0638131    -0.68   0.494     .8380905    1.088948
hous_inc |   1.0000634  .0000631    -0.58   0.565     .9998401    1.000087
drink |   .8765794   .338872    -0.34   0.733     .4108941    1.870047
smoke |   .5711224   .2227431    -1.44   0.151      .265921    1.226608
pest_pois |   2.422114  2.004567     1.07   0.285     .4783343    12.26472
lang12 |   .6715966   .449198   -0.60   0.552     .1810429    2.491354
 drugs |          1  (omitted)
_cons |    2.33836   3.030144     0.66   0.512     .1844544    29.64378
------------------------------------------------------------------------------

.logistic depress dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        162
LR chi2(9)      =       2.70
Prob > chi2     =     0.9749
Log likelihood = -110.14601                       Pseudo R2       =     0.0121

------------------------------------------------------------------------------
depress | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   .9975993   .0051778    -0.46   0.643     .9875025    1.007799
   age |   1.00111   .0169362     0.07   0.948     .9684598    1.034861
levledu |   .9809326   .0637499    -0.30   0.767     .8636153    1.114187
hous_inc |   .9999465   .0000613    -0.87   0.383     .9988264    1.000067
   drink |   .7829771   .2966513    -0.65   0.518     .3726055    1.645314
   smoke |   1.062749   .4032877     0.16   0.873       .50515    2.235843
pest_pois |   1.516158   1.238023     0.51   0.610     .3059803    7.512692
lang12 |   .7331289   .4857321    -0.47   0.639     .2000873    2.686217
drugs |   1.664872   2.515707     0.34   0.736     .0861333    32.18032
_cons |   1.703177   2.147279     0.42   0.673     .1439157    20.15632
------------------------------------------------------------------------------

. logistic pr_concen dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        162
LR chi2(9)      =       6.13
Prob > chi2     =     0.7269
Log likelihood = -88.578953                       Pseudo R2       =     0.0334
------------------------------------------------------------------------------
pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   .9999989   .0061803    -0.00   1.000     .9879587    1.012186
   age |   .9688764   .0205379    -1.49   0.136     .9294475    1.009978
levledu |   .9995676   .0777046    -0.01   0.996     .8583043    1.164081
hous_inc |   .9998451   .0003216    -1.06   0.286     .9944364    1.005269
drink |   .8179247   .3630824    -0.45   0.651     .3426566    1.952394
   smoke |   1.596784   .7058789     1.06   0.290       .671396    3.797788
pest_pois |   1.427605   1.298667     0.39   0.696     .2400407    8.490458
lang12 |   1.956253   .27058789    1.06   0.290       .671396    3.797788
drugs |   2.925289   1.7448858     0.70   0.484     .1449317    59.04379
_cons |   .4994625   .7727107    -0.45   0.654     .0240781    10.36057
------------------------------------------------------------------------------

. logistic short_mem dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
       drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        160
LR chi2(8)      =       7.34
Prob > chi2     =     0.5002
Log likelihood = -102.17923                       Pseudo R2       =     0.0347
------------------------------------------------------------------------------
short_mem | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   .9945929   .0061844    -0.87   0.383     .9825454    1.006788
   age |   .9815934   .0177768    -1.03   0.305     .9473626    1.017061
levledu |   1.068423   .0758785     0.93   0.351     .9297489    1.227781
hous_inc |   .9999465   .0000613    -1.06   0.286     .9944364    1.005269
drink |   .7732319   .3580399    -1.65   0.096     .3561802    1.67861
_cons |   1.703177   2.147279     0.42   0.673     .1439157    20.15632
------------------------------------------------------------------------------
| Variable   | Estimate 1 | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|------------|------------|-----------|-------|------|---------------------|
| smoke      | 1.106405   | .4374225  | 0.26  | 0.798| .5097859             |
| pest_pois  | 2.462154   | 2.027301  | 1.09  | 0.274| .4902848             |
| lang12     | 1.391294   | .977013   | 0.47  | 0.638| .3512987             |
| drugs      | 1 (omitted)| .7417829  | .993104| -0.22 | 0.823 |

Logistic regression
Number of obs = 160
LR chi2(8) = 9.61
Prob > chi2 = 0.2938
Log likelihood = -80.503489
Pseudo R2 = 0.0563

| Variable   | Estimate 1 | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|------------|------------|-----------|-------|------|---------------------|
| smoke      | 1.539953   | .729748   | 0.91  | 0.362| .6083353             |
| pest_pois  | 1.426799   | 1.340688  | 0.38  | 0.705| .2262215             |
| lang12     | 23.54414   | 143.1657  | 0.47  | 0.642| .0891379             |
| drugs      | 1 (omitted)| .7417829  | .993104| -0.22 | 0.823 |

Logistic regression
Number of obs = 160
LR chi2(8) = 7.04
Prob > chi2 = 0.5322
Log likelihood = -31.123179
Pseudo R2 = 0.1016
. logistic reading dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =  162  
                           LR chi2(9) =  7.20  
                           Prob > chi2 =  0.6166  
Log likelihood = -82.213624                       Pseudo R2 =  0.0419

------------------------------------------------------------------------------
  reading  |  Odds Ratio  Std. Err.   z    P>|z|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
   dedtp_cr  |   .9954725   .0070477   -0.64   0.521     .9817696    1.009367  
    age     |   .9508934   .0220721   -2.17   0.030     .9086021     .995153  
   levledu  |     .91857   .0738747   -1.06   0.291     .7846132    1.075397  
  hous_inc  |   .9999828   .0000757   -0.23   0.820     .9998345    1.000131  
     drink  |   .7903504   .3594721   -0.52   0.605     .3240939    1.927385  
    smoke  |   .8366147   .3780433   -0.39   0.693      .345057    2.028431  
   pest_pois|    .815276   .9343788   -0.18   0.859     .0862486    7.706503  
    lang12  |   .9156197   .7522875   -0.11   0.915     .1829594    4.582217  
     drugs  |   3.338186   5.383542   0.75   0.455     .1415028      78.715  
   _cons   |   5.452753   8.722301   1.06   0.289     .2371493    125.3747  
------------------------------------------------------------------------------

. logistic fam_mem dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =  162  
                           LR chi2(9) = 10.52  
                           Prob > chi2 =  0.3097  
Log likelihood = -84.150963                       Pseudo R2 =  0.0589

------------------------------------------------------------------------------
  fam_mem  |  Odds Ratio  Std. Err.   z    P>|z|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
   dedtp_cr  |   1.003364   .0059151   0.57   0.569     .9918373    1.015024  
    age     |   1.01656    .020748    0.80   0.421      .976697    1.058049  
   levledu  |   1.221868   .1078126   2.27   0.023     1.027822    1.452549  
  hous_inc  |   .9998603   .0000843  -1.66   0.098     .9996951    1.000026  
     drink  |   .6475626   .2971024  -0.95   0.344     .2634812    1.591527  
    smoke  |   2.126954   1.016377   1.58   0.114     .8336938    5.426373  
   pest_pois|   .9863912   .9087159  -0.01   0.988     .1621351    6.000967  
    lang12  |   .8212362   .6045636  -0.27   0.789     .1904194    3.476091  
     drugs  |   3.471252   5.54372    0.78   0.436     .1517349    79.41216  
   _cons   |   5.452753   8.722301   1.06   0.289     .2371493    125.3747  
------------------------------------------------------------------------------

. logistic chest dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =  162  
                           LR chi2(9) = 19.96  
                           Prob > chi2 =  0.0182  
Log likelihood = -92.428868                       Pseudo R2 =  0.0974

------------------------------------------------------------------------------
  chest  |  Odds Ratio  Std. Err.   z    P>|z|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
   dedtp_cr  |   1.003364   .0059151   0.57   0.569     .9918373    1.015024  
    age     |   1.01656    .020748    0.80   0.421      .976697    1.058049  
   levledu  |   1.221868   .1078126   2.27   0.023     1.027822    1.452549  
  hous_inc  |   .9998603   .0000843  -1.66   0.098     .9996951    1.000026  
     drink  |   .6475626   .2971024  -0.95   0.344     .2634812    1.591527  
    smoke  |   2.126954   1.016377   1.58   0.114     .8336938    5.426373  
   pest_pois|   .9863912   .9087159  -0.01   0.988     .1621351    6.000967  
    lang12  |   .8212362   .6045636  -0.27   0.789     .1904194    3.476091  
     drugs  |   3.471252   5.54372    0.78   0.436     .1517349    79.41216  
   _cons   |   5.452753   8.722301   1.06   0.289     .2371493    125.3747  
------------------------------------------------------------------------------
|                | Odds Ratio   | Std. Err.      | z    | P>|z|     | [95% Conf. Interval] |
|----------------|--------------|----------------|------|---------|---------------------|
| chest          |              |                |      |         |                     |
| dedtp_cr       | .996284      | .0059756       | -0.62| 0.535   | .9846405            | 1.008065            |
| age            | .9903295     | .0190348       | -0.51| 0.613   | .953716             | 1.028349            |
| levledu        | 1.088832     | .0818316       | 1.13 | 0.257   | .9396984            | 1.261634            |
| hous_inc       | .9997164     | .0000947       | -2.99| 0.003   | .9995308            | .9999021            |
| drink          | 1.372149     | .5793777       | 0.75 | 0.454   | .99776              | 3.139161            |
| smoke          | .6528769     | .2746877       | -1.01| 0.311   | .286221             | 1.489227            |
| pest_pois      | 4.968369     | 4.498809       | 1.77 | 0.077   | .8422855            | 29.3068             |
| lang12         | 1.105204     | .80276         | 0.14 | 0.890   | .2661805            | 4.588903            |
| drugs          | 1.164153     | 1.784923       | 0.10 | 0.921   | .0576654            | 23.50199            |
| _cons          | .7594631     | 1.088549       | -0.19| 0.848   | .0457581            | 12.60508            |

```
 logistical notes dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly

drugs dropped and 2 obs not used

Logistic regression
Number of obs = 160
LR chi2(8)     = 13.72
Prob > chi2    = 0.0895
Log likelihood = -78.448062 Pseudo R2 = 0.0804
```

|                | Odds Ratio   | Std. Err.      | z    | P>|z|     | [95% Conf. Interval] |
|----------------|--------------|----------------|------|---------|---------------------|
| chek_door      |              |                |      |         |                     |
| dedtp_cr       | 1.002486     | .0067514       | 0.37 | 0.712   | .9893406            | 1.015806            |
| age            | .9484855     | .223051        | -2.25| 0.025   | .9057604            | .9932259            |
| levledu        | .9939657     | .0834098       | -0.07| 0.943   | .8432218            | 1.171658            |
| hous_inc       | .9999033     | .0000867       | -1.12| 0.265   | .9997333            | 1.000073            |
| drink          | .5200818     | .2434804       | -1.40| 0.153   | .2077662            | 1.301873            |
| smoke          | .8718527     | .4097461       | -0.29| 0.770   | .3470583            | 2.1902              |
| pest_pois      | 9.193928     | 8.050001       | 2.53 | 0.011   | 1.652753            | 51.14396            |
| lang12         | .9516076     | .7127365       | -0.07| 0.947   | .219242             | 4.1304              |
| drugs          | 1 (omitted)  |                |      |         |                     |
| _cons          | 3.859913     | 6.110898       | 0.85 | 0.394   | .1733728            | 85.9358             |

```
 logistical chek_door dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly

pest_pois dropped and 7 obs not used

Logistic regression
Number of obs = 155
LR chi2(8)     = 3.18
Prob > chi2    = 0.9228
Log likelihood = -103.82496 Pseudo R2 = 0.0151
```

|                | Odds Ratio   | Std. Err.      | z    | P>|z|     | [95% Conf. Interval] |
|----------------|--------------|----------------|------|---------|---------------------|
| chek_door      |              |                |      |         |                     |
| dedtp_cr       | .9996219     | .0052482       | -0.07| 0.943   | .9893883            | 1.009961            |
. logistic q16_head dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression
Number of obs =  160
LR chi2(8) =  6.98
Prob > chi2 =  0.5390
Log likelihood = -94.249371  Pseudo R2 =  0.0357

-------------+----------------------------------------------------------------
   q16_head  |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dedtp_cr  |  1.002411   .006008     0.40   0.688     .9907045    1.014256
      age  |  0.9888433   .0181958    -0.61   0.542     .9538156    1.025157
  levledu  |  1.058692   .0750492     0.80   0.421     .9213597    1.216494
 hous_inc  |  0.9998728   .0000643    -1.98   0.048     .9997468    .9999988
    drink  |  1.208736   .5011895     0.46   0.648     .5362776    2.724414
     smoke  |  1.051715   .4390063     0.12   0.904     .4640773    2.383451
pest_pois  |  2.443079   2.754381     0.79   0.428     .2680859    22.26389
   lang12  |  1.622032   1.334782     0.80   0.421     .9213597    1.216494
      drugs  |          1  (omitted)
     _cons  |  1.827136   2.494903     0.44   0.659     .1257415    26.54991
-------------+----------------------------------------------------------------

. logistic less_sex dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression
Number of obs =  160
LR chi2(8) =  5.50
Prob > chi2 =  0.7032
Log likelihood = -104.51417  Pseudo R2 =  0.0256

-------------+----------------------------------------------------------------
  less_sex  |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    dedtp_cr  |  1.005031   .006008     0.40   0.688     .9907045    1.014256
      age  |  0.9888433   .0181958    -0.61   0.542     .9538156    1.025157
  levledu  |  1.058692   .0750492     0.80   0.421     .9213597    1.216494
 hous_inc  |  0.9998728   .0000643    -1.98   0.048     .9997468    .9999988
    drink  |  1.157149   .4523105     0.37   0.709     .5378588    2.489487
     smoke  |  1.051715   .4390063     0.12   0.904     .4640773    2.383451
pest_pois  |  2.443079   2.754381     0.79   0.428     .2680859    22.26389
   lang12  |  1.622032   1.334782     0.80   0.421     .9213597    1.216494
      drugs  |          1  (omitted)
     _cons  |  1.827136   2.494903     0.44   0.659     .1257415    26.54991
-------------+----------------------------------------------------------------
|               | Odds Ratio   | Std. Err. |   z  | P>|z| | [95% Conf. Interval] |
|---------------|--------------|-----------|------|-------|---------------------|
| dedtp_cr      | 1.003784     | .0089282  | 0.42 | 0.671 | .9864364  1.021436  |
| age           | .9549448     | .0242062  | -1.82| 0.069 | .9086607  1.003586 |
| levledu       | .9716222     | .1000649  | -0.28| 0.780 | .7940253  1.188942 |
| hous_inc      | .9999131     | .0000797  | -1.09| 0.276 | .9997568  1.000069 |
| drink         | .648486      | .3992702  | -0.70| 0.482 | .1940078  2.167614 |
| smoke         | 1.144456     | .6980144  | 0.22 | 0.825 | .3462929  3.78229 |
| pest_pois     | 1            | (omitted) |      |       |                     |
| lang12        | 1.290655     | 1.388578  | 0.24 | 0.813 | .156685  10.63147  |
| drugs         | 1            | (omitted) |      |       |                     |
| _cons         | 71.3987      | 146.6504  | 2.08 | 0.038 | 1.274538  3999.703 |

---

Logistic regression

Logistic regression

|               | Odds Ratio   | Std. Err. |   z  | P>|z| | [95% Conf. Interval] |
|---------------|--------------|-----------|------|-------|---------------------|
| dedtp_cr      | .9984792     | .0055521  | -0.27| 0.784 | .9876564  1.009421  |
| age           | .9816949     | .0175118  | -1.04| 0.300 | .9479655  1.016624 |
| levledu       | 1.050473     | .0720702  | 0.72 | 0.473 | .918303  1.201665 |
| smoke         | 1.134539     | .4427293  | 0.32 | 0.746 | .528027  2.437712  |
| pest_pois     | 2.012997     | 1.658025  | 0.85 | 0.396 | .400629  10.11448  |
| lang12        | 1.700403     | 1.15525   | 0.78 | 0.435 | .4490009  6.439563 |
| drugs         | 1            | (omitted) |      |       |                     |
| _cons         | .2133658     | .2804926  | -1.18| 0.240 | .0162229  2.806221 |

---

. logistic q16_score dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression

Logistic regression

|               | Odds Ratio   | Std. Err. |   z  | P>|z| | [95% Conf. Interval] |
|---------------|--------------|-----------|------|-------|---------------------|
| dedtp_cr      | .9984792     | .0055521  | -0.27| 0.784 | .9876564  1.009421  |
| age           | .9816949     | .0175118  | -1.04| 0.300 | .9479655  1.016624 |
| levledu       | 1.050473     | .0720702  | 0.72 | 0.473 | .918303  1.201665 |

---

. logistic q16_score50 dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression

Logistic regression

|               | Odds Ratio   | Std. Err. |   z  | P>|z| | [95% Conf. Interval] |
|---------------|--------------|-----------|------|-------|---------------------|
| dedtp_cr      | .9984792     | .0055521  | -0.27| 0.784 | .9876564  1.009421  |
| age           | .9816949     | .0175118  | -1.04| 0.300 | .9479655  1.016624 |
| levledu       | 1.050473     | .0720702  | 0.72 | 0.473 | .918303  1.201665 |
. logistic q16_score75 dedtp_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs =        162
LR chi2(9)      =      13.52
Prob > chi2     =     0.1405
Log likelihood = -83.785103                       Pseudo R2       =     0.0747

------------------------------------------------------------------------------
q16_score75 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
dedtp_cr |   .9983192   .0067162    -0.25   0.803     .9852421     1.01157
age |   .9820445   .0210572    -0.85   0.398     .9416283    1.024195
levledu |   1.109454   .0953974     1.21   0.227     .9373852    1.313109
hous_inc |   .999850   .0008955    -1.68   0.094     .9996745    1.000025
drink |   1.26661   .5846257     0.51   0.609     .5125734    3.129894
smoke |   1.290697   .5944526     0.55   0.580     .5233456    3.183169
pest_pois |   3.783545   3.220892     1.56   0.118     .7133131    20.06863
lang12 |   .499377   .3714863    -0.93   0.351     .1162037    2.146036
drugs |   2.413231   3.733767     0.57   0.569     .1163093    50.07067
_cons |   .5611598   .8745909    -0.37   0.711     .0264517    11.90473
------------------------------------------------------------------------------

. logistic tired cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
     drugs dropped and 2 obs not used

Logistic regression                               Number of obs =        166
LR chi2(8)      =      17.45
Prob > chi2     =     0.0258
Log likelihood = -104.87557                       Pseudo R2       =     0.0768

