A Macro Using SAS® ODS to Summarize Client Information from Multiple Procedures
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Abstract
If the client requests the programmer to run multiple procedures, repetitively, massive amounts of output may be generated. However, the client may only be interested in reviewing a fraction of each set of statistics which are output by the procedures executed. This macro demonstrates how to use ODS OUTPUT to summarize large quantities of output from multiple procedures and combine them into one summary dataset. In our paper, we combine output from PROC LOGISTIC and PROC FREQ. Requested exposures are modeled sequentially to generate crude and adjusted statistics. Desired statistics from each procedure are kept as one or more observations in a dataset per exposure. These datasets are then merged by exposure to generate a dataset which contains both crude and adjusted statistics for the exposure. These merged summary datasets are finally concatenated sequentially, as the macro executes, to produce one summary dataset for all exposures for which the macro was executed. This summary dataset may then be used by the programmer to generate output for the client to review, by using PROC REPORT or any other SAS reporting utility. Although the macro code is advanced, using the macro is simple for those with additional statistical reporting needs.

Example
In an example presented in Appendix 2, we show how the programmer would include the macro code in a program for use. After including the code for the macro, the programmer may call the macro (%summary). There are 5 parameters in the macro call: the working dataset (sasdata), the outcome variable (WHEEZE), the exposure variable (farmsize or eyecolor), the value of the referent level for the exposure variable (0 or 2), and the list of base model covariates (%log_vars). If the exposure variable is continuous, insert a ‘#’ before it in the macro call to avoid its inclusion in the CLASS statement. If the exposure variable is nominal, insert a ‘@’ before it in the macro call to prevent crude and adjusted trend statistics from being generated. If any of the base model exposures are to be included in the CLASS statement, insert a ‘@’ before the variable name, as per the example in Appendix 2.

In our example, we present 5 base model covariates. To improve readability of the macro call, we suggest long lists of covariates are passed as the value of a macro variable (log_vars). The macro call returns a dataset of crude and adjusted statistics for all of the macro calls performed (%summary). The dataset will contain 14 observations, one observation for the trend test of the ordinal exposure variable farmsize, five observations for each level of the ordinal variable farmsize, two observations for the dichotomous exposure of MilkCows (only one will be printed in the summary table), one observation for the continuous exposure variable yronfarm, and 5 observations for each of the levels in the nominal exposure variable eyecolor.

Appendix 3 contains a copy of the PROC CONTENTS for the summary dataset(%summary). All variables used with this program must be labeled for proper execution. All non-continuous variables used with this program must be formatted for proper execution. Due to the limitations of PROC LOGISTIC in SAS, formatted data is limited to 16 characters.

Appendix 4 contains an example of a summary table printed from the dataset, %summary.

Coding Methods
This macro code offers the programmer a simple method for summarizing the crude and adjusted statistics for the client to review and report. The programmer is required to supply a minimum number of parameters needed for the modeling, and then is returned a dataset which contains all the desired statistics which can then be reported in whatever method the client wishes. The parameters supplied by the programmer include the original working dataset, the dichotomous outcome variable, the exposure variable, the referent level of the exposure variable, and the list of additional base model covariates included in the model. All variables must be numeric variables with labels and formats. In the following description, macro variables and datasets within parentheses are for reference to the macro code in Appendix 1.

The macro begins by separating the list of additional base model exposures into separate macro variables (%bv@ & k). Base model ordinal variables are then identified for inclusion in the CLASS statement of the PROC LOGISTIC(by a preceding @). The modeled exposure variable (%exp @) is identified as ordinal(by a preceding #) or nominal(by a preceding @) for appropriate analysis by the macro. An analysis dataset is created by keeping only the observations where the outcome, as well as all the exposure variables, are recorded (%logis). The purpose for this is to ensure that the crude statistics are generated for the same number of observations as the adjusted statistics.