------------------------------------------------------------------------------
tired | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dcca_cr |   1.218427   .3065378     0.79   0.432     .7441321    1.995028
age |   .9717315   .0171032    -1.63   0.103     .9387814    1.005838
levledu |   1.077922   .0705271     1.14   0.252     .9480584    1.225278
hous_inc |   .9998231   .0006687    -2.57   0.010     .9996884    1.000057
drink |   .4794052   .1911741    -1.84   0.065     .2194149    1.047464
smoke |   1.388078   .5379746     0.85   0.397     .6494043    2.966964
pest_pois |   2.087682   1.861221     0.83   0.409     .3637449    11.98207
lang12 |   .612862   .4543559    -0.37   0.711     .0264517    11.90473
drugs |          1  (omitted)
_cons |   6.458359   8.549281     1.41   0.159     .4823256    86.47767
------------------------------------------------------------------------------
### Logistic Regression for hart_palp

**Logistic regression**

- Number of obs = 166
- LR chi2(8) = 9.59
- Prob > chi2 = 0.2951
- Log likelihood = -107.16435
- Pseudo R2 = 0.0428

|   | Odds Ratio | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|---|------------|-----------|-------|------|----------------------|
| hart_palp |           |           |       |     |                      |
| cis_dcca_cr | 1.025604 | .2519157  | 0.10  | 0.918 | .6337269   1.659807 |
| age | .9563059 | .0175062  | -2.44 | 0.015 | .9226026   .9912403 |
| levledu | .9579304 | .0620491  | -0.66 | 0.507 | .8437196   1.087601 |
| hous_inc | .9999403 | .0000645  | -0.93 | 0.355 | .9998138   1.000067 |
| drink | .6561314 | .2530681  | -1.09 | 0.275 | .3080951   1.397323 |
| smoke | .8066104 | .3047107  | -0.57 | 0.569 | .3846875   1.691296 |
| pest_pois | 3.294928 | 2.741805  | 1.43  | 0.152 | .6449658   16.83276 |
| lang12 | 1.673649 | 1.147353  | 0.75  | 0.453 | .4366483   6.415006 |
| drugs | 1 (omitted) | | | | |
| _cons | 5.015391 | 6.454213  | 1.25  | 0.210 | .4026331   62.47412 |

**Note:** drugs != 0 predicts success perfectly. Drugs dropped and 2 obs not used.

### Logistic Regression for tingling

**Logistic regression**

- Number of obs = 166
- LR chi2(8) = 9.72
- Prob > chi2 = 0.2855
- Log likelihood = -103.74629
- Pseudo R2 = 0.0447

|   | Odds Ratio | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|---|------------|-----------|-------|------|----------------------|
| tingling |           |           |       |     |                      |
| cis_dcca_cr | .8097527 | .2090986  | -0.82 | 0.414 | .4881471   1.343242 |
| age | .9932574 | .0177345  | -0.38 | 0.705 | .9590996   1.028632 |
| levledu | 1.103446 | .0777656  | 1.40  | 0.162 | .9610864   1.266892 |
| hous_inc | .9999751 | .0000629  | 0.40  | 0.693 | .9998518   1.000098 |
| drink | .6684351 | .2638205  | -1.02 | 0.307 | .3083925   1.448821 |
| smoke | .9820431 | .3841924  | -0.05 | 0.963 | .4561698   2.114144 |
| pest_pois | 2.700861 | 2.224962  | 1.21  | 0.228 | .5373843   13.57437 |
| lang12 | .4491502 | .3040121  | -1.18 | 0.237 | .1191919   1.69253 |
| drugs | 1 (omitted) | | | | |
| _cons | 1.043511 | 1.376799  | 0.03  | 0.974 | .0786011   13.85367 |

**Note:** drugs != 0 predicts success perfectly. Drugs dropped and 2 obs not used.

### Logistic Regression for irritated

**Logistic regression**

- Number of obs = 166
- LR chi2(8) = 9.72
- Prob > chi2 = 0.2855
- Log likelihood = -103.74629
- Pseudo R2 = 0.0447

|   | Odds Ratio | Std. Err. | z     | P>|z|  | [95% Conf. Interval] |
|---|------------|-----------|-------|------|----------------------|
| irritated |           |           |       |     |                      |
| cis_dcca_cr | .8097527 | .2090986  | -0.82 | 0.414 | .4881471   1.343242 |
| age | .9932574 | .0177345  | -0.38 | 0.705 | .9590996   1.028632 |
| levledu | 1.103446 | .0777656  | 1.40  | 0.162 | .9610864   1.266892 |
| hous_inc | .9999751 | .0000629  | 0.40  | 0.693 | .9998518   1.000098 |
| drink | .6684351 | .2638205  | -1.02 | 0.307 | .3083925   1.448821 |
| smoke | .9820431 | .3841924  | -0.05 | 0.963 | .4561698   2.114144 |
| pest_pois | 2.700861 | 2.224962  | 1.21  | 0.228 | .5373843   13.57437 |
| lang12 | .4491502 | .3040121  | -1.18 | 0.237 | .1191919   1.69253 |
| drugs | 1 (omitted) | | | | |
| _cons | 1.043511 | 1.376799  | 0.03  | 0.974 | .0786011   13.85367 |

**Note:** drugs != 0 predicts success perfectly.
drugs dropped and 2 obs not used

Logistic regression

Number of obs = 166
LR chi2(8) = 4.85
Prob > chi2 = 0.7732

Log likelihood = -107.76909  Pseudo R2 = 0.0220

------------------------------------------------------------------------------
irritated | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dcca_cr |   1.025617   .2512701     0.10   0.918     .6345212    1.657771
age         |   1.003037   .0171535     0.18   0.859     .9699738    1.037227
levledu     |   .9819715   .0628254    -0.28   0.776     .8662436    1.11316
hous_inc    |   .9999623   .0000629    -0.60   0.549     .9998391    1.000086
drink       |   .918386   .3511905    -0.22   0.824     .4340363    1.943231
smoke       |   .6390509   .2426281    -1.18   0.238     .3036409    1.344964
pest_pois   |   2.466002   2.023795     1.10   0.271      .493663    12.31846
lang12      |   .6923531   .4531151    -0.56   0.574     .1919787    2.496906
drugs       |          1  (omitted)
_cons       |   1.279013   1.595366     0.20   0.844     .1109521    14.74396
------------------------------------------------------------------------------

.logistic depress cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 168
LR chi2(9) = 2.35
Prob > chi2 = 0.9845

Log likelihood = -114.5082  Pseudo R2 = 0.0102

------------------------------------------------------------------------------
depress | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dcca_cr |   1.053476   .244469   0.22    0.822     .6684905    1.660175
age         |   1.000081   .016663   0.00    0.996     .9679493    1.033279
levledu     |   .979338   .0608397   -0.34    0.737     .8670681    1.106145
hous_inc    |   .9999495  .0000608   -0.83    0.406     .9998302    1.000069
drink       |   .8103442  .3025774   -0.56    0.573     .389795   1.684623
smoke       |   1.10777   .408487   0.28    0.781     .5377455    2.282035
pest_pois   |   1.545626  1.253799   0.54    0.592     .31425   7.602104
lang12      |   .7413372   .484299   -0.46    0.647     .2060364    2.667397
drugs       |  1.385821   2.036786   0.22    0.824     .0777532    24.69996
_cons       |   1.562645  1.904312   0.37    0.714     .1433992    17.02841
------------------------------------------------------------------------------

.logistic pr_concen cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 168
LR chi2(9) = 6.12
Prob > chi2 = 0.7283

Log likelihood = -92.497468  Pseudo R2 = 0.0320

------------------------------------------------------------------------------
pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
. logistic short_mem cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: drugs != 0 predicts success perfectly
  drugs dropped and 2 obs not used

Logistic regression
  Number of obs = 166
  LR chi2(8) = 7.20
  Prob > chi2 = 0.5148
Log likelihood = -106.08884  Pseudo R2 = 0.0328

short_mem | Odds Ratio Std. Err.  z  P>|z|  [95% Conf. Interval]
-------------+--------------------------------------------------
cis_dcca_cr | .9973786 .2467502 -0.01 0.992 .6141492 1.619743
  age | .9846808 .0175795 -0.86 0.387 .9508215 1.019746
  levledu | 1.099461 .075527  1.38 0.167 .9609634 1.257919
  hous_inc | .99992 .0000655 -1.22 0.222 .9997916 1.000048
  drink | .7676327 .3003218 -0.68 0.499 .3565635 1.652609
  smoke | 1.217712 .4697365  0.51 0.610 .5717297 2.593573
  pest_pois | 2.559133 2.102488  1.14 0.253 .5114201 12.80584
  lang12 | 1.503539 1.024937  0.60 0.550 .395244 5.719583
  drugs | 1 (omitted)
  _cons | .4229042 .5476167 -0.66 0.506 .0334214 5.351295
-------------+--------------------------------------------------

. logistic perspire cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: drugs != 0 predicts failure perfectly
  drugs dropped and 2 obs not used

Logistic regression
  Number of obs = 166
  LR chi2(8) = 9.50
  Prob > chi2 = 0.3018
Log likelihood = -83.319892  Pseudo R2 = 0.0539

perspire | Odds Ratio Std. Err.  z  P>|z|  [95% Conf. Interval]
-------------+--------------------------------------------------
cis_dcca_cr | .9823046 .2864318 -0.06 0.951 .5546806 1.7396
  age | .9632572 .021803 -1.65 0.098 .9214581 1.006952
  levledu | 1.076439 .0915117  0.87 0.386 .9112252 1.271607
-------------+--------------------------------------------------
|       | Odds Ratio   | Std. Err. |      z  |     P>|z|  |   [95% Conf. Interval] |
|-------|--------------|-----------|--------|--------|-----------------------|
| button|              |           |        |        |                       |
| cis_dcca_cr | 3.031758     | 1.401977  | 2.40   | 0.016  | 1.224823               |
| age    | .9679249     | .0415077  | -0.76  | 0.447  | .8898964               |
| levledu | 1.139837     | .0466846  | 0.76   | 0.448  | .8126721               |
| hous_inc | .9998562     | .0001637  | -0.88  | 0.380  | .9995355               |
| drink  | 1.156767     | 0.112888  | 0.15   | 0.881  | .1714079               |
| smoke  | 2.461147     | 2.348755  | 0.94   | 0.345  | .3791465               |
| pest_pois | 4.221417     | 5.639077  | 1.08   | 0.281  | .3078942               |
| lang12 | 6.294004     | 17.09934  | 0.68   | 0.498  | .0306431               |
| drugs  |              |           |        |        |                       |
| _cons | .0021264     | .0079845  | -1.64  | 0.101  | 1.35e-06               |

Logistic regression

Number of obs = 166
LR chi2(8) = 11.42
Prob > chi2 = 0.1792
Log likelihood = -29.276414

Pseudo R2 = 0.1632

--------------------------+
 button | Odds Ratio   | Std. Err. |      z  |     P>|z|  |   [95% Conf. Interval] |
--------------------------+
 cis_dcca_cr | 1.565963     | .4263746  | 1.65   | 0.100  | .918374               |
 age    | .9475827     | .0219819  | -2.32  | 0.020  | .9054638               |
 levledu | .9345311     | .0792966  | -0.87  | 0.386  | .8019244               |
 hous_inc | .9999803     | .000077   | -0.26  | 0.798  | .9998295               |
 drink  | .7272616     | .3326962  | -0.71  | 0.481  | .2932084               |
 smoke  | .8887993     | .4018593  | -0.26  | 0.794  | .3663901               |
 pest_pois | .972312      | 1.11929   | -0.02  | 0.981  | .1018436               |
 lang12 | .8584466     | .7121595  | -0.15  | 0.880  | .18304                 |
 drugs  | 2.153521     | 3.24027   | 0.51   | 0.610  | .1128232               |
 _cons | 3.387295     | 5.227927  | 0.79   | 0.429  | .1644806               |
. logistic fam_mem cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        168
LR chi2(9)      =      10.61
Prob > chi2     =     0.3031
Log likelihood = -85.724265                       Pseudo R2       =     0.0583

------------------------------------------------------------------------------
fam_mem | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dcca_cr |   1.082833   .3010479     0.29   0.775     .6279303    1.867289
age |   1.017454   .0207351     0.85   0.396     .9776144    1.058916
levledu |   1.228023   .1080966     2.33   0.020     1.033427    1.459263
hous_inc |   .9998621   .0000844    -1.63   0.102     .9996966    1.000028
drink |   .6593946   .3024646    -0.91   0.364     .2683483    1.620287
smoke |   2.061216   .9681959     1.54   0.124     .8209117    5.175479
pest_pois |   .9940608   .9126621    -0.01   0.995     .1644039    6.010544
lang12 |   .7264569   .5340181    -0.43   0.664     .1719856    3.068511
drugs |   4.290503   6.579212     0.95   0.342     .2124442    86.65057
_cons |   .0445573   .0684918    -2.02   0.043     .0021902    .9064696
------------------------------------------------------------------------------

. logistic chest cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        168
LR chi2(9)      =      20.15
Prob > chi2     =     0.0170
Log likelihood = -96.153364                       Pseudo R2       =     0.0948

------------------------------------------------------------------------------
chest | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dcca_cr |   .9554633   .2503081    -0.17   0.862     .5717681    1.596644
age |   .9939612   .0188259    -0.32   0.749     .9577396    1.031553
levledu |   1.117341   .0817652     1.52   0.129     .9680466    1.28966
hous_inc |   .999722   .0000927    -3.00   0.003     .9995402    1.00007
drink |   1.365048   .5684492     0.75   0.455     .603505    3.087559
smoke |   .7110519   .2921318    -0.83   0.407     .3178262    1.59079
pest_pois |   .9999037   .9999037    -0.02   0.980     .9999037   1.000000
lang12 |   1.214704   .8548195     0.28   0.778     .3058139    4.824848
drugs |   .9643381   1.428179    -0.02   0.980     .0529182    17.57332
_cons |   .4530499   .6317744    -0.57   0.570     .0294545    6.968506
------------------------------------------------------------------------------

. logistic notes cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
LR chi2(8)      =      16.18
Prob > chi2     =     0.0399
Log likelihood = -79.980636  Pseudo R² = 0.0919

| notes | Odds Ratio   | Std. Err.   | z   | P>|z| | [95% Conf. Interval] |
|-------+-------------+-------------+-----+-----+------------------------|
| cis_dcca_cr | 1.540087 .4431685 | 1.50 0.133 | .8762083 2.706968 |
| age     | .9482782 .0219217 | -2.30 0.022 | .9062714 .9922321 |
| levledu | 1.018127 .0843077 | 0.22 0.828 | .8655992 1.197532 |
| hous_inc| .9998991 .0000862 | -1.17 0.242 | .9997301 1.000068 |
| drink   | .4645578 .2182454 | -1.63 0.103 | .1849917 1.166614 |
| smoke   | .8306001 .3841031 | -0.40 0.688 | .3355536 2.055995 |
| pest_pois| 10.32843 9.088695 | 2.65 0.008 | 1.840788 57.95154 |
| lang12  | .8958357 .6764728 | -0.15 0.884 | .2039201 3.93547 |
| drugs   | 1 (omitted) |
| _cons   | 2.61039 4.031652 | 0.62 0.534 | .1264898 53.87102 |

Logistic regression
Number of obs = 161
LR chi2(8) = 3.18
Prob > chi2 = 0.9224
Log likelihood = -107.73056  Pseudo R² = 0.0146

| chek_door | Odds Ratio   | Std. Err.   | z   | P>|z| | [95% Conf. Interval] |
|-----------+-------------+-------------+-----+-----+------------------------|
| cis_dcca_cr | 1.17045 .2778458 | 0.66 0.507 | .7350069 1.863864 |
| age       | .9810677 .0173021 | -1.08 0.278 | .9477357 1.015572 |
| levledu   | 1.007469 .06511 | 0.12 0.908 | .8876076 1.143517 |
| hous_inc  | .9999522 .0000623 | -0.77 0.443 | .9998301 1.000074 |
| drink     | 1.209811 .4594733 | 0.50 0.616 | .5746989 2.5468 |
| smoke     | .8542528 .3199873 | -0.42 0.674 | .4099605 1.780044 |
| pest_pois |          1 (omitted) |
| lang12    | 1.258395 .8821916 | 0.33 0.743 | .3184831 4.972189 |
| drugs     | .8244731 1.215334 | -0.13 0.896 | .0458609 14.82211 |
| _cons     | 1.087426 1.400251 | 0.07 0.948 | .0871624 13.56658 |

Logistic regression
Number of obs = 166
LR chi2(8) = 6.79
Prob > chi2 = 0.5592
Log likelihood = -99.003445  Pseudo R² = 0.0332

| q16_head | Odds Ratio   | Std. Err.   | z   | P>|z| | [95% Conf. Interval] |
|----------+-------------+-------------+-----+-----+------------------------|

Logistic regression
Number of obs = 161
LR chi2(8) = 3.18
Prob > chi2 = 0.9224
Log likelihood = -107.73056  Pseudo R² = 0.0146

| chek_door | Odds Ratio   | Std. Err.   | z   | P>|z| | [95% Conf. Interval] |
|-----------+-------------+-------------+-----+-----+------------------------|
| cis_dcca_cr | 1.17045 .2778458 | 0.66 0.507 | .7350069 1.863864 |
| age       | .9810677 .0173021 | -1.08 0.278 | .9477357 1.015572 |
| levledu   | 1.007469 .06511 | 0.12 0.908 | .8876076 1.143517 |
| hous_inc  | .9999522 .0000623 | -0.77 0.443 | .9998301 1.000074 |
| drink     | 1.209811 .4594733 | 0.50 0.616 | .5746989 2.5468 |
| smoke     | .8542528 .3199873 | -0.42 0.674 | .4099605 1.780044 |
| pest_pois |          1 (omitted) |
| lang12    | 1.258395 .8821916 | 0.33 0.743 | .3184831 4.972189 |
| drugs     | .8244731 1.215334 | -0.13 0.896 | .0458609 14.82211 |
| _cons     | 1.087426 1.400251 | 0.07 0.948 | .0871624 13.56658 |

Logistic regression
Number of obs = 166
LR chi2(8) = 6.79
Prob > chi2 = 0.5592
Log likelihood = -99.003445  Pseudo R² = 0.0332

| q16_head | Odds Ratio   | Std. Err.   | z   | P>|z| | [95% Conf. Interval] |
|----------+-------------+-------------+-----+-----+------------------------|
. logistic less_sex cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs =  166
               LR chi2(8)      = 5.02
               Prob > chi2     = 0.7558
Log likelihood = -109.45062                       Pseudo R2       = 0.0224

                       | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dcca_cr |  .8535008   .2090182    -0.65   0.518     .5281397    1.379301
age | 1.000473   .0171857     0.03   0.978     .9673505     1.03473
levledu | 1.075111   .0701978     1.11   0.267     .9459658    1.221888
hous_inc | 1.0999046   .000065    -1.47   0.142     .9997773    1.100032
drink | 1.082006   .4137856     0.21   0.837     .5113394    2.289549
smoke | 1.009768   .3792567     0.03   0.979     .4836381    2.108252
pest_pois | 1.856107   1.521687     0.75   0.451     .3721902    9.256381
lang12 | 1.750249   1.185434     0.83   0.409     .4640725    6.601062
drugs | 1 (omitted)
_cons | 1.700362   2.229374     0.40   0.686     .1301717    22.2109

. logistic q16_score cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression                               Number of obs =  159
               LR chi2(7)      =  6.05
               Prob > chi2     = 0.5337
Log likelihood = -53.128155                       Pseudo R2       = 0.0539

                       | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
q16_score | 1.106672   .2903271     0.39   0.699     .6617784    1.850654
. logistic q16_score50 cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 159
LR chi2(7) = 7.14
Prob > chi2 = 0.4140
Log likelihood = -105.50024 Pseudo R2 = 0.0328

|                | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|----------------|------------|-----------|-------|-----|----------------------|
| q16_score50    |            |           |       |     |                      |
| cis_dcca_cr    | 1.057873   | 0.2576763 | 0.23  | 0.817| (.6562932  1.705174) |
| age            | .9854969   | 0.0173678 | -0.83 | 0.407| (.9520379  1.020132) |
| levledu        | 1.080475   | 0.0717481 | 1.17  | 0.244| (.9486177  1.23066)  |
| hous_inc       | .9998943   | 0.0000657 | -1.61 | 0.108| (.9997657  1.000023) |
| drink          | .7725834   | 0.2942143 | -0.68 | 0.498| (.3662619  1.629667) |
| smoke          | .9572328   | 0.0303977 | -0.12 | 0.908| (.4576575  2.00214)  |
| pest_pois      | (omitted)  |           |       |     |                      |
| lang12         | 1.14167    | 1.192699  | 0.13  | 0.899| (.1473308  8.846837) |
| drugs          | (omitted)  |           |       |     |                      |
| _cons          | 106.2102   | 215.9534  | 2.29  | 0.022| (1.974457  5713.267) |

. logistic q16_score75 cis_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression
Number of obs = 168
LR chi2(9) = 13.52
Prob > chi2 = 0.1404
Log likelihood = -86.597405 Pseudo R2 = 0.0724

|                | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|----------------|------------|-----------|-------|-----|----------------------|
| q16_score75    |            |           |       |     |                      |
| cis_dcca_cr    | 1.118445   | .3081595  | 0.41  | 0.685| (.6517595  1.919296) |
| age            | .9813147   | .0206946  | -0.89 | 0.371| (.9415809  1.022725) |
| levledu        | 1.125321   | .0940777  | 1.41  | 0.158| (.9552462  1.325676) |
| hous_inc       | .9998586   | .0000873  | -1.62 | 0.105| (.9996875  1.00003)  |
|       | Odds Ratio | Std. Err. |    z  | P>|z|  | [95% Conf. Interval] |
|-------|------------|-----------|------|-----|---------------------|
| drink | 1.148741   | .523565   | 0.30 | 0.76 | 0.470183        |
| smoke | 1.258265   | .5668146  | 0.51 | 0.61 | 0.520390        |
| pest_pois | 4.207801 | 3.565662  | 1.70 | 0.09 | .799379        |
| lang12 | 0.5302386  | .3819899  | -0.88 | 0.37 | .129198        |
| drugs | 2.06436    | 3.097787  | 0.48 | 0.63 | .1090107 |
| _cons | 0.4427068  | .6676074  | -0.54 | 0.59 | .0230406 |

.logistic tired trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 18.56
Prob > chi2 = 0.0174
Log likelihood = -104.32139  Pseudo R2 = 0.0817

| tired | Odds Ratio | Std. Err. |    z  | P>|z|  | [95% Conf. Interval] |
|-------|------------|-----------|------|-----|---------------------|
| trans_dcca_cr | 1.441773 | .423228  | 1.25 | 0.21 | .811015 |
| age | .97212    | .0170067  | -1.62 | 0.10 | .939352 |
| levledu | 1.079607 | .0709314 | 1.17 | 0.24 | .949163 |
| hous_inc | .9998725 | .000684  | -2.52 | 0.01 | .999634 |
| drink | .4632262  | .183581   | -1.92 | 0.05 | .211422 |
| smoke | 1.366345  | .5307481  | 0.80 | 0.42 | .638140 |
| pest_pois | 2.1729  | 1.941504  | 0.87 | 0.38 | .377123 |
| lang12 | .5997991  | .4460344  | -0.69 | 0.49 | .139642 |
| drugs | 1 (omitted) | | |
| _cons | 5.609762  | 7.48175   | 1.29 | 0.19 | .410861 |

.logistic hart_palp trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 9.97
Prob > chi2 = 0.2670
Log likelihood = -106.97303  Pseudo R2 = 0.0445

| hart_palp | Odds Ratio | Std. Err. |    z  | P>|z|  | [95% Conf. Interval] |
|-----------|------------|-----------|------|-----|---------------------|
| trans_dcca_cr | 1.166506 | .2881109  | 0.62 | 0.53 | .718872 |
| age | .9560654  | .0174002  | -2.47 | 0.01 | .922562 |
| levledu | .9585205 | .0621592  | -0.65 | 0.51 | .844115 |
| hous_inc | .9999417 | .0000644  | -0.91 | 0.37 | .999815 |
| drink | .6397722  | .24794   | -1.15 | 0.24 | .293279 |
| smoke | 0.7973075 | 0.3020708 | -0.60 | 0.55 | .379434 |
| pest_pois | 3.402407 | 2.836673  | 1.47 | 0.14 | .663923 |
| lang12 | 1.653277  | 1.136346  | 0.73 | 0.46 | .4298235 |
. logistic tingling trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs  
  note: drugs != 0 predicts success perfectly  
  drugs dropped and 2 obs not used

Logistic regression               Number of obs =      166
                                     LR chi2(8) =     9.13
                                     Prob > chi2 =    0.3316
Log likelihood = -104.04081           Pseudo R2 =      0.0420

          | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
---------+--------------------------------------------------
trans_dcca_cr |   0.924669    .240351     -0.30   0.763     .5555606    1.539009
   age |   0.991645    .017531    -0.47   0.635     .9578743    1.026606
levledu |   1.103199    .077564     1.40   0.162     .9611857    1.266193
 hous_inc |   0.999971    .000063    -0.58   0.564     .9998408    1.000087
   drink |   0.659831    .260805    -1.05   0.293     .3040783    1.431798
   smoke |   0.979031    .382492    -1.21   0.226     .4552457    2.105459
pest_pois |   2.766346    2.279121     1.24   0.217     .5503305    13.905591
   lang12 |   0.441414    .298612    -1.21   0.227     .1172237    1.662171
   drugs |          1  (omitted)
     _cons |    1.03907    1.37392     0.03   0.977     .0778282    13.872444

. logistic irritated trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs  
  note: drugs != 0 predicts success perfectly  
  drugs dropped and 2 obs not used

Logistic regression               Number of obs =      166
                                     LR chi2(8) =      5.29
                                     Prob > chi2 =    0.7259
Log likelihood = -107.54934           Pseudo R2 =      0.0240

          | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
---------+--------------------------------------------------
trans_dcca_cr |   1.178976    .287951     0.67   0.500     .7304815    1.902835
   age |   1.002782    .017037    -0.16   0.870     .9699397    1.036736
levledu |   0.982219    .062946    -0.28   0.778     .8662815    1.113674
 hous_inc |   0.999639    .000268    -0.58   0.564     .9998408    1.000087
   drink |   0.89419    .343697    -0.29   0.771     .4209746    1.899345
   smoke |   0.629914    .240261    -1.21   0.226     .2982753    1.330286
pest_pois |   2.555158    2.100438     1.14   0.254     .5101495    12.797888
   lang12 |   0.441413    .298612    -1.21   0.227     .1172237    1.662171
   drugs |          1  (omitted)
     _cons |    1.18103    1.48039     0.13   0.894     .1012274    13.779211
Logistic regression

Number of obs = 168

LR chi2(9) = 2.48
Prob > chi2 = 0.9814

Log likelihood = -114.4456  Pseudo R2 = 0.0107

| Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|-----------|------|------|-----------------------|
| depress    |           |      |      |                       |
| trans_dcca_cr | 1.104482  .262466  0.42  0.676 | .6932354  1.759691 |
| age        | 1.000217  .0165382  0.01  0.990 | .9683228  1.033163 |
| levledu    | .9794239  .0608666 -0.33  0.738 | .8671065  1.106229 |
| hous_inc   | .9999511  .0000607 -0.81  0.420 | .9998321  1.00007 |
| drink      | .8012412  .3002032 -0.59  0.554 | .3844513  1.66988 |
| smoke      | 1.101526  .4068125  0.26  0.793 | .5341112  2.271738 |
| pest_pois  | 1.565092  1.272821  0.55  0.582 | .3179034  7.705217 |
| lang12     | .7370108  .4815864 -0.47  0.640 | .3541112  2.271738 |
| drugs      | 1.384621  2.032032  0.22  0.824 | .0781999  24.51634 |
| _cons      | 1.503608  1.839606  0.33  0.739 | .1366856  16.54043 |

Logistic regression

Number of obs = 168

LR chi2(9) = 6.13
Prob > chi2 = 0.7270

Log likelihood = -92.490862  Pseudo R2 = 0.0321

| Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|------------|-----------|------|------|-----------------------|
| pr_concen  |           |      |      |                       |
| trans_dcca_cr | .9331534 .2536171 -0.25  0.799 | .5477838  1.589633 |
| age        | .9747568  .0199211 -1.25  0.211 | .9364837  1.014594 |
| levledu    | 1.034026  .0773088  0.45  0.654 | .8930822  1.197213 |
| hous_inc   | .9999755  .0000696 -0.35  0.725 | .9998391  1.000112 |
| drink      | .8222981  .360005  -0.45  0.655 | .3486344  1.939493 |
| smoke      | 1.653872  .7090968  1.18  0.240 | .7146019  3.827714 |
| pest_pois  | 1.32627  1.200942  0.31  0.755 | .2248361  7.823444 |
| lang12     | 2.043178  1.80317  0.81  0.418 | .3623213  11.52176 |
| drugs      | 2.943505  4.367336  0.73  0.467 | .1606647  53.92736 |
| _cons      | 3.131371  .4720952 -0.77  0.441 | .0163094  6.012183 |

Logistic regression

Number of obs = 166

LR chi2(8) = 7.48
Prob > chi2 = 0.4856

Log likelihood = -105.95006  Pseudo R2 = 0.0341
### Logistic regression results

| Short_mem | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|-----------|------------|-----------|------|-----|----------------------|
| trans_dcca_cr | 1.139054 | 0.2829835 | 0.52 | 0.600 | (0.6999618, 1.853594) |
| age | 0.984232 | 0.174398 | -0.90 | 0.370 | (0.9506374, 1.019014) |
| levlevelu | 1.100593 | 0.0757522 | 1.39 | 0.164 | (0.9616999, 1.259545) |
| hous_inc | 0.999204 | 0.000653 | -1.22 | 0.223 | (0.997924, 1.000049) |
| drink | 0.748442 | 0.293416 | -0.74 | 0.461 | (0.3462894, 1.617631) |
| smoke | 1.20606 | 0.466514 | 0.48 | 0.628 | (0.5650887, 2.574075) |
| pest_pois | 2.644857 | 2.174509 | 1.18 | 0.237 | (0.572972, 13.25044) |
| lang12 | 1.482009 | 1.101369 | 0.58 | 0.564 | (0.3890131, 5.645954) |
| drugs | 1 (omitted) | | | | |
| cons | 0.3921146 | 0.5099293 | -0.72 | 0.472 | (0.030652, 5.016104) |

Logistic regression

- **Number of obs**: 166
- **LR chi2(8)**: 9.64
- **Prob > chi2**: 0.2910
- **Log likelihood**: -83.249148
- **Pseudo R²**: 0.0547

### Logistic regression results

| Perspire | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------|------------|-----------|------|-----|----------------------|
| trans_dcca_cr | 1.110716 | 0.3030777 | 0.38 | 0.700 | (0.6506359, 1.896128) |
| age | 0.9629188 | 0.0216838 | -1.68 | 0.093 | (0.9213436, 1.060637) |
| levlevelu | 1.078123 | 0.0918989 | 0.88 | 0.378 | (0.912246, 1.274161) |
| hous_inc | 0.9999515 | 0.0000785 | -0.62 | 0.537 | (0.9997978, 1.000105) |
| drink | 0.7083158 | 0.3291098 | -0.74 | 0.458 | (0.2849227, 1.760868) |
| smoke | 1.539096 | 0.7127999 | 0.93 | 0.352 | (0.6209396, 3.814888) |
| pest_pois | 1.608278 | 1.498168 | 0.51 | 0.610 | (0.2590816, 9.983568) |
| lang12 | 0.3871511 | 0.2770875 | -1.33 | 0.185 | (0.0952068, 1.57432) |
| drugs | 1 (omitted) | | | | |
| cons | 1.412721 | 2.19984 | 0.22 | 0.824 | (0.066772, 29.88942) |

Logistic regression

- **Number of obs**: 166
- **LR chi2(8)**: 10.76
- **Prob > chi2**: 0.2160
- **Log likelihood**: -29.606857
- **Pseudo R²**: 0.1537

### Logistic regression results

| Button | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|--------|------------|-----------|------|-----|----------------------|
| trans_dcca_cr | 2.46878 | 1.211268 | 1.84 | 0.065 | (0.9437435, 6.458191) |
| age | .978403 .041354 -0.52 0.605 .9006182 1.062906 |
| levledu | 1.122377 .1907339 0.68 0.497 .804429 1.565993 |
| hous_inc | .9998978 .0001597 -0.64 0.522 .9995849 1.000211 |
| drink | 1.08418 1.080891 0.08 0.935 .0382028 913.3569 |
| smoke | 2.35922 2.296725 0.88 0.378 .3500379 15.90091 |
| pest_pois | 4.038172 5.211726 1.08 0.279 .3218187 50.67088 |
| lang12 | 5.907014 15.19272 0.69 0.490 .0382028 913.3569 |
| drugs | 1 (omitted) |
| _cons | .0021423 .0078502 -1.68 0.093 1.63e-06 2.818042 |

```
logistic reading trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
```

Logistic regression  
Number of obs = 168  
LR chi2(9) = 9.51  
Prob > chi2 = 0.3918  
Log likelihood = -82.535833  
Pseudo R2 = 0.0545

```
reading | Odds Ratio Std. Err. z  P>|z| [95% Conf. Interval]  
----------+--------------------------------------------------
trans_dcca_cr | 1.62823 .460218 1.72 0.085 .9356735 2.833396  
  age | .9498861 .0219513 -2.22 0.026 .9078222 .993899  
  levledu | .9335526 .073283 -0.88 0.381 .8004243 1.088823  
  hous_inc | .9999931 .0000759 -0.09 0.927 .9998443 1.000142  
  drink | .701359 .3256609 -0.76 0.445 .5822951 1.742519  
  smoke | .8689885 .3964165 0.31 0.758 .3556117 2.123499  
  pest_pois | .9967251 1.146919 -0.31 0.758 .3556117 2.123499  
  lang12 | .8788165 .3577261 0.58 0.559 .127858 44.79986  
  drugs | 2.393328 3.577261 0.58 0.559 .127858 44.79986  
  _cons | 2.965565 4.61138 0.70 0.484 .1407701 62.47477  

. logistic fam_mem trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
```

Logistic regression  
Number of obs = 168  
LR chi2(9) = 10.53  
Prob > chi2 = 0.3091  
Log likelihood = -85.764602  
Pseudo R2 = 0.0579

```
fam_mem | Odds Ratio Std. Err. z  P>|z| [95% Conf. Interval]  
---------+--------------------------------------------------
trans_dcca_cr | 1.007536 .2778975 0.03 0.978 .5867904 1.729968  
  age | 1.018276 .0205826 0.90 0.370 .9787232 1.059427  
  levledu | 1.227963 1.081133 2.33 0.020 1.03334 1.459243  
  hous_inc | .999864 .0000842 -1.62 0.106 .999699 1.000029  
  drink | .6666857 .3073699 -0.88 0.379 .2700732 1.645737  
  smoke | .2071056 .9727892 1.55 0.121 .8248535 5.200045  
  pest_pois | .9773951 .8980437 -0.02 0.980 .1614265 5.917872  
  lang12 | .7335703 .593773 -0.42 0.673 .1736093 3.099635  
  drugs | 4.480231 6.79386 0.99 0.323 .2293672 87.5124  
  _cons | .0448737 .0694005 -2.01 0.045 .0021654 .9299039  
```
Logistic regression
Number of obs = 168
LR chi2(9) = 20.17
Prob > chi2 = 0.0169
Log likelihood = -96.144103 Pseudo R2 = 0.0949

|               | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|---------------|------------|-----------|-------|-------|----------------------|
| chest         |            |           |       |       |                      |
| trans_dcca_cr | 0.944655   | 0.2454298 | -0.22 | 0.826 | .5675341  1.571738    |
| age           | 0.993067   | 0.186645  | -0.34 | 0.737 | .95779    1.03097     |
| levledu       | 1.117062   | 0.0817187 | 1.51  | 0.130 | .9678489  1.289279    |
| hous_inc      | 0.9997202  | 0.0000928 | -3.01 | 0.003 | .9995382  .9999021    |
| drink         | 1.371698   | 0.5730436 | 0.76  | 0.449 | .6048654  3.110701    |
| smoke         | 0.713174   | 0.0020038 | -1.04 | 0.300 | .999745   1.000079    |
| pest_pois     | 5.009825   | 4.521372  | 1.79  | 0.074 | .8543037  29.37871    |
| lang12        | 1.215657   | 0.055794  | 0.28  | 0.781 | .306996   4.829329     |
| drugs         | 1 (omitted)|           |       |       |                      |
| _cons         | 0.463846   | 0.650186  | -0.55 | 0.584 | .0297318  7.236472    |