Macro variables are then generated which contain the number of levels in the outcome(%oc_kt) and modeled exposure(%exp_kt) variables, which were passed in the macro call(%com, %exp). The values of each level in the outcome(%oc_i) and modeled exposure(%exp_i) variables as well as the formats (%fmt_i) are also placed in macro variables. It is important then to set a macro variable to the value of the format of the referent level of the exposure variable (%reffmt) since the CLASS statement in the PROC LOGISTIC will require the formatted value to identify the referent level in a multi-level exposure variable.

Next, the crude association between the outcome and exposure variable is determined (%crudep) for the continuous, dichotomous, and trend of the ordinal exposures. The crude association is then generated for each class of the ordinal as well as nominal exposures. This is followed by the assignment of column frequencies and percents between the exposure and...
outcome variable where the modeled exposure variable is dichotomous, ordinal, or nominal. The frequencies and percents are stored in one dataset for each level of the outcome variable and are merged together with the crude associations generated in the PROC LOGISTIC ODS Output datasets (__cstats).

If the modeled exposure variable contains more than 2 levels and is not nominal, then the adjusted statistics are generated for a trend test of the modeled exposure variable. These adjusted statistics are output using ODS Output datasets (__trend). An additional PROC LOGISTIC is executed to generate the adjusted statistics for the dichotomous exposure variable, or CLASS variables in the event that the exposure variable contains more than 2 levels and is either ordinal or nominal. The adjusted statistics are retained in datasets (__param, _odds) as one observation for each comparison level of the exposure variable (r-1 observations).

These datasets are then merged together with the dataset that contains the crude statistics (__cstats) to form a dataset that contains an observation for each comparison level of the exposure variable as well as an observation for the referent level (__cstats). If the exposure variable contains r>2 levels, and is not nominal, then the dataset containing the adjusted statistics from the trend test of the exposure variable (__trend) are added as an additional observation into the dataset containing the crude and adjusted CLASS statistics (__cstats). If the variable was identified by the programmer as continuous, then the dataset containing the continuous statistics (__ctn) will be set to __cstats.

Finally, the macro concatenates the statistics generated and stored in the final dataset (__cstats) with a summary dataset that contains statistics from each previous call of the macro for other exposure variables (__summary).

Summary

The accompanying macro code, using ODS, alleviates the tedious programming and manual extraction associated with the creation of individual datasets for PROC FREQ, the running of necessary crude and adjusted analyses using PROC FREQ and PROC LOGISTIC, and the extraction of pertinent cell counts and statistics when we have a large case-control study with numerous exposure variables. It provides the client with a dataset of pertinent summary information without overwhelming him or her with pages and pages of output. The programmer can then determine what method of outputting the data will be used for reporting the summary statistics to the researcher.