Note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 18.37
Prob > chi2 = 0.0186
Log likelihood = -78.886577 Pseudo R2 = 0.1043

|               | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|---------------|------------|-----------|-------|-------|----------------------|
| notes         |            |           |       |       |                      |
| trans_dcca_cr | 1.817552   | 0.5584115 | 1.94  | 0.052 | .9953363  3.318974    |
| age           | 0.950053   | 0.0220028 | -2.21 | 0.027 | .9078924  .9941713    |
| levledu       | 1.01928    | 0.085639  | 0.23  | 0.820 | .8645225  1.20174     |
| hous_inc      | 0.999118   | 0.0000851 | -1.04 | 0.300 | .999745   1.000079    |
| drink         | 0.4354025  | 0.2082856 | -1.74 | 0.082 | .1704894  1.111948    |
| smoke         | 0.8117655  | 0.3818953 | -0.44 | 0.658 | .3228365  2.041167    |
| pest_pois     | 10.99425   | 9.710468  | 2.71  | 0.007 | 1.946964  62.08311    |
| lang12        | 0.8786305  | 0.6665429 | -0.17 | 0.865 | .1986422  3.886343    |
| drugs         | 1 (omitted)|           |       |       |                      |
| _cons         | 2.094645   | 3.28652   | 0.47  | 0.637 | .0967312  45.35804    |

Note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression
Number of obs = 161
LR chi2(8) = 4.73
Prob > chi2 = 0.7859
Log likelihood = -106.95641 Pseudo R2 = 0.0216

|          | Odds Ratio   | Std. Err. | z    | P>|z| |  [95% Conf. Interval] |
|----------|--------------|-----------|------|------|-----------------------|
| chek_door|              |           |      |      |                       |
| trans_dcca_cr | 1.426296 | .3761898 | 1.35 | 0.178 | .8505558 2.391755 |
| age      | .9809445      | .0171904  | -1.10 | 0.272 | .9478239 1.015222 |
| levledu  | 1.007834      | .0654311  | 0.12  | 0.904 | .8874153 1.144593 |
| hous_inc | .9999569      | .0000622  | -0.69 | 0.489 | .999835 1.000079 |
| drink    | 1.162404      | .4448424  | 0.39  | 0.694 | .5490465 2.460962 |
| smoke    | .8369293      | .3156045  | -0.47 | 0.637 | .3996706 1.75257  |
| pest_pois|              |           |      |      |                       |
| lang12   | 1.218468      | .8566384  | 0.28  | 0.779 | .3071716 4.833342 |
| drugs    | .8041224      | 1.191178  | -0.15 | 0.883 | .0440965 14.66358 |
| _cons    | .9595314      | 1.241612  | -0.03 | 0.975 | .0759667 12.11979 |

logistic q16 head trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression Number of obs = 166
LR chi2(8) = 6.66
Prob > chi2 = 0.5742
Log likelihood = -99.071962 Pseudo R2 = 0.0325

|          | Odds Ratio   | Std. Err. | z    | P>|z| |  [95% Conf. Interval] |
|----------|--------------|-----------|------|------|-----------------------|
| q16_head |              |           |      |      |                       |
| trans_dcca_cr | 1.032484 | .283752  | 0.12 | 0.907 | .6024932 1.769353 |
| age      | .9912289      | .0177166  | -0.49 | 0.622 | .9571062 1.026568 |
| levledu  | 1.05749       | .0709993  | 0.83  | 0.405 | .9271014 1.206217 |
| hous_inc | .9998793      | .0000633  | -1.91 | 0.057 | .9997553 1.000003 |
| drink    | 1.269255      | .5150932  | 0.59  | 0.557 | .5729431 2.811812 |
| smoke    | 1.08698       | .4364546  | 0.21  | 0.835 | .4948105 2.387834 |
| pest_pois| 2.361987      | 2.65088   | 0.77  | 0.444 | .2617981 21.31025 |
| lang12   | 1.453212      | .998743   | 0.54  | 0.587 | .3778566 5.588957 |
| drugs    |              |           |      |      |                       |
| _cons    | 1.699582      | 2.232357  | 0.40  | 0.686 | .1295122 22.30352 |

logistic less_sex trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression Number of obs = 166
LR chi2(8) = 4.87
Prob > chi2 = 0.7713
Log likelihood = -109.52329 Pseudo R2 = 0.0218
| variable         | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|------------------|------------|-----------|-------|------|------------------------|
| less_sex         |            |           |       |      |                        |
| trans_dcca_cr    | .8780668   | .2195012  | -0.52 | 0.603 | [.5379503 1.43322]     |
| age              | .9994314   | .0170172  | -0.03 | 0.973 | [.9666287 1.033347]    |
| levledu          | 1.074783   | .0700717  | 1.11  | 0.269 | [.9458578 1.221282]    |
| hous_inc         | .9999008   | .000065   | -1.53 | 0.127 | [.9997733 1.000028]    |
| drink            | 1.083657   | .4152913  | 0.21  | 0.834 | [.5113106 2.296672]    |
| smoke            | 1.012511   | .3802025  | 0.03  | 0.974 | [.4850307 2.113634]    |
| pest_pois        | 1.862869   | 1.527961  | 0.76  | 0.448 | [.3732592 9.297242]    |
| lang12           | 1.741456   | 1.179323  | 0.82  | 0.413 | [.4618218 6.566752]    |
| drugs            | 1 (omitted) |          |      |      |                        |
| _cons            | .3226293   | .4100949  | -0.89 | 0.373 | [.026714 3.896443]     |

. logistic q16_score trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 159
LR chi2(7) = 6.00
Prob > chi2 = 0.5399
Log likelihood = -53.154686 Pseudo R2 = 0.0534

| variable         | Odds Ratio | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|------------------|------------|-----------|-------|------|------------------------|
| q16_score        |            |           |       |      |                        |
| trans_dcca_cr    | 1.349607   | .6408476  | 0.63  | 0.528| [.532136 3.422882]     |
| age              | .9519091   | .243235   | -1.93 | 0.054| [.9054101 1.000796]    |
| levledu          | .9592575   | .096567   | -0.41 | 0.679| [.784919 1.168488]     |
| hous_inc         | .9999072   | .0000795  | -1.17 | 0.243| [.9997515 1.000063]    |
| drink            | .6047156   | .371384   | -0.81 | 0.416| [.1798505 2.03325]     |
| smoke            | 1.066882   | .6620741  | 0.15  | 0.878| [.33603 3.580487]      |
| pest_pois        | 1 (omitted) |          |      |      |                        |
| lang12           | 1.151391   | 1.200756  | 0.14  | 0.892| [.149117 8.890347]     |
| drugs            | 1 (omitted) |          |      |      |                        |
| _cons            | 93.88723   | 189.2725  | 2.25  | 0.024| [1.8056 4881.928]      |

. logistic q16_score50 trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 159
LR chi2(7) = 7.27
Prob > chi2 = 0.4015
Log likelihood = -105.43857                      Pseudo R2       =     0.0333

---------------------------------------------------------------------
qu16_score50 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+----------------------------------------------------------------
   trans_dcca_cr |   1.108439   .2730544     0.42   0.676     .6839519    1.796379
    age |   .9856371   .0172262    -0.83   0.408      .952446    1.019985
   levledu |   1.080734   .0718367     1.17   0.243      .948723    1.231115
  hous_inc |   .9998961   .0000654    -1.59   0.112     .999768    1.000024
    drink |   .7639137   .2919371    -0.70   0.481     .3612013    1.61562
   smoke |   .9522223   .3590356    -0.13   0.897     .4547709    1.993811
pest_pois |          1  (omitted)
   lang12 |   .7354261   .5157098    -0.44   0.661     .1860557    2.906934
  drugs |          1  (omitted)
   _cons |   1.460634   1.916715     0.29   0.773     .1115715    19.12183
---------------------------------------------------------------------

.logistic q16_score75 trans_dcca_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        168
LR chi2(9)      =      14.29
Prob > chi2     =     0.1124
Log likelihood = -86.213671                       Pseudo R2       =     0.0765

---------------------------------------------------------------------
qu16_score75 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+----------------------------------------------------------------
   trans_dcca_cr |   1.293897   .3496665     0.95   0.340     .7618483    2.19751
    age |   .9815867   .0205518    -0.89   0.375     .9421213    1.022705
   levledu |   1.127705   .0948368     1.43   0.153      .9563385    1.329777
  hous_inc |   .9998635   .0000866    -1.58   0.115     .9996938    1.000033
    drink |   1.1072   .5089469     0.22   0.825     .4497322    2.725826
   smoke |   1.233675   .5599242     0.46   0.644     .5068376    3.002845
pest_pois |   4.410741   3.748435     1.75   0.081     .8339203    23.32914
   lang12 |   .5233804   .3780805    -0.90   0.370     .1270354    2.156304
  drugs |   2.03753   3.068715     0.47   0.637     .1064421    39.00271
   _cons |   .3873993   .5880434    -0.62   0.532     .0197742    7.589614
---------------------------------------------------------------------

.logistic tired cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
LR chi2(8)      =      19.02
Prob > chi2     =     0.0148
Log likelihood = -104.09202                       Pseudo R2       =     0.0837

---------------------------------------------------------------------
tired | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
----------+----------------------------------------------------------------
   cis_dbva_cr |   1.910197   .8464948     1.46   0.144     .8014419    4.552858
    age |   .9701222   .0171820    -1.71   0.087     .9370239    1.00439
---------------------------------------------------------------------
levledu | 1.07894 .0711399 1.15 .249 .9481424 1.227782
hous Inc | .9998093 .0000708 -2.69 .007 .9996704 .9999481
drink | .4612597 .1850605 -1.93 .054 .2101057 1.012636
smoke | 1.400267 .5448158 0.87 .387 .6531691 3.001901
pest_pois | 2.179594 1.952709 0.87 .384 .376513 12.61744
lang12 | .6228262 .4634186 -0.64 .525 .1448852 2.677379
_drugs | 1 (omitted)
__cons | 6.530003 8.705537 1.41 .159 .4787686 89.06376
------------------------------------------------------------------------------
.l logistic hart_palp cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 9.67
Prob > chi2 = 0.2887
Log likelihood = -107.12212
Pseudo R2 = 0.0432

---

hart_palp | Odds Ratio Std. Err. z  P>|z|  [95% Conf. Interval]
---------|-------------+----------------------
cis_dbva_cr | 1.141461 .4893464 .31 0.758 .492662 2.644678
age | .9559893 .0174577 -2.46 .014 .9223779 .9908256
levledu | .9581637 .062099 -0.66 .510 .8438649 1.087944
hous_inc | .9999379 .0000652 -0.95 .340 .9998101 1.000066
drink | .6501149 .2513812 -1.11 .265 .3046873 1.387158
smoke | .8070517 .3049333 -0.57 .570 .3848457 1.692451
pest_pois | 3.329257 .2772909 1.44 .149 .6507122 17.03357
lang12 | 1.681114 1.15323 .76 0.449 .4382077 6.449324
drugs | 1 (omitted)
__cons | 4.954096 6.367831 1.24 .213 .3988945 61.52771
---

.l logistic tingling cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 9.25
Prob > chi2 = 0.3220
Log likelihood = -103.98205
Pseudo R2 = 0.0426

tingling | Odds Ratio Std. Err. z  P>|z|  [95% Conf. Interval]
---------|-------------+----------------------
cis_dbva_cr | .8161688 .3633814 -0.46 0.648 .3410366 1.953255
age | .9923203 .0176705 -0.43 0.665 .9582842 1.027565
levledu | 1.103202 .0775639 1.40 0.162 .961189 1.266197
hous_inc | .9999754 .0000633 -0.39 0.697 .9998513 1.000099
drink | .6633893 .2619116 -1.04 0.299 .3059899 1.438235
smoke | .9737586 .3801335 -0.07 0.946 .4530659 2.092865
. logistic irritated cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
                                  LR chi2(8)      =       5.30
                                  Prob > chi2     =     0.7248
Log likelihood = -107.54407                       Pseudo R2       =     0.0241

-------------+----------------------------------------------------------------
 irritated | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |    1.33511   .5671117     0.68   0.496     .5807029    3.069588
   age |    1.001936   .0171033     0.11   0.910     .9689692    1.036025
 levledu |    .9819349   .0629272    -0.28   0.776     .8660311    1.113351
 hous_inc |    .9999565   .0000638    -0.68   0.496     .9998315    1.000082
   drink |    .895387   .3439252    -0.29   0.774      .421752    1.900921
   smoke |    .6379432   .2427768    -1.18   0.238     .3025849    1.900921
   pest_pois |    2.544435   2.09188     1.14   0.256     .5079079     12.7467
   lang12 |    .692113   .4528081    -0.56   0.574     .1919936    2.494981
   drugs |          1  (omitted)
   _cons |    1.254672   1.564544     0.18   0.856     .1089189    14.45296
-------------+----------------------------------------------------------------

. logistic depress cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        168
                                  LR chi2(9)      =       3.42
                                  Prob > chi2     =     0.9450
Log likelihood = -113.97322                       Pseudo R2       =     0.0148

-------------+----------------------------------------------------------------
depress | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |    1.53786   .6265544     1.06   0.291     .6920232    3.417535
   age |    1.000406   .0166441    -0.10   0.924     .9663115    1.031567
 levledu |    .9786674   .0610032    -0.35   0.729     .8661184    1.105842
 hous_inc |    .999941   .0000626    -0.95   0.342     .9998195    1.000063
   drink |    .7800555   .2929945    -0.66   0.508      .373601    1.628707
   smoke |    1.10843   .4101761     0.28   0.781      .536685    2.289268
   pest_pois |    1.614752   1.316501     0.59   0.557     .3268614    7.981548
   lang12 |    1.251945   1.851261    -0.15   0.879     .0690091    22.71244
   drugs |          1  (omitted)
   _cons |    1.543972   1.886341     0.36   0.722     .1408276    16.92743
-------------+----------------------------------------------------------------

. logistic pr_concen cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        168
                                  LR chi2(9)      =       3.42
                                  Prob > chi2     =     0.9450
Log likelihood = -113.97322                       Pseudo R2       =     0.0148

-------------+----------------------------------------------------------------
pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |    1.53786   .6265544     1.06   0.291     .6920232    3.417535
   age |    1.000406   .0166441    -0.10   0.924     .9663115    1.031567
 levledu |    .9786674   .0610032    -0.35   0.729     .8661184    1.105842
 hous_inc |    .999941   .0000626    -0.95   0.342     .9998195    1.000063
   drink |    .7800555   .2929945    -0.66   0.508      .373601    1.628707
   smoke |    1.10843   .4101761     0.28   0.781      .536685    2.289268
   pest_pois |    1.614752   1.316501     0.59   0.557     .3268614    7.981548
   lang12 |    1.251945   1.851261    -0.15   0.879     .0690091    22.71244
   drugs |          1  (omitted)
   _cons |    1.543972   1.886341     0.36   0.722     .1408276    16.92743
-------------+----------------------------------------------------------------
Logistic regression                               Number of obs   =        168
                       LR chi2(9)      =       6.84
                       Prob > chi2     =     0.6538
Log likelihood = -92.135174                       Pseudo R2       =     0.0358
------------------------------------------------------------------------------
pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |   1.497177   .6810012     0.89   0.375     .6139008    3.651304
          age |   .9723519   .0199133    -1.37   0.171     .9340955    1.012175
          levledu |   1.034437   .0777345     0.45   0.652     .8927686    1.198585
          hous_inc |   .9999671   .0000711    -0.46   0.644     .9998279    1.000106
          drink |   .774601   .3411941    -0.58   0.562     .3266955    1.836593
          smoke |   1.649333   .7110953     1.16   0.246     .7084679    3.839692
          pest_pois |   1.421885   1.290445     0.39   0.698     .2400762     8.42132
          lang12 |   2.034382   1.794822     0.80   0.421     .3609649    11.46569
          drugs |   2.560322   3.831059     0.63   0.530     .1363406    48.07993
          _cons |   .2918206   .4360115    -0.82   0.410     .0156073     5.45636
------------------------------------------------------------------------------

.logistic short_mem cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
                       LR chi2(8)      =       7.69
                       Prob > chi2     =     0.4644
Log likelihood = -105.84644                       Pseudo R2       =     0.0350
------------------------------------------------------------------------------
short_mem | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |   1.349753   .5802095     0.70   0.485     .5812376    3.134402
          age |   .9832447   .0175052    -0.95   0.343     .9495269    1.01816
          levledu |   1.100971   .0758587     1.40   0.163     .9618925    1.260158
          hous_inc |   .9999126   .0000667    -1.31   0.190     .9997818    1.000043
          drink |   .744173   .3927307    -0.58   0.562     .3442247    1.608814
          smoke |   1.217727   .47095    -0.51   0.611     .5706266    2.598651
          pest_pois |   2.664293   2.192892     1.19   0.234     .5308675    13.37143
          lang12 |   1.506145   1.02843     0.63   0.530     .1363406    48.07993
          drugs |          1  (omitted)
          _cons |   .4062038   .5249109    -0.70   0.486     .0322694    5.113244
------------------------------------------------------------------------------

.logistic perspire cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
                       LR chi2(8)      =       9.66
                       Prob > chi2     =     0.2900
Log likelihood = -83.24222 Pseudo R2 = 0.0548

| predictor       | Odds Ratio   | Std. Err. | z     | P>|z|    | 95% Conf. Interval |
|-----------------|--------------|-----------|-------|--------|-------------------|
| perspire        |              |           |       |        |                   |
| cis_dbva_cr     | 1.224023     | 0.616835  | 0.40  | 0.688  | 0.4558622         |
| age             | 0.962535     | 0.021658  | -1.70 | 0.090  | 0.9210084         |
| levledu         | 1.078674     | 0.092028  | 0.89  | 0.375  | 0.9125762         |
| hous_inc        | 0.9999463    | 0.0000796 | -0.67 | 0.500  | 0.9997903         |
| drink           | 0.7095078    | 0.0329168 | -0.74 | 0.459  | 0.3857933         |
| smoke           | 1.551353     | 0.7177946 | 0.95  | 0.343  | 0.6264247         |
| pest_pois       | 1.603632     | 1.492498  | 0.51  | 0.612  | 0.2587574         |
| lang12          | 0.3919716    | 0.2805018 | -1.31 | 0.191  | 0.0964095         |
| drugs           |              |           |       |        |                   |
| _cons           | 1.443169     | 2.235094  | 0.24  | 0.813  |                   |

Logistic regression

Number of obs = 166
LR chi2(8)     = 12.57
Prob > chi2    = 0.1276
Log likelihood = -28.700334 Pseudo R2 = 0.1796

| predictor       | Odds Ratio   | Std. Err. | z     | P>|z|    | 95% Conf. Interval |
|-----------------|--------------|-----------|-------|--------|-------------------|
| button          |              |           |       |        |                   |
| cis_dbva_cr     | 8.926605     | 7.52004   | 2.60  | 0.009  | 0.1192477         |
| age             | 0.969257     | 0.040382  | -0.75 | 0.454  | 0.9325433         |
| levledu         | 1.15692      | 0.20777   | 0.81  | 0.417  | 0.8136413         |
| hous_inc        | 0.999815     | 0.000167  | -1.10 | 0.269  | 0.9994878         |
| drink           | 0.9922198    | 0.9975614 | -0.01 | 0.994  | 0.1383006         |
| smoke           | 2.678365     | 2.62278   | 1.01  | 0.314  | 0.3929467         |
| pest_pois       | 4.431831     | 6.03144   | 1.09  | 0.274  | 0.307717          |
| lang12          | 7.34657      | 20.76409  | 0.71  | 0.480  | 0.0288588         |
| drugs           |              |           |       |        |                   |
| _cons           | 0.0018178    | 0.006953  | -1.65 | 0.099  | 1.01e-06          |

Logistic regression

Number of obs = 168
LR chi2(9)     = 11.39
Prob > chi2    = 0.2502
Log likelihood = -81.596526 Pseudo R2 = 0.0652

| predictor       | Odds Ratio   | Std. Err. | z     | P>|z|    | 95% Conf. Interval |
|-----------------|--------------|-----------|-------|--------|-------------------|
| reading         |              |           |       |        |                   |
| cis_dbva_cr     | 2.953525     | 1.412177  | 2.27  | 0.024  | 1.1570522         |
| age             | 0.9468271    | 0.0218153 | -2.37 | 0.018  | 0.905021          |
levledu |  .9347367   .0739286   -0.85   0.394   .8005382    1.091495
hous_inc |  .9999639   .0000795   -0.45   0.650   .9998081     1.00012
drink |  .8972172   .4120818   -0.24   0.813   .2752676    1.726631
smoke |  .8972172   .4120818   -0.24   0.813   .3647121    2.207217
pest_pois |  .9999639   .0000795   -0.45   0.650   .9998081     1.00012
lang12 |  .9385462   .7599198   -0.08   0.938   .1919804    4.588328
drugs |  2.012265   3.071337     0.46   0.647   .1010389    40.07574
_cons |  3.299086   5.094074     0.77   0.439   .1599797    68.03344
------------------------------------------------------------------------------
.logistic fam_mem cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression                               Number of obs   =        168
LR chi2(9)      =      11.11
Prob > chi2     =     0.2680
Log likelihood = -85.474591                       Pseudo R2       =     0.0610
------------------------------------------------------------------------------
fam_mem |   Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |   1.453976   .7093802     0.77   0.443     .5588103    3.783118
age |   1.016325   .0206068     0.80   0.425     .9767283    1.057527
levledu |   1.229714   .1087318     2.34   0.019     1.034047    1.462405
hous_inc |   .9998541   .0000856    -1.70   0.088     .9996863    1.000022
drink |   .6377088   .2949488    -0.97   0.331     .2575909    1.578754
smoke |   2.076599   .9787202     1.55   0.121     .8244673    5.230362
pest_pois |   1.025026   .9408744     0.03   0.979     .1695955    3.086022
lang12 |   .9999639   .0000795   -0.45   0.650     .9998081     1.00012
drugs |   4.019523   6.256823     0.89   0.371     .1901898    84.94969
_cons |   .0435817   .0669118    -2.04   0.041       .00215    .8834287
------------------------------------------------------------------------------
.logistic chest cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression                               Number of obs   =        168
LR chi2(9)      =      20.18
Prob > chi2     =     0.0168
Log likelihood = -96.138013                       Pseudo R2       =     0.0950
------------------------------------------------------------------------------
chest | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |   1.120511   .5151713     0.25   0.805     .4550555    2.759106
age |   .9999639   .0000795   -0.45   0.650     .9568992   1.030352
levledu |  1.118005   .0818512     1.52   0.128     .968558    1.290511
hous_inc |  .9997182   .0000932    -3.02   0.003     .9995355    .9999009
drink |  1.344008   .5605061     0.71   0.478     .5934935    3.0436
smoke |  .7061546   .2900943    -0.85   0.397     .3156596    1.579722
pest_pois |  5.170376   4.670762     1.82   0.069     .8801814    30.37191
lang12 |  1.213648   .8556517     0.27   0.784     .3047716    4.832934
drugs |  .9026984   1.341298     -0.07   0.945     .0490639    16.60822
_cons |  .4418067   .6143228    -0.59   0.557     .0289504    6.742327
------------------------------------------------------------------------------
Logistic regression                               Number of obs   =        166
LR chi2(8)      =      18.12
Prob > chi2     =     0.0203
Log likelihood = -79.009501                       Pseudo R2       =     0.1029
------------------------------------------------------------------------------
notes | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |   2.826513   1.432128     2.05   0.040      1.04705    7.630182
    age |   .9480734    .021728    -2.33   0.020     .9064296    .9916304
levledu |   1.022757   .0858865     0.27   0.789     .8675456    1.205737
hous_inc |   1.000054   .0000009     0.00   0.998     .9999982    1.000001
   drink |   .4422279   .2115131    -1.71   0.088     .1731909     1.12919
  smoke |   .8484219   .3978266    -0.35   0.726     .3384401    2.126874
pest_pois |   10.85713   9.636752     2.69   0.007     1.906301    61.83561
   lang12 |   .9502803   .7230289    -0.07   0.947     .2138985    4.221781
  drugs |          1  (omitted)
   _cons |   2.410661   3.722325     0.57   0.569     .1168928    49.71467
------------------------------------------------------------------------------

Logistic regression                               Number of obs   =        161
LR chi2(8)      =       3.82
Prob > chi2     =     0.8728
Log likelihood = -107.41111                       Pseudo R2       =     0.0175
------------------------------------------------------------------------------
chek_door | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cis_dbva_cr |   1.538875   .6397744     1.04   0.300     .6812766    3.476028
    age |   .9802881   .0172638    -1.13   0.258     .947029    1.014715
levledu |   1.007089   .0652467     0.11   0.913     .8869942    1.143444
hous_inc |   1.000000   .0000000     0.00   0.999     .9999999    1.000000
   drink |   1.186157   .4525427     0.45   0.654     .5616373    2.505117
  smoke |   .8567514   .3216847    -0.41   0.681     .410444     1.788363
pest_pois |          1  (omitted)
   lang12 |   1.282791   .8996054     0.36   0.723     .3245032    5.070992
  drugs |   .7856648   1.162572    -0.16   0.871     .0432204    14.28189
   _cons |   1.093327   1.408446     0.07   0.945     .0875418    13.65478
------------------------------------------------------------------------------
Logistic regression                               Number of obs   =        166
                  LR chi2(8)      =       6.65
                  Prob > chi2    =     0.5748
Log likelihood = -99.074747                       Pseudo R2       =     0.0325

------------------------------------------------------------------------------
  q16_head | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  cis_dbva_cr |   1.041401   .4698243     0.09   0.928     .4301319    2.521358
  age        |    .991143   .0178365    -0.49   0.621     .9567935    1.026726
  levledu    |   1.057447   .0710091     0.83   0.406     .9270419    1.206197
  hous_inc   |   .9998783   .0000641    -1.90   0.058     .9997528    1.000004
  drink      |   1.271176   .5157078     0.59   0.554     .5739562    2.815351
  smoke      |   1.089281   .4371084     0.21   0.831     .4960987    2.391726
  pest_pois  |   2.357675    2.64601     0.76   0.445     .2613267    21.27082
  lang12     |   1.458963   1.000762     0.55   0.582     .3803384    5.596523
  drugs      |          1  (omitted)
  _cons      |   1.720897   2.251486     0.41   0.678     .1324676     22.3563
------------------------------------------------------------------------------

logistic less_sex cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
       drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
                  LR chi2(8)      =       5.54
                  Prob > chi2    =     0.6989
Log likelihood = -109.19008                       Pseudo R2       =     0.0247

------------------------------------------------------------------------------
  less_sex | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  cis_dbva_cr |   .6587733   .2856828    -0.96   0.336     .281582    1.541228
  age        |   1.001006   .017223    0.06    0.953     .9678122    1.035338
  levledu    |   1.07509    .0710497    1.11   0.267     .9459848    1.221816
  hous_inc   |   .9999107   .0000641   -1.37   0.170     .9997829    1.000038
  drink      |   1.101869   .4223668    0.25   0.800     .5198144    2.335669
  smoke      |   1.00463    .3773403    0.01   0.990     .4811646    2.09758
  pest_pois  |   1.832306   1.502488    0.74   0.460     .3672973    9.140676
  lang12     |   1.717807   1.16223    0.80   0.424     .4561107    6.469612
  drugs      |          1  (omitted)
  _cons      |   .3117562   .3960484   -0.92   0.359     .0258505     3.759777
------------------------------------------------------------------------------

logistic q16_score cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
       pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
       drugs dropped and 2 obs not used
Logistic regression

Number of obs = 159
LR chi2(7) = 5.87
Prob > chi2 = 0.5549
Log likelihood = -53.218386  Pseudo R2 = 0.0523

| q16_score | Odds Ratio   | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|-----------|--------------|-----------|------|-----|----------------------|
| cis_dbva_cr | 1.457624     | 1.005563  | 0.55 | 0.585 | .3770789 5.634546 |
| age       | .9509539     | .0247703  | -1.93 | 0.054 | .9036234 1.000763 |
| levledu   | .9580771     | .0967106  | -0.42 | 0.671 | .7861007 1.167677 |
| hous_inc  | .9999007     | .0000798  | -1.24 | 0.214 | .9997442 1.000057 |
| drink     | .6079208     | .3772472  | -0.80 | 0.423 | .1801487 2.051459 |
| smoke     | 1.117036     | .6752404  | 0.18  | 0.855 | .3416035 3.652687 |
| pest_pois | 1 (omitted)  |           |      |      |                      |
| lang12    | 1.192978     | 1.240752  | 0.17  | 0.865 | .1553618 9.160533 |
| drugs     | 1 (omitted)  |           |      |      |                      |
| _cons     | 106.4175     | 216.0733  | 2.30  | 0.022 | 1.989329 5692.712 |

. logistic q16_score50 cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression

Number of obs = 159
LR chi2(7) = 8.17
Prob > chi2 = 0.3176
Log likelihood = -104.98606  Pseudo R2 = 0.0375

| q16_score50 | Odds Ratio   | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|-------------|--------------|-----------|------|-----|----------------------|
| cis_dbva_cr | 1.556515     | .6634801  | 1.04 | 0.299 | .6750256 3.589108 |
| age         | .9836708     | .0173574  | -0.93 | 0.351 | .9502325 1.018286 |
| levledu     | 1.081187     | .0721422  | 1.17 | 0.242 | .9486469 1.232246 |
| hous_inc    | .9998842     | .0000672  | -1.72 | 0.085 | .9997524 1.000016 |
| drink       | .7438566     | .2852526  | -0.77 | 0.440 | .3508102 1.577271 |
| smoke       | .9581144     | .3621386  | -0.11 | 0.910 | .4567606 2.009769 |
| pest_pois   | 1 (omitted)  |           |      |      |                      |
| lang12      | 1.739236     | .5194029  | -0.43 | 0.667 | .1865138 2.929917 |
| drugs       | 1 (omitted)  |           |      |      |                      |
| _cons       | 1.502764     | 1.971164  | 0.31  | 0.756 | .1149148 19.65194 |

. logistic q16_score75 cis_dbva_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 168
LR chi2(9) = 15.59
Prob > chi2 = 0.0759
Log likelihood = -85.561325  Pseudo R2 = 0.0835
. logistic tired fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 17.48
Prob > chi2 = 0.0254
Log likelihood = -104.858
Pseudo R2 = 0.0770

---
tired | Odds Ratio Std. Err. z P>|z|  [95% Conf. Interval]
-----+--------------------------------------------------
fpba_cr | 1.161488 .2188012 0.79 0.427 .8029071 1.680212
age | .9733688 .01694 -1.55 0.121 .9407269 1.007143
levledu | 1.082891 .0714132 1.21 0.227 .9515922 1.232307
hous_inc | .9998197 .0000694 -2.60 0.009 .9996838 .9999556
drink | .4756321 .1906688 -1.85 0.064 .2167934 1.043509
smoke | 1.416964 .550628 0.90 0.370 .6615832 3.034822
pest_pois | 2.093753 1.865252 0.83 0.407 .3652744 12.00139
lang12 | .6356612 .470796 -.61 0.544 .1488648 2.71431
drugs | 1 (omitted)
_cons | .4013536 .6045399 -0.61 0.544 .0209606 7.685136
---

. logistic hart_palp fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 9.78
Prob > chi2 = 0.2805
Log likelihood = -107.06688
Pseudo R2 = 0.0437

---
hart_palp | Odds Ratio Std. Err. z P>|z|  [95% Conf. Interval]
----------+--------------------------------------------------
. logistic tingling fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 11.22
Prob > chi2 = 0.1894
Log likelihood = -102.99302 Pseudo R2 = 0.0517

---

. logistic irritated fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 166
LR chi2(8) = 4.95
Prob > chi2 = 0.7629
Log likelihood = -107.72034 Pseudo R2 = 0.0225

---
. logistic depress fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression
  Number of obs = 168
  LR chi2(9) = 2.36
  Prob > chi2 = 0.9843
  Log likelihood = -114.50327  Pseudo R2 = 0.0102

  +--------------------------------------------------+
  |        Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
  |--------------------------------------------------|
  |   depress |         |            |        |                |            |
  |   fpba_cr |    .959 |   .165 | -0.24 |  0.807 |     .6837316   1.344252 |
  |   age     |  1.000 |   .017 |   0.04 |  0.970 |     .9687522   1.033554 |
  |   levledu |   .978 |   .061 | -0.35 |  0.726 |     .8660481   1.105449 |
  |   hous_inc|   .999 |   .061 | -0.79 |  0.432 |     .9998325   1.000072 |
  |   drink   |  .823 |   .308 | -0.52 |  0.604 |     .3964393   1.712313 |
  |   smoke   |  1.108 |   .409 |   0.28 |  0.780 |     .5382483   2.283065 |
  |   pest_pois| 1.505 |   1.223 |   0.50 |  0.615 |     .3062109   7.398279 |
  |   lang12  |  1.745 |   1.769 | -0.44 |  0.660 |     .1472894   18.25029 |
  |   drugs   |  3.172 |   4.744 |  0.77 |  0.440 |     .1691373   59.48685 |
  |   _cons   | 1.640 |   2.016 | -0.40 |  0.688 |     .0182131   7.116055 |
  +--------------------------------------------------+

. logistic pr_concen fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression
  Number of obs = 168
  LR chi2(9) = 6.89
  Prob > chi2 = 0.6483
  Log likelihood = -92.108654  Pseudo R2 = 0.0361

  +--------------------------------------------------+
  |        Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval] |
  |--------------------------------------------------|
  |   pr_concen |         |            |        |                |            |
  |   fpba_cr   |    .820 |   .187 | -0.87 |  0.384 |     .524454      1.282325 |
  |   age       |  1.000 |   .020 | -1.25 |  0.212 |     .9362322   1.014743 |
  |   levledu   |  1.031 |   .077 |  0.41 |  0.685 |     .8900075   1.193922 |
  |   hous_inc  |  1.000 |   .000 | -0.22 |  0.829 |     .9998476   1.000122 |
  |   drink     |  .830 |   .363 | -0.42 |  0.671 |     .3531825   1.954667 |
  |   smoke     |  1.651 |   .701 |  1.17 |  0.243 |     .7110384   3.835253 |
  |   pest_pois |  1.269 |   1.150 |  0.26 |  0.793 |     .2143662   7.504745 |
  |   lang12    |  1.992 |   1.769 |  0.78 |  0.438 |     .3496248   11.35333 |
  |   drugs     |  3.172 |   4.744 |  0.77 |  0.440 |     .1691373   59.48685 |
  |   _cons     |  3.600 |   5.481 | -0.67 |  0.502 |     .0182131   7.116055 |
  +--------------------------------------------------+

. logistic short_mem fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: drugs != 0 predicts success perfectly
Logistic regression

Number of obs = 166
LR chi2(8) = 8.77
Prob > chi2 = 0.3623
Log likelihood = -105.30715  Pseudo R2 = 0.0400

------------------------------------------------------------------------------
short_mem | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
fpba_cr |   .7768187   .1658456    -1.18   0.237     .5112036    1.180444
age |    .984749   .0175675    -0.86   0.389     .9509124     1.01979
levledu |   1.093497   .0754121     1.30   0.195     .9552462    1.251757
hous_inc |   .9999313   .0000659    -1.04   0.297     .9998022    1.00006
drink |   .7896482   .3094442    -0.60   0.547     .3663263    1.702155
smoke |   1.220782   .4743464     0.51   0.608     .5700273    2.614451
pest_pois |   2.379144   1.956375     1.05   0.292     .4747622    11.92245
lang12 |   1.465406   .9997134     0.56   0.575     .3848223    5.580274
drugs |          1  (omitted)
_cons |   .5403475   .7107318    -0.47   0.640     .0410268    7.116699
------------------------------------------------------------------------------

Logistic regression

Number of obs = 166
LR chi2(8) = 11.14
Prob > chi2 = 0.1937
Log likelihood = -82.498256  Pseudo R2 = 0.0633

------------------------------------------------------------------------------
perspire | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+----------------------------------------------------------------
fpba_cr |   .7213432   .1971705    -1.20   0.232     .4221592    1.232559
age |    .9621835   .0220217    -1.68   0.092     .9199755    1.006328
levledu |   1.069255   .0917417     0.79   0.432     .9046916    1.263754
hous_inc |   .9999641   .0000793    -0.45   0.651     .9998088     1.00012
drink |   .7359512   .3399654    -0.66   0.507     .2976082    1.819924
smoke |   1.578884   .7335475     0.98   0.326     .6351599    3.924799
pest_pois |   1.461447   1.359065     0.41   0.683     .2361633    9.043855
lang12 |   1.465406   .9997134     0.56   0.575     .3848223    5.580274
drugs |          1  (omitted)
_cons |   .5403475   .7107318    -0.47   0.640     .0410268    7.116699
------------------------------------------------------------------------------

Logistic regression

Number of obs = 166
LR chi2(8) = 11.14
Prob > chi2 = 0.1937
Log likelihood = -82.498256  Pseudo R2 = 0.0633

------------------------------------------------------------------------------
perspire | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+----------------------------------------------------------------
fpba_cr |   .7213432   .1971705    -1.20   0.232     .4221592    1.232559
age |    .9621835   .0220217    -1.68   0.092     .9199755    1.006328
levledu |   1.069255   .0917417     0.79   0.432     .9046916    1.263754
hous_inc |   .9999641   .0000793    -0.45   0.651     .9998088     1.00012
drink |   .7359512   .3399654    -0.66   0.507     .2976082    1.819924
smoke |   1.578884   .7335475     0.98   0.326     .6351599    3.924799
pest_pois |   1.461447   1.359065     0.41   0.683     .2361633    9.043855
lang12 |   1.465406   .9997134     0.56   0.575     .3848223    5.580274
drugs |          1  (omitted)
_cons |   .5403475   .7107318    -0.47   0.640     .0410268    7.116699
------------------------------------------------------------------------------
LR chi2(8) = 7.17  
Prob > chi2 = 0.5186
Log likelihood = -31.400439  
Pseudo R2 = 0.1024

| button | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|--------|------------|-----------|-------|------|----------------------|
| fpba_cr| 1.473742   | .4106728  | 1.39  | 0.164| .8535441 2.544587    |
| age    | .9826774   | .0402536  | -0.43 | 0.670| .9068659 1.064826    |
| levledu| 1.15038    | .0191447  | 0.84  | 0.401| .8294985 1.595391    |
| hous_inc| .9998529  | .0001599  | -0.92 | 0.358| .9995394 1.000166    |
| drink  | 1.342675   | 1.260062  | 0.31  | 0.754| .2133744 8.448884    |
| smoke  | 2.899005   | 2.70233   | 1.14  | 0.254| .4664392 18.01785    |
| pest_pois| 3.078641  | .0001599  | -0.88 | 0.381| .2491176 38.0464     |
| lang12 | 6.802142   | 18.72439  | 0.70  | 0.486| .0308693 1498.872    |

. logistic reading fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression
Number of obs = 168
LR chi2(9) = 6.41
Prob > chi2 = 0.6978
Log likelihood = -84.081929 Pseudo R2 = 0.0367

| reading | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|---------|------------|-----------|-------|------|----------------------|
| fpba_cr | 1.075299   | .2080143  | 0.38  | 0.707| .7359806 1.571059    |
| age     | .9522915   | .0217742  | -2.14 | 0.033| .910557  .9959388    |
| levledu | .9372189   | .0727101  | -0.84 | 0.403| .8050154 1.091133    |
| hous_inc| .9998984   | .000076   | -0.20 | 0.839| .9998356 1.000134    |
| drink   | .7619678   | .3466012  | -0.60 | 0.550| .3124246 1.858353    |
| smoke   | .9119139   | .4068058  | -0.21 | 0.836| .3803924 2.186129    |
| pest_pois| .9154233  | 1.046823  | -0.08 | 0.938| .0973283 8.610033    |
| lang12  | .9404218   | .7467671  | -0.08 | 0.938| .1979614 4.467502    |
| drugs   | 3.641239   | 3.927964  | 0.65  | 0.514| .1431954 48.71768    |
| _cons   | 3.408421   | 5.322939  | 0.79  | 0.432| .1596724 72.7573    |

. logistic fam_mem fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression
Number of obs = 168
LR chi2(9) = 10.72
Prob > chi2 = 0.2952
Log likelihood = -85.670174 Pseudo R2 = 0.0589

| fam_mem | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|---------|------------|-----------|-------|------|----------------------|
| fpba_cr | .9020882   | .2182467  | -0.43 | 0.670| .5614532 1.449387    |
| age     | 1.018453   | .0206254  | 0.90  | 0.367| .9788194 1.059691    |
| levledu | 1.225919   | 1.08075   | 2.31  | 0.021| .1031386 1.457143    |
|                | Odds Ratio   | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|----------------|--------------|-----------|------|-------|---------------------|
| chest          | .6236445     | .1614754  | -1.82| 0.068 | .3754414 1.035934   |
| fpba_cr        | .9944058     | .0190448  | -0.29| 0.770 | .9577706 1.032442  |
| age            | 1.109989     | .0821597  | 1.41 | 0.159 | .9600942 1.283285  |
| levledu        | .9997355     | .0000953  | -2.78| 0.006 | .9995487 .9999223 |
| hous_inc       | 1.413248     | .5957108  | 0.82 | 0.412 | .6186158 3.228613  |
| drink          | .7125071     | .2978012  | -0.81| 0.417 | .3140646 1.616439  |
| smoke          | 9.748839     | 8.501817  | 2.61 | 0.010 | 1.764545 53.86083 |
| pest_pois      | .9484068     | .8708348  | -0.06| 0.954 | .1568247 5.735547  |
| lang12         | .7257855     | .5343044  | -0.44| 0.663 | .1714652 3.072138  |
| drugs          | 4.729359     | 7.135095  | 1.03 | 0.303 | .2458161 90.99011  |
| _cons          | .0494013     | .0768589  | -1.93| 0.053 | .0023412 1.042423  |

. logistic notes fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 166
LR chi2(8) = 14.72
Prob > chi2 = 0.0649
Log likelihood = -80.712141
Pseudo R2 = 0.0835

| notes | Odds Ratio   | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|-------|--------------|-----------|------|-------|---------------------|
| fpba_cr        | 1.189484     | .2332685  | 0.88 | 0.376 | .8098982 1.746976   |
| age            | .9519612     | .0218875  | -2.14| 0.032 | .9100147 .9958411 |
| levledu        | 1.018667     | .0844879  | 0.22 | 0.824 | .8658321 1.198479  |
| hous_inc       | .9999034     | .0000851  | -1.13| 0.257 | .9997366 1.00007  |
| drink          | .7125071     | .2978012  | -0.81| 0.417 | .3140646 1.616439  |
| smoke          | 9.748839     | 8.501817  | 2.61 | 0.009 | 1.764545 53.86083 |
| pest_pois      | .9457265     | .7046071  | -0.07| 0.940 | .2195754 4.07331 |
| lang12         | .7257855     | .5343044  | -0.44| 0.663 | .1714652 3.072138  |
| drugs          | 2.512542     | 3.94413   | 0.59 | 0.557 | .1158555 54.48912 |
| _cons          | 1 (omitted)  |           |      |       |                     |
. logistic chek_door fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression                          Number of obs =     161
LR chi2(8) =      2.98
Prob > chi2 =     0.9356
Log likelihood = -107.83156                  Pseudo R2 =    0.0136

----------------------------------------------
          | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
----------------------------------------------
  chek_door |
    fpba_cr |   1.088193   .1893995     0.49   0.627     .7736679    1.530584
       age |   .9827226   .0171063    -1.00   0.317     .9497604    1.016829
  levledu |   1.01044   .0654847     0.16   0.873     .8899098    1.147296
   hous_inc |   .9999515   .0000625    -0.78   0.438     .9998289    1.000074
      drink |   1.216989   .4621496     0.52   0.605     .5781551    2.561705
      smoke |   .864711   .3236674    -0.39   0.698     .4152028    1.800867
   pest_pois |          1  (omitted)
   lang12 |   1.297123   .9058371     0.37   0.710     .3300275    5.098143
     drugs |          1  (omitted)
     _cons |   1.011488   1.313084     0.01   0.993     .0794248    12.88147
----------------------------------------------

. logistic q16_head fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                          Number of obs =     166
LR chi2(8) =      6.67
Prob > chi2 =     0.5722
Log likelihood = -99.062936                  Pseudo R2 =     0.0326

----------------------------------------------
          | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
----------------------------------------------
   q16_head |
    fpba_cr |   .9671438   .1803728    -0.18   0.858     .6710293    1.393929
       age |   .9913678   .0176783    -0.49   0.627     .9573176    1.026629
  levledu |   1.05659   .0711421     0.82   0.414     .9259625    1.205644
   hous_inc |   .9998806   .0000637    -1.88   0.061     .9997559    1.000005
      drink |   1.286932   .5217859     0.62   0.534     .581348    2.848884
      smoke |   1.086763   .4363991     0.21   0.836     .4946833    2.387494
  pest_pois |   2.317445   2.602327     0.75   0.454     .256549    20.93383
  lang12 |   1.459989    1.000396     0.55   0.581     .3811531    5.592419
     drugs |          1  (omitted)
     _cons |   1.778874   2.346502     0.44   0.662     .1340695    23.60262
----------------------------------------------

. logistic less_sex fpba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
Logistic regression

Number of obs = 166
LR chi2(8)     = 6.46
Prob > chi2   = 0.5954

Log likelihood = -108.72648 Pseudo R2 = 0.0289

| less_sex | Odds Ratio | Std. Err. | z   | P>|z| | [95% Conf. Interval] |
|----------|------------|-----------|-----|-----|----------------------|
| fpba_cr  | .7679614   | .1575383  | -1.29| 0.198| .5137187   1.148031 |
| age      | .9992878   | .0171096  | -0.04| 0.967| .9663101   1.033391 |
| levledu  | 1.068961   | .0699438  | 1.02 | 0.308| .9402998   1.215226 |
| hous_inc | .9999132   | .0000654  | -1.33| 0.185| .999785    1.000041 |
| drink    | 1.099177   | .4216854  | 0.25 | 0.805| .5182209   2.331419 |
| smoke    | .9983104   | .0000654  | -0.00| 0.996| .999785    1.000041 |
| pest_pois| 1.772169   | 1.454021  | 0.70 | 0.486| .3549074   8.84902   |
| lang12   | 1.681652   | 1.141949  | 0.77 | 0.444| .4443408   6.364382 |
| drugs    | 1 (omitted)|                       |     |      |                      |
| _cons    | .3853493   | .4939309  | -0.74| 0.457| .0312469   4.752289 |

Logistic regression

Number of obs = 159
LR chi2(7)     = 5.64
Prob > chi2   = 0.5823

Log likelihood = -53.33545 Pseudo R2 = 0.0502

| q16_score | Odds Ratio | Std. Err. | z   | P>|z| | [95% Conf. Interval] |
|-----------|------------|-----------|-----|-----|----------------------|
| fpba_cr   | .9260534   | .2469895  | -0.29| 0.773| .5490482   1.56193   |
| age       | .9541708   | .0239336  | -1.87| 0.061| .9083963   1.002252  |
| levledu   | .9608859   | .0971467  | 0.39 | 0.693| .78816    1.171465  |
| hous_inc  | .9999098   | .0000802  | -0.13| 0.996| .9997526   1.000067 |
| drink     | .6527974   | .4065672  | 0.68 | 0.493| .1925944   2.212653 |
| smoke     | 1.118745   | .6802992  | 0.18 | 0.854| .339721    3.684169 |
| pest_pois | 1 (omitted)|                       |     |     |                      |
| lang12    | 1.25481    | 1.294458  | 0.22 | 0.826| .1661428   9.477077 |
| drugs     | 1 (omitted)|                       |     |     |                      |
| _cons     | 101.0008   | 202.0924  | 2.31 | 0.021| 2.000579   5099.101 |

Logistic regression

Number of obs = 159
LR chi2(7)     = 5.64
Prob > chi2   = 0.5823

Log likelihood = -53.33545 Pseudo R2 = 0.0502
Logistic regression

Number of obs = 159
LR chi2(7) = 8.26
Prob > chi2 = 0.3103

Log likelihood = -104.94299  Pseudo R2 = 0.0379

| q16_score50 | Odds Ratio | Std. Err. | z   | P>|z| | [95% Conf. Interval] |
|-------------|------------|-----------|-----|------|----------------------|
| fpba_cr     | .8160017   | .1601273  | -1.04 | 0.300 | .5554645 1.198742    |
| age         | .9861291   | .0172806  | -0.80 | 0.425 | .9528348 1.020587    |
| levledu     | 1.074746   | .0715959  | 1.08  | 0.279 | .9431956 1.224644    |
| hous_inc    | .9999047   | .0000658  | -1.45 | 0.147 | .9997757 1.000034    |
| drink       | .8037861   | .3064159  | -0.57 | 0.567 | .3807581 1.696805    |
| smoke       | .9547198   | .3614977  | -0.12 | 0.903 | .4545426 2.00529     |
| pest_pois   | -          |           |      |      | 1 (omitted)         |
| lang12      | .7436556   | .5197246  | -0.42 | 0.672 | .1890105 2.925889    |
| drugs       | -          |           |      |      | 1 (omitted)         |
| _cons       | 1.857066   | 2.455283  | 0.47  | 0.640 | .1391322 24.78716    |

Logistic regression

Number of obs = 168
LR chi2(9) = 13.75
Prob > chi2 = 0.1316

Log likelihood = -86.483585  Pseudo R2 = 0.0736

| q16_score75 | Odds Ratio | Std. Err. | z   | P>|z| | [95% Conf. Interval] |
|-------------|------------|-----------|-----|------|----------------------|
| fpba_cr     | .8691062   | .2024818  | -0.60 | 0.547 | .5505065 1.372092    |
| age         | .9823022   | .0206995  | -0.85 | 0.397 | .9425584 1.023722    |
| levledu     | 1.120365   | .0938292  | 1.36  | 0.175 | .9507638 1.320221    |
| hous_inc    | .999867    | .000088   | -1.51 | 0.131 | .9996945 1.000039    |
| drink       | 1.180205   | .536662   | 0.36  | 0.716 | .4840603 2.877499    |
| smoke       | 1.272106   | .5737545  | 0.53  | 0.594 | .5255433 3.079204    |
| pest_pois   | 3.916675   | 3.302903  | 1.62  | 0.105 | .7500768 20.4517     |
| lang12      | .5248527   | .3771069  | -0.90 | 0.370 | .1283656 2.145982    |
| drugs       | 2.363362   | 3.516655  | 0.58  | 0.563 | .1279242 43.66243    |
| _cons       | .5330587   | .8169333  | -0.41 | 0.681 | .0264409 10.74669    |

Logistic regression

Number of obs = 166
LR chi2(8) = 16.89
|         | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|---------|------------|-----------|------|------|----------------------|
| tired   | 0.9976696  | 0.0096005 | -0.24| 0.808| 0.9790292 1.016665  |
| pba_cr  | 0.9742195  | 0.0170582 | 1.49 | 0.136| 0.9413533 1.008233  |
| age     | 1.076001   | 0.0705056 | 1.12 | 0.264| 0.9463181 1.223455  |
| levledu | 0.9998271  | 0.000682  | -2.54| 0.011| 0.9996934 0.9999608 |
| hous_inc| 0.494587   | 0.1959936 | 0.78 | 0.445| 0.2274735 1.075362  |
| drink   | 1.394677   | 0.539934  | 1.12 | 0.264| 0.9463181 1.223455  |
| smoke   | 1.965416   | 1.740524  | -2.54| 0.011| 0.9996934 0.9999608 |
| pest_pois| 1.6356921  | 0.4683206 | -0.61| 0.539| 0.1500232 2.693614  |
| drugs   | 1.076001   | 0.0705056 | 1.12 | 0.264| 0.9463181 1.223455  |
| _cons   | 6.665921   | 8.794152  | 1.44 | 0.150| 0.5022215 88.47592  |

Logistic regression

Number of obs = 166
LR chi2(8) = 9.61
Prob > chi2 = 0.2932
Log likelihood = -107.15168
Pseudo R2 = 0.0429

| hart_palp | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|-----------|------------|-----------|------|------|----------------------|
| pba_cr    | 1.001745   | 0.0090649 | 0.19 | 0.847| 0.9841345 1.01967  |
| age       | 0.9560369  | 0.017583  | -2.44 | 0.015| 0.9221886 0.9911277 |
| levledu   | 0.9584254  | 0.0621829 | -0.65| 0.513| 0.8439799 1.08839  |
| hous_inc  | 0.9999412  | 0.000644  | -0.91| 0.361| 0.9998149 1.000067 |
| drink     | 0.9584254  | 0.0621829 | -0.65| 0.513| 0.8439799 1.08839  |
| smoke     | 0.9584254  | 0.0621829 | -0.65| 0.513| 0.8439799 1.08839  |
| pest_pois | 1.6356921  | 0.4683206 | -0.61| 0.539| 0.1500232 2.693614  |
| lang12    | 1.675501   | 1.147815  | 0.75 | 0.451| 0.4375446 6.41604  |
| drugs     | 1.675501   | 1.147815  | 0.75 | 0.451| 0.4375446 6.41604  |
| _cons     | 5.048407   | 6.491607  | 1.26 | 0.208| 0.4060859 62.76114 |

Logistic regression

Number of obs = 166
LR chi2(8) = 9.04
Prob > chi2 = 0.3389
Log likelihood = -104.08433
Pseudo R2 = 0.0416
## Logistic Regression Results

### Irritation

|   | Odds Ratio | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|---|------------|-----------|------|-------|----------------------|
| pba_cr | 1.000749   | 0.0099001 | 0.08 | 0.940 | 1.020342            |
| age | .9912586   | .0176181  | -0.49 | 0.621 | .9573222 1.026398   |
| levledu | 1.104143   | .0779139  | 1.40 | 0.160 | .9615248 1.267916   |
| hous_inc | .9999713   | .0000628  | -0.46 | 0.648 | .9998482 1.000094  |
| drink | .650189    | .2556379  | -1.09 | 0.274 | .3008629 1.405111   |
| smoke | .9752239   | .3815093  | -0.06 | 0.949 | .4530153 2.099403   |
| pest_pois | 2.823259   | 2.32305   | 1.26 | 0.207 | .5628079 14.16254   |
| lang12 | .4367813   | .2952951  | -1.23 | 0.220 | .1160891 1.643375   |
| drugs | 1 (omitted) |           |      |       |          |
| _cons | .9919276   | 1.305078  | -0.01 | 0.995 | .0752584 13.07389   |

Logistic regression

Logistic regression                               Number of obs   =        166
LR chi2(8)      =       4.94
Prob > chi2     =     0.7641
Log likelihood = -107.72611                       Pseudo R2       =     0.0224

### Depression

|   | Odds Ratio | Std. Err. | z    | P>|z|   | [95% Conf. Interval] |
|---|------------|-----------|------|-------|----------------------|
| pba_cr | 0.997308   | 0.0087486 | -0.31 | 0.759 | 0.9803075 1.014603 |
| age | 1.004059   | 0.0172441 | 0.24 | 0.814 | .9708241 1.038432 |
| levledu | 0.9803938 | 0.0628853 | -0.31 | 0.758 | .8645736 1.111729 |
| hous_inc | 0.999962   | 0.0000628 | -0.60 | 0.545 | .999839 1.000085 |
| drink | 0.9232373  | 0.3512772 | -0.21 | 0.834 | .4379703 1.946176 |
| smoke | 0.6355188  | 0.2416465 | -1.19 | 0.233 | .3017974 1.338262 |
| pest_pois | 2.431324  | 1.992892 | 1.08 | 0.278 | .4876805 12.12133 |
| lang12 | 0.6975371  | 0.455982 | -0.55 | 0.582 | .1937021 2.511888 |
| drugs | 1 (omitted) |           |      |       |          |
| _cons | 1.292447   | 1.610352  | 0.21 | 0.837 | .112419 14.85887 |

Logistic regression

Logistic regression                               Number of obs   =        168
LR chi2(9)      =       2.83
Prob > chi2     =     0.9706
Log likelihood = -114.26935                       Pseudo R2       =     0.0122

### Conclusion

The logistic regression results for irritation and depression show that certain variables have a statistically significant effect on the outcomes. For irritation, the odds ratio for pba_cr is 1.000749, indicating a slight increase in the odds of irritation with pba_cr. However, none of the other variables except for and pistols (pest_pois) show a significant effect. For depression, the odds ratio for pba_cr is 0.997308, suggesting a slight decrease in the odds of depression with pba_cr. Similar to irritation, only pesticides (pest_pois) show a significant effect.
smoke | 1.094521  .4039998  0.24  0.807  .5309286  2.256378
pest_pois | 1.496096  1.214135  0.50  0.620  .3049149  7.340743
lang12 | .7537327  .491863  -0.43  0.665  .2097727  2.70823
drugs | 1.458638  2.13599  0.26  0.797  .0826935  25.72907
_cons | 1.599296  1.949593  0.39  0.700  .1466516  17.44097

------------------------------------------------------------------------------
.logistic pr_concen pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
Logistic regression                               Number of obs   =        168
LR chi2(9)      =       7.65
Prob > chi2     =     0.5699
Log likelihood = -91.730608                       Pseudo R2       =     0.0400
------------------------------------------------------------------------------
pr_concen | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
pba_cr |   .9709882    .029054    -0.98   0.325     .9156809    1.029636
age |   .9755072   .0200527    -1.21   0.228     .9369859    1.015612
levledu |   1.034944   .0772082     0.46   0.645      .894162    1.197892
hous_inc |   .9999734   .0000699    -0.38   0.703      .999836    1.00011
drink |   .825767    .3575329    -0.44   0.658     .3534372    1.929314
smoke |   1.647192   .7030085     1.17   0.242     .7136058    3.802159
pest_pois |   1.329019   1.200289     0.31   0.753     .2263484    7.803415
lang12 |   2.001253   1.761951     0.79   0.431     .3563558   11.23881
drugs |   3.146199   4.675005     0.77   0.440     .1709888    57.89018
_cons |   .3440946   .5174721    -0.71   0.478     .0180545     6.55799
------------------------------------------------------------------------------

.logistic short_mem pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used
Logistic regression                               Number of obs   =        166
LR chi2(8)      =       7.21
Prob > chi2     =     0.5142
Log likelihood =  -106.0863                       Pseudo R2       =     0.0329
------------------------------------------------------------------------------
short_mem | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
pba_cr |   1.000741   .0102028    -0.07   0.942     .9809425   1.02094
age |   .9845183  .0175321    -0.88   0.381     .9507488   1.019487
levledu |   1.099806   .0757013     1.38   0.167     .9610072   1.258652
hous_inc |   .9999201   .0000654    -1.22   0.222      .999792    1.000048
drink |   .7668461   .2990234    -0.68   0.496      .357116    1.646749
smoke |   1.219036   .4705891     0.51   0.608      .572036    2.59782
pest_pois |   2.56629    2.10505    1.15   0.251      .514151    12.80915
lang12 |   1.502244   1.02339     0.60   0.550      .3952459    5.709706
drugs |          1  (omitted)
_cons |   .4213934   .54546     -0.67   0.504     .0333331    5.327212
------------------------------------------------------------------------------
. logistic perspire pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
                                                     LR chi2(8)      =      10.42
                                                     Prob > chi2     =     0.2370
                                                     Log likelihood = -82.862098                       Pseudo R2       =     0.0591

--------------------------------------------------------------------------------------------
           perspire | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+--------------------------------------------------
      pba_cr   |  1.010895   .0100731     1.09   0.277     .9913436    1.030832
        age    |  .9608168   .0219025    -1.75   0.080     .9188336    1.004718
      levledu   |  1.082138   .0931371     0.92   0.359      .914159    1.280984
    hous_inc   |  .9999537   .0000787    -0.59   0.556     .9997995    1.000108
       drink   |  .7118000   .3310349    -0.73   0.465     .2860829    1.771022
       smoke   |  1.589399   .7411173     0.99   0.320     .6372764    3.964038
   pest_pois   |  1.637233    1.52354     0.53   0.596      .264252    10.14385
      lang12   |  .3842018   .2758744    -1.33   0.183     .0940498    1.569498
   drugs | 1 (omitted)
     _cons    |  1.460395   2.283636     0.24   0.809     .0681454    31.29708
--------------------------------------------------------------------------------------------

. logistic button pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        166
                                                     LR chi2(8)      =       7.13
                                                     Prob > chi2     =     0.5230
                                                     Log likelihood = -31.420658                       Pseudo R2       =     0.1019

--------------------------------------------------------------------------------------------
          button | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+--------------------------------------------------
     pba_cr    |  1.020041   .0133144     1.52   0.128     .9942757    1.046473
        age    |  .9752282   .0410625    -0.60   0.551     .8979786    1.059123
      levledu   |  1.142134   .1907111     0.80   0.426      .8233516    1.584342
    hous_inc   |  .9998754   .0001616    -0.77   0.441     .9995588    1.000192
       drink   |  1.445974   1.431004     0.37   0.709     .2078603    10.05888
       smoke   |  2.803287   2.692179     1.07   0.283     .4267795    18.4133
   pest_pois   |  2.963272   3.775246     0.85   0.394      .2439663    35.99259
      lang12   |  7.079193   20.45627     0.68   0.498     .0245654   2040.063
   drugs | 1 (omitted)
     _cons    |  .0028942   .0113162    -1.49   0.135     1.36e-06    6.160978
--------------------------------------------------------------------------------------------

. logistic reading pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        168
                                                     LR chi2(9)      =       6.98
Prob > chi2  =  0.6387  
Log likelihood = -83.796939  
Pseudo R2  =  0.0400

|               | Odds Ratio | Std. Err. | z   | P>|z|  | [95% Conf. Interval] |
|---------------|------------|-----------|-----|------|----------------------|
| pba_cr        | 1.008537   | .009373   | 0.91| 0.360| .9903329  1.027077   |
| age           | .949166    | .022192   | -2.23| 0.026| .9066517  .9936738  |
| levledu       | .9375937   | .0731424  | -0.83| 0.409| .8046588  1.09249   |
| hous_inc      | .9999901   | .000758   | -0.13| 0.896| .9998416  1.000139  |
| drink         | .7628056   | .3486468  | -0.59| 0.554| .3114332  1.86837   |
| smoke         | .9247836   | .4153795  | -0.17| 0.862| .383452   2.23033   |
| pest_pois     | .9277122   | 1.061465  | -0.07| 0.948| .0985121  8.736486 |
| lang12        | .9242997   | .7380013  | -0.10| 0.921| .1932753  4.420276 |
| drugs         | 2.645616   | 3.956097  | 0.65 | 0.515| .1411532  49.58643 |
| _cons         | 3.795146   | 5.923535  | 0.85 | 0.393| .1780973  80.87228 |

. logistic fam_mem pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression  
Number of obs =  168  
LR chi2(9)  =  10.55  
Prob > chi2  =  0.3079
Log likelihood = -85.756629  
Pseudo R2  =  0.0579

|               | Odds Ratio | Std. Err. | z   | P>|z|  | [95% Conf. Interval] |
|---------------|------------|-----------|-----|------|----------------------|
| pba_cr        | .9982878   | .0136177  | -0.13| 0.900| .9719512  1.025338  |
| age           | 1.018489   | .0206152  | 0.91 | 0.365| .9572753  1.030767  |
| levledu       | 1.226785   | .1082582  | 2.32 | 0.021| 1.031939  1.458422  |
| hous_inc      | .9998636   | .0000843  | -1.62| 0.105| .9996984  1.000029  |
| drink         | .6689769   | .3050464  | -0.88| 0.378| .2736983  1.635122  |
| smoke         | 2.065091   | .9698301  | 1.54 | 0.123| .8226003  5.184293 |
| pest_pois     | .9715696   | .8906511  | -0.03| 0.975| .1611261  5.85844   |
| lang12        | .7357547   | .5404287  | -0.42| 0.676| .1743837  3.104275  |
| drugs         | 4.504452   | 6.82153   | 0.99 | 0.320| .2315179  87.63939 |
| _cons         | .045655    | .0703764  | -2.00| 0.045| .0022252  .9367023 |

. logistic chest pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression  
Number of obs =  168  
LR chi2(9)  =  20.12  
Prob > chi2  =  0.0172
Log likelihood = -96.165302  
Pseudo R2  =  0.0947

|               | Odds Ratio | Std. Err. | z   | P>|z|  | [95% Conf. Interval] |
|---------------|------------|-----------|-----|------|----------------------|
| pba_cr        | 1.000809   | .0099698  | 0.08| 0.935| .9814578  1.020541  |
| age           | .9933418   | .018744   | -0.35| 0.723| .9572753  1.030767  |
| levledu       | 1.118187   | .0821428  | 1.52| 0.128| .9682431  1.291351  |
| hous_inc      | .9997213   | .0000925  | -3.01| 0.003| .99954    0.999026  |
. logistic notes pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
    drugs dropped and 2 obs not used

Logistic regression                     Number of obs =      166
             LR chi2(8)      =     14.00
             Prob > chi2     =     0.0818
             Log likelihood =  -81.070712                       Pseudo R2       =     0.0795

                              | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------------------------+-------------------------------------------
   notes |-------------------------------------------------
   pba_cr |   .9974167   .0157554    -0.16   0.870     .9670098     1.02878
   age |   .9515852   .0220422    -2.14   0.032     .9093493    .9957828
   levledu |   1.010499   .0826468     0.13   0.898     .8608309    1.18619
   hous_inc |   .9990888   .000085     -1.07   0.283     .9974237    1.000075
   drink |   .4963157   .2292828    -1.52   0.129     .2006913    1.227403
   smoke |   .8430278   .3847714    -0.37   0.708     .3446195    2.062262
   pest_pois |   9.124356   7.914997     2.55   0.011     1.666558    49.95557
   lang12 |   .9280648   .6898609    -0.10   0.920     .2161984    3.983862
   drugs |   1.000000   .000000     0.00   1.000
   _cons |   3.258136    5.02739     0.77   0.444     .1583224    67.04956

. logistic chek_door pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
    pest_pois dropped and 7 obs not used

Logistic regression                     Number of obs =      161
             LR chi2(8)      =       2.80
             Prob > chi2     =     0.9460
             Log likelihood =  -107.9195                       Pseudo R2       =     0.0128

                              | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------------------------+-------------------------------------------
   chek_door |-------------------------------------------------
   pba_cr |   .9975892   .0099577    -0.24   0.809     .9782621    1.017298
   age |   .9833612   .0172622    -0.96   0.339     .9501034    1.017783
   levledu |   1.007286   .0650865     0.11   0.911     .8874665    1.143283
   hous_inc |   .9999547   .0000619    -0.73   0.464     .9998334    1.000076
   drink |   1.238934   .4677192     0.57   0.570     .5911596    2.596519
   smoke |   .8577065   .320777     -0.41   0.682     .4120923    1.785184
   pest_pois |          1  (omitted)
   lang12 |   1.2966    .904829     0.37   0.710     .3302155    5.091137
   _cons |
drugs |  .9084199  1.33049  -0.07  0.948  .0514754  16.03146  
_cons |  1.101437  1.41849  0.08  0.940  .0882545  13.7462  

------------------------------------------------------------------------------
.logistic q16_head pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: drugs != 0 predicts success perfectly
  drugs dropped and 2 obs not used

Logistic regression                     Number of obs =        166  
                                      LR chi2(8) =       8.90  
                                      Prob > chi2 =     0.3509  
Log likelihood =  -97.950219          Pseudo R2 =     0.0435  
------------------------------------------------------------------------------
                 q16_head | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]  
-------------------+----------------------------------------------------------------
          pba_cr |   .9832985   .0136903    -1.21   0.226     .9568288      1.0105  
          age |   .9948734   .0181462    -0.28   0.778     .9599357    1.031083  
        levledu |   1.053846   .0720521     0.77   0.443     .9216802    1.204965  
        hous_inc |   .9998741   .0000637    -1.98   0.048     .9997493    .9999989  
          drink |   1.297078   .5275539     0.64   0.522     .5844684    2.878531  
          smoke |   1.057429   .4291631     0.14   0.891     .4772948    2.342696  
       pest_pois |   2.229053   2.499467     0.71   0.475     .2475464     20.0717  
         lang12 |   1.501058   1.029688     0.59   0.554     .3912867    5.758376  
        drugs |          1  (omitted)  
        _cons |   1.750379   2.304631     0.43   0.671     .1325562     23.1134  
------------------------------------------------------------------------------

.logistic less_sex pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
  note: drugs != 0 predicts success perfectly
  drugs dropped and 2 obs not used

Logistic regression                     Number of obs =        166  
                                      LR chi2(8) =       5.31  
                                      Prob > chi2 =     0.7239  
Log likelihood =  -109.30336          Pseudo R2 =     0.0237  
------------------------------------------------------------------------------
              less_sex | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]  
-------------------+----------------------------------------------------------------
          pba_cr |   .9902179   .0136903    -0.72   0.469     .9641925    1.016946  
          age |   1.000575   .0171666     0.03   0.973     .9674889    1.034794  
        levledu |   1.07294   .070093     1.08   0.281     .9439916    1.219502  
        hous_inc |   .9998995   .0000637    -1.54   0.122     .999772    1.000027  
          drink |   1.062922   .4036703     0.16   0.872     .5049364    2.237514  
          smoke |   .9910184   .3719151    -0.02   0.981     .4772948    2.237514  
       pest_pois |   1.87794   1.53589     0.77   0.441     .3780236     9.3292  
         lang12 |   1.726605   1.167103     0.81   0.419     .4590088    6.494789  
        drugs |          1  (omitted)  
        _cons |   .3103703   .3915544    -0.93   0.354     .0261835     3.679019  
------------------------------------------------------------------------------
. logistic q16_score pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                     Number of obs =      159
                                    LR chi2(7)      =     8.87
                                    Prob > chi2     =     0.2622
Log likelihood = -51.719491           Pseudo R2       =     0.0790

                                 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
q16_score    |   0.9805782   .0128345    -1.50   0.134     .9557429    1.006059
pba_cr       |   0.9606202   .0250622    -1.54   0.124      .912734    1.011019
age          |   0.9341009   .1022648    -0.62   0.533     .7537109    1.157665
levledu      |   0.9999004   .0000798    -1.25   0.212      .999744    1.000057
hous_inc     |   0.6266251   .4010143    -0.73   0.465     .1787615    2.196553
drink        |   1.019491   .6417187     0.03   0.976     .2968892     3.50084
smoke        |          1  (omitted)
pest_pois    |          1  (omitted)
lang12       |   1.340298   1.393468     0.28   0.778     .1746755    10.2842
drugs        |          1  (omitted)
_cons        |   114.4458   237.3644     2.29   0.022     1.964174    6668.372
-------------+----------------------------------------------------------------

. logistic q16_score50 pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                     Number of obs =      159
                                    LR chi2(7)      =     7.11
                                    Prob > chi2     =     0.4179
Log likelihood = -105.51947           Pseudo R2       =     0.0326

                     | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
q16_score50    |   0.9988424   .0096209    -0.12   0.904     .9801626    1.017878
pba_cr        |   0.9863338   .0173453    -0.78   0.434     .9529169    1.020923
age           |   1.079895   .0718299     1.16   0.248     .9479014    1.230268
levledu       |   0.9998953   .0000654    -1.60   0.109      .9997671    1.000032
hous_inc      |   .7793968   .2954323    -0.66   0.511     .3707734    1.638358
drink         |   0.9575402   .3605999    -0.12   0.908     .4577235    2.003138
smoke         |          1  (omitted)
pest_pois     |          1  (omitted)
lang12        |   0.7507159   0.5247418    -0.41   0.682     .1907636    2.954308
drugs         |          1  (omitted)
_cons         |   1.530572   2.000586     0.33   0.745     .1181034    19.8356
```
. logistic q16_score75 pba_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression                               Number of obs   =        168
LR chi2(9)      =      14.11
Prob > chi2     =     0.1186
Log likelihood = -86.304068                       Pseudo R2       =     0.0756

------------------------------------------------------------------------------
          | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    pba_cr |   1.009392   .0098049     0.96   0.336     .9903568    1.028794
   age |   .9806407   .0207202    -0.93   0.355     .9408592    1.022104
  levledu |   1.131868   .0958967     1.46   0.144     .9586902    1.336328
   hous_inc |   .9998628   .0000873    -1.57   0.116     .9996918    1.000034
   drink |   1.161219    .531809     0.33   0.744      .473244    2.849331
  smoke |   1.290509   .5847071     0.56   0.574     .5310023    3.136358
  pest_pois |   4.226105   3.571217     1.71   0.088      .806572    22.14305
   lang12 |   .5297642   .3820064    -0.88   0.378     .1289115    2.177076
    drugs |   2.151179   3.192528     0.52   0.606     .1173337     39.4394
    _cons |   .4267296   .6507871    -0.56   0.577     .0214794    8.477813
------------------------------------------------------------------------------

. logistic tired tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        168
LR chi2(8)      =      17.18
Prob > chi2     =     0.0283
Log likelihood = -106.89351                       Pseudo R2       =     0.0744

------------------------------------------------------------------------------
    tired | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   tcpy_cr |   1.005722   .0072768     0.79   0.430     .9915603    1.020086
   age |   .9682187   .0166342    -1.88   0.060     .9361591    1.001376
  levledu |   1.065443   .0694377     0.97   0.331     .9376825    1.210611
  hous_inc |   .9998785   .0000593    -2.05   0.041     .9997622    .9999948
    drink |   .4590112   .1808361    -2.97   0.003     .2120686    .9935053
    smoke |   1.352104   .5195276     0.79   0.432     .6367182    2.871261
   pest_pois |   2.306775   2.041809     0.94   0.345     .4069831    13.07477
  lang12 |   .5755125   .4211363    -0.76   0.448     .1371452    2.415066
    drugs |          1  (omitted)
    _cons |   7.802647  10.26565     1.56   0.118     .5920356    102.8338
------------------------------------------------------------------------------

. logistic hart_palp tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used
```
Logistic regression                               Number of obs   =        168
                      LR chi2(8)      =      12.59
                      Prob > chi2     =     0.1269
Log likelihood = -106.26808                       Pseudo R2       =     0.0559
------------------------------------------------------------------------------
                  hart_palp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------------+----------------------------------------------------------------
             tcpy_cr |   1.007874   .0094524     0.84   0.403      .989517    1.026572
             age     |   .9556311   .0174357    -2.49   0.013     .9220614    .9904228
            levledu  |   .9604941    .063062    -0.61   0.539     .8445169    1.092398
            hous_inc |   .9999279    .000061    -1.18   0.237     .9998083    1.000047
            drink    |   .8437477    .3237809    -0.44   0.658     .3977145    1.790003
             smoke   |   .6861333   .2664608    -0.97   0.332     .3205113    1.468837
          pest_pois |   3.196172   2.639829     1.41   0.159     .6332765    16.13121
           lang12   |   1.626186   1.117383     0.71   0.479     .4229544    6.252398
        _cons      |   4.624955   6.004609     1.18   0.238     .3630672    58.91528
------------------------------------------------------------------------------

. logistic tingling tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
   note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used
Logistic regression                               Number of obs   =        168
                      LR chi2(8)      =       9.55
                      Prob > chi2     =     0.2981
Log likelihood = -103.49258                       Pseudo R2       =     0.0441
------------------------------------------------------------------------------
                 tingling | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------------+----------------------------------------------------------------
             tcpy_cr |   .998170    .0047391    -0.39   0.700     .9889246    1.007502
             age     |   .9874341   .0175075    -0.71   0.476     .9537094    1.022351
            levledu  |   1.086488   .0763592     1.18   0.238     .9466767    1.246947
            hous_inc |   .9999526   .0000595    -0.80   0.425     .9998361    1.000069
            drink    |   .6949395   .2746901    -0.92   0.357     .320513    1.508006
             smoke   |   .920556   .3614132     -0.21   0.833     .4264479    1.987167
          pest_pois |   3.017784   2.483336     1.34   0.180     .601498    15.14057
           lang12   |   .421584   .2871124     -1.27   0.205     .1109655    1.601696
        _cons      |   1.378184   1.828265     0.24   0.809     .1023584    18.55627
------------------------------------------------------------------------------

. logistic irritated tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
   note: drugs != 0 predicts success perfectly
   drugs dropped and 2 obs not used
Logistic regression                               Number of obs   =        168
                      LR chi2(8)      =       9.82
                      Prob > chi2     =     0.2780
Log likelihood = -106.23312                       Pseudo R2       =     0.0442
|                  | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|------------------|------------|-----------|-------|-------|----------------------|
| irritated        |            |           |       |       |                      |
| tcpy_cr          | 1.021037   | .0126598  | 1.68  | 0.093 | .9965234 1.046154    |
| age              | 1.002028   | .0171392  | 0.12  | 0.906 | .9689929 1.03619    |
| levledu          | .9907941   | .0648735  | -0.14 | 0.888 | .871465 1.126463    |
| hous_inc         | .9999692   | .0000581  | -0.53 | 0.597 | .9988553 1.000083   |
| drink            | .9260327   | .3604848  | -0.20 | 0.844 | .4317892 1.986008   |
| smoke            | .62429     | .4342835  | -1.21 | 0.226 | .2910626 1.339018   |
| pest_pois        | 2.371667   | 1.957493  | 1.05  | 0.295 | .4704365 11.95656   |
| lang12           | .7081791   | .4680138  | -0.52 | 0.602 | .1939144 2.586283   |
| drugs            | 1 (omitted)|           |       |       |                      |
| _cons            | .9605086   | 1.215263  | -0.03 | 0.975 | .0804519 11.46743   |

.logistic depress tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 170
LR chi2(9) = 4.25
Prob > chi2 = 0.8940
Log likelihood = -114.52929
Pseudo R2 = 0.0182

|                  | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|------------------|------------|-----------|-------|-------|----------------------|
| depress          |            |           |       |       |                      |
| tcpy_cr          | 1.006594   | .0079362  | 0.83  | 0.405 | .9911587 1.022269    |
| age              | .9992147   | .0164227  | -0.05 | 0.962 | .9675396 1.031927   |
| levledu          | .9895067   | .0618616  | -0.17 | 0.866 | .8753942 1.118494   |
| hous_inc         | .9999494   | .000057   | -0.89 | 0.375 | .9998376 1.000061   |
| drink            | .854946    | .3191978  | -0.42 | 0.675 | .4112812 1.777209   |
| smoke            | 1.169569   | .4342838  | 0.42  | 0.673 | .5648828 2.421551   |
| pest_pois        | 1.530266   | 1.240352  | 0.52  | 0.600 | .3124846 7.493857   |
| lang12           | .7134301   | .4672612  | -0.52 | 0.606 | .1976318 2.575408   |
| drugs            | 1.478567   | 2.166366  | 0.27  | 0.790 | .0836909 26.12186   |
| _cons            | 1.341115   | 1.643372  | 0.24  | 0.811 | .121457 14.80845    |

.logistic pr_concen tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Logistic regression

Number of obs = 170
LR chi2(9) = 15.20
Prob > chi2 = 0.0857
Log likelihood = -86.315821
Pseudo R2 = 0.0809

|                  | Odds Ratio | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|------------------|------------|-----------|-------|-------|----------------------|
| pr_concen        |            |           |       |       |                      |
| tcpy_cr          | .9285615   | .0325677  | -2.11 | 0.035 | .8668745 0.9946382   |
| age              | .9662309   | .0207348  | -1.60 | 0.109 | .9264342 1.007737   |
| levledu          | 1.024999   | .0618616  | 0.32  | 0.748 | .8817167 1.191564   |
| hous_inc         | .9999494   | .000057   | -0.89 | 0.375 | .9998376 1.000061   |
| drink            | .8642976   | .3833358  | -0.33 | 0.742 | .3623564 2.061535   |
| smoke            | 1.79447    | .7519086  | 1.32  | 0.185 | .7556082 4.261629   |
### logistic short_mem tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Note: 1 failure and 0 successes completely determined.

#### logistic short_mem tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

|          | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------|------------|-----------|------|------|----------------------|
| short_mem |            |           |      |      |                      |
| tcpy_cr  | 0.9989658  | 0.0039251 | -0.26| 0.792| 0.9913024 1.006688  |
| age      | 0.9843647  | 0.0171379 | -0.91| 0.365| 0.9513416 1.018534  |
| levledu  | 1.092376   | 0.0743472 | 1.30 | 0.194| 0.9559586 1.248259  |
| hous_inc | 0.999959   | 0.0000569 | -0.72| 0.472| 0.9998474 1.000071  |
| drink    | 0.7498882  | 0.290149  | -0.74| 0.457| 0.3512748 1.600833  |
| smoke    | 1.14596    | 0.4381692 | 0.36 | 0.722| 0.5416316 2.42457   |
| pest_pois| 2.720187   | 2.224894  | 1.22 | 0.221| 0.5475 13.51491   |
| lang12   | 1.449634   | 0.9790901 | 0.55 | 0.582| 0.3857914 5.447085  |
| drugs    | 1 (omitted)|           |      |      |                      |
| _cons    | 0.4377304  | 0.5622101 | -0.64| 0.520| 0.0353138 5.425863  |

#### logistic perspire tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

Note: drugs != 0 predicts failure perfectly

drugs dropped and 2 obs not used

#### logistic perspire tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs

|          | Odds Ratio | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------|------------|-----------|------|------|----------------------|
| perspire |            |           |      |      |                      |
| tcpy_cr  | 0.999747   | 0.0047599 | -0.05| 0.958| 0.9904611 1.00912   |
| age      | 0.9657398  | 0.0171379 | -1.56| 0.120| 0.9242451 1.009097  |
| levledu  | 1.10027    | 0.0950049 | 1.11 | 0.268| 0.9289679 1.301361  |
| hous_inc | 0.9999406  | 0.0000742 | -0.80| 0.424| 0.9997951 1.000086  |
| drink    | 0.8248679  | 0.382962  | -0.41| 0.678| 0.3320446 2.049144  |
| smoke    | 1.762119   | 0.8230713 | 1.21 | 0.225| 0.7054168 4.401741  |
| pest_pois| 1.424207   | 1.324895  | 0.38 | 0.704| 0.2299995 8.818996  |
| lang12   | 0.3676273  | 0.2648877 | -1.39| 0.165| 0.0895548 1.509131  |
| drugs    | 1 (omitted)|           |      |      |                      |
. logistic button tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts failure perfectly
drugs dropped and 2 obs not used

Logistic regression
Number of obs = 168
LR chi2(8) = 5.81
Prob > chi2 = 0.6686
Log likelihood = -32.190471 Pseudo R2 = 0.0828

button | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
tcpy_cr |   .9996876   .0092456    -0.03   0.973     .9817297    1.017974
age |   .9803861    .040298    -0.48   0.630     .9045012    1.062638
levledu |   1.111829    .174174     0.68   0.499     .8178858    1.511414
hous_inc |   .9998566   .0001607    -0.89   0.372     .9995417    1.000172
drink |   1.495792   1.412808     0.43   0.670     .2349053    9.524657
smoke |   2.542307   2.335547     1.02   0.310     .4200034    15.38874
pest_pois |   2.640469    3.33433    0.77   0.442     .2222923    31.37334
lang12 |   7.611927   21.97956     0.70   0.482     .0265238    2184.504
_drugs |          1  (omitted)
_cons |   .0038539   .0147323    -1.45   0.146     2.15e-06    6.915042

Logistic regression
Number of obs = 170
LR chi2(9) = 7.55
Prob > chi2 = 0.5802
Log likelihood = -83.994278 Pseudo R2 = 0.0430

reading | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
tcpy_cr |   .9932751   .0125894    -0.53   0.594     .9689044    1.018259
age |   .9509095    .021632    -2.21   0.027     .9094427    0.9942671
levledu |   .9345653    .072243    -0.88   0.381     .8031761    1.087448
hous_inc |   .9999627   .000072    -0.52   0.605     .9998217    1.000104
drink |   .8119741   .3692664    -0.46   0.647     .3329937    1.979923
smoke |   .8780615   .3942289    -0.29   0.772     .3642131    2.116871
pest_pois |   .8924757   1.019282    -0.10   0.921     .0951597    8.370273
lang12 |   .9813096   .7879444    -0.02   0.981     .2033914    4.734559
_drugs |   2.475867   3.686262    0.61   0.543     .1337804    45.82073
_cons |   4.285943   6.653281     0.94   0.348     .2044957    89.82734

Logistic regression
Number of obs = 170
LR chi2(9) = 13.12
| fam_mem | Odds Ratio   | Std. Err. | z    | P>|z| | 95% Conf. Interval |
|---------|--------------|-----------|------|-----|-------------------|
| tcpy_cr | 0.9910274    | 0.0134395 | -0.66| 0.506  | 0.9650334 - 1.017722 |
| age     | 1.020227     | 0.0204935 | 1.00 | 0.319  | 0.9808411 - 1.061195 |
| levledu | 1.266342     | 0.1133784 | 2.64 | 0.008  | 1.06253 - 1.509249  |
| hous_inc| 0.9998543    | 0.0008111 | -1.80| 0.072  | 0.9996953 - 1.000013 |
| drink   | 0.7077854    | 0.3236034 | -0.76| 0.450  | 0.288867 - 1.734106 |
| smoke   | 0.9998543    | 0.0187057 | -0.57| 0.566  | 0.9532238 - 1.026565 |
| pest_pois| 1.098901    | 0.0806181 | 1.29 | 0.199  | 0.9517268 - 1.268834 |
| lang12  | 0.9259793    | 0.2815421 | 0.95 | 0.348  | 0.514404 - 16.66857 |
| drugs   | 4.225272     | 6.437515  | 0.95 | 0.344  | 0.2132977 - 83.69957 |

Logistic regression  
Number of obs = 170  
LR chi2(9) = 21.79  
Prob > chi2 = 0.0096  
Log likelihood = -94.591306  
Pseudo R2 = 0.1033

| notes | Odds Ratio   | Std. Err. | z    | P>|z| | 95% Conf. Interval |
|-------|--------------|-----------|------|-----|-------------------|
| tcpy_cr | 0.9992366    | 0.0044312 | -0.17| 0.863  | 0.9905892 - 1.00796 |

Logistic regression  
Number of obs = 168  
LR chi2(8) = 14.50  
Prob > chi2 = 0.0695  
Log likelihood = -80.037491  
Pseudo R2 = 0.0831
. logistic chek_door tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used

Logistic regression                               Number of obs   =        163
LR chi2(8)      =       6.52
Prob > chi2     =     0.5887
Log likelihood = -106.75476                       Pseudo R2       =     0.0297
------------------------------------------------------------------------------
chek_door | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
tcpy_cr |   .9856967   .0134231    -1.06   0.290     .9597359     1.01236
age |    .979811   .0171618    -1.16   0.244     .9467453    1.014032
levledu |   1.008734   .0656222     0.13   0.894     .8879783     1.14591
hous_inc |   .9999413   .0000587    -2.15   0.031     .9997561    .9999886
drink |   1.372912   .5253957     0.83   0.408     .6484837    2.906609
smoke |    .874448    .332503    -0.35   0.724     .4150212    1.842458
pest_pois |          1  (omitted)
lang12 |   1.244082   .8821435     0.31   0.758      .309946     4.99358
drugs |   .8388884   1.229171    -0.12   0.905     .0474779    14.82235
_cons |   1.380073   1.798877     0.25   0.805     .1072483    17.75879
------------------------------------------------------------------------------

. logistic q16_head tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used

Logistic regression                               Number of obs   =        168
LR chi2(8)      =       8.87
Prob > chi2     =     0.3537
Log likelihood = -100.29984                       Pseudo R2       =     0.0423
------------------------------------------------------------------------------
q16_head | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
----------+--------------------------------------------------
tcpy_cr |   1.011388   .0147476     0.78   0.437     .9828924    1.04071
age |   .9935797   .0175399    -0.36   0.715     .9597908    1.028559
levledu |   1.039057   .0698833     0.57   0.569     .9107317    1.185463
hous_inc |   .9999413   .0000587    -2.15   0.031     .9997561    .9999886
drink |   1.211109   .4858841     0.48   0.633      .5516836    2.658742

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```
.logistic less_sex tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used
Logistic regression
Number of obs = 168
LR chi2(8) = 5.22
Prob > chi2 = 0.7337
Log likelihood = -110.37362 Pseudo R2 = 0.0231

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<td>.0040052</td>
<td>-0.50</td>
<td>0.619</td>
<td>.9901873 1.005887</td>
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<tr>
<td>age</td>
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<td>.9680244 1.034122</td>
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<tr>
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```
.logistic q16_score tcpy_cr age levledu hous_inc drink smoke pest_pois lang12 drugs
note: pest_pois != 0 predicts success perfectly
pest_pois dropped and 7 obs not used
note: drugs != 0 predicts success perfectly
drugs dropped and 2 obs not used
Logistic regression
Number of obs = 161
LR chi2(7) = 5.16
Prob > chi2 = 0.6405
Log likelihood = -53.812917 Pseudo R2 = 0.0457

<table>
<thead>
<tr>
<th>q16_score</th>
<th>Odds Ratio</th>
<th>Std. Err.</th>
<th>z</th>
<th>P&gt;z</th>
<th>[95% Conf. Interval]</th>
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### Logistic Regression Results

#### Model 1: q16_score50

| Variable    | Coefficient | Std. Error | z    | P>|z| | 95% Conf. Interval |
|-------------|-------------|------------|------|------|---------------------|
| tcpy_cr     | .9976842    | .0041917   | -0.55| 0.581| .9895024 - 1.005934 |
| age         | .9838537    | .0171127   | -0.94| 0.349| .9508786 - 1.017972 |
| levledu     | 1.082115    | .072182    | 1.18 | 0.237| .9494983 - 1.233253 |
| hous_inc    | .9998886    | .0000619   | -1.80| 0.072| .9997673 - 1.00001  |
| drink       | .8495923    | .0000169   | 1.18 | 0.237| .9494983 - 1.233253 |
| smoke       | .9615369    | .072182    | 1.18 | 0.237| .9494983 - 1.233253 |
| pest_pois   | 1 (omitted) |            |      |      |                     |
| lang12      | .7252813    | .5094813   | -0.46| 0.647| .1830506 - 2.873703 |
| drugs       | 1 (omitted) |            |      |      |                     |
| _cons       | 1.634429    | 2.149898   | 0.37 | 0.709| .1240826 - 21.52885 |

#### Model 2: q16_score75

| Variable    | Coefficient | Std. Error | z    | P>|z| | 95% Conf. Interval |
|-------------|-------------|------------|------|------|---------------------|
| tcpy_cr     | .9967299    | .0041917   | -0.55| 0.581| .9895024 - 1.005934 |
| age         | .9838537    | .0207728   | -0.88| 0.377| .9415983 - 1.02305  |
| levledu     | 1.116841    | .0934904   | 1.32 | 0.187| .9478459 - 1.315968 |
| hous_inc    | .9998839    | .000891    | -1.81| 0.069| .9996631 - 1.000013 |
| drink       | 1.315762    | .609745    | 0.59 | 0.554| .5305388 - 3.263155 |
| smoke       | 1.311092    | .599632    | 0.59 | 0.554| .5349499 - 3.213313 |
| pest_pois   | 4.025098    | 3.406057   | 1.15 | 0.100| .766453 - 21.13817 |
| lang12      | 2.170693    | 3.225023   | 0.52 | 0.602| .1180208 - 39.92438 |
| drugs       | 2.523199    | 2.797262   | 0.43 | 0.671| .026399 - 10.36922 |
| _cons       | 1.634429    | 2.149898   | 0.37 | 0.709| .1240826 - 21.52885 |

**Note:**
- Pest_pois != 0 predicts success perfectly
- Drugs != 0 predicts success perfectly
- Drugs dropped and 2 obs not used
- Pest_pois dropped and 7 obs not used
end of do-file

exit, clear