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Appendix 1. Macro Code

```
%MACRO summary(__daet, __outcom, __expo, __ref, __baseva);
/* create macro variables for each of the */
/* base variables specified */
/* as well as a counter for how many base */
/* variables are passed into the macro */
%LET __varkt=0;
%LET __k=1;
%LET __w=%SCAN(__baseva,&__k);
%DO __w=%SCAN(__baseva,&__k);
%LET __varkt=%&__w;
%LET __k=%&__k;
%LET __w=%SCAN(__baseva,&__k);
%END;
/* determine which base model variables will*/
/* be in the class statement. */
%LET __cvkt=1;
%DO i=1 %TO &__varkt;
%LET __amp=%SUBSTR(&__bv&i,1,1);
%IF &__amp=1 THEN DO;
%LET __bv&i=%SUBSTR(&__bv&i,1,1);%END;
%LET __csv__cvkt=%&__bv&i;
%LET __cvkt=%EVAL(&__cvkt+1);%END;
/* check to see if the user requested the */
/* exposure variable to be continuous. If */
/* it is continuous, then set the __ctn */
/* macro flag to '1' and reset the exposure */
/* variable to be equal to __expo minus the */
/* included ampersand sign (@). */
%LET __pound=# %THEN DO;
%LET __ctn=1;
%LET __expo=%SUBSTR(&__expo,2);%END;
/* check to see if the user requested the */
/* exposure variable to be categorical. If */
/* it is categorical, then set the __cat */
/* macro flag to '1' and reset the exposure */
/* variable to be equal to __expo minus the */
/* included ampersand sign (@). */
%IF __pound=# %THEN DO;
%LET __cat=1;
%LET __expo=%SUBSTR(&__expo,2);%END;
/* create an analysis dataset that contains */
/* only the observations that will be in the */
/* model. Also use this data step to assign */
/* the label and formats for the exposure */
/* variable to macro variables. */
DATA _logis;
SET &__daet ;
%KEEP &__outcom &__expo;
%DO i=1 %TO &__varkt; &__bv&i %END;
IF &__outcom > .z; CALL SYMPUT('_explab',VLABEL(&__expo)); CALL SYMPUT('_oclab',VLABEL(&__outcom)); CALL SYMPUT('_fmt',TRIMPUT(VFORMATN(&__expo),CHAR8.))); CALL SYMPUT('_ofmt',TRIMPUT(VFORMATN(&__outcom),CHAR8.))); END;
%IF &__outcom > .z;
%IF &__expo > .z;
%repeat the exclusions for each exposure*/
/* variable in the base model */
%DO i=1 %TO &__varkt;
%IF &__bv&i > .z;
%END;
%END; RUN;
/* create a PROC FREQ output dataset that */
/* will be used to attain the total number of */
/* levels in the outcome variable */
PROC FREQ DATA=_logis;
TABLES &__outcom / NOPRINT OUT=_oc; RUN;
/* Create two macro variables that contain */
/* the levels of the outcome variable. Set */
/* macro variables for the n's of the two */
/* levels of the outcome variable put the */
/* total number of outcome levels into a macro*/
/* variable */
DATA _NULL_;%LET _N_ =obs_tot;
%IF &__outcom =obs_tot %THEN DO;
%LET _oc=____ock.;
%GLOBAL __ocki.;
CALL SYMPUT("__oc&i.",LEFT(PUT(&__outcom,4.)));  
CALL SYMPUT("__oc__kt&i.",LEFT(PUT(COUNT,5.)));  
END;  
%END;RUN;  
/* create a PROC FREQ output dataset that */  
/* will be used to attain the total number of */  
/* levels in the exposure variable */  
PROC FREQ DATA=_logis;  
TABLES &__exp_kt / NOPRINT OUT=_levels;RUN;  
END;RUN;  
/* with the referent level */  
/* comparison level of the exposure variable */  
/* continuous exposures */  
/* associations of ordinal, dichotomous, */  
/* determine the crude p-value for the */  
/* first set contains the values of the levels*/  
/* put the total number of levels of exposure*/  
/* levels in the exposure variable */  
/* will be used to attain the total number of*/  
DATA _NULL_;  
IF 0 THEN SET _levels NOP=sobs_tot;  
IF N=1 THEN DO;  
CALL SYMPUT ('__exp_cnt', LEFT(PUT(sobs_tot,4.)));  
END;RUN;  
STOP;END;RUN;  
/* Create two sets of macro variables. The */  
/* first set contains the values of the levels*/  
/* in the exposure variable. The second set */  
/* contains the values of the formats for each*/  
/* level in the exposure variable */  
%IF &__ctn NE 1 THEN %DO;  
%DO i=1 TO &__exp_kt;  
%GLOBAL  
__exp&i=0. __fmt&i=.  
DATA _NULL_;  
LENGTH zzz $ 16;  
SET _levels NOP=sobs_tot;  
IF &i=N THEN DO;  
CALL SYMPUT ('__exp&i.', LEFT(PUT(&__exp&i,4.)));  
zzz=SUBSTR(LEFT PUT(&__exp&i, &__vfmt, 1));  
END;RUN;  
CALL SYMPUT ('"_reffmt"', SUBSTR(LEFT PUT(zzz, $CHAR16.)),1));  
IF &__exp&i=0 THEN CALL SYMPUT ('"_reffmt"', SUBSTR(LEFT PUT(zzz, $CHAR16.)),1));  
END;RUN;  
%END; %END;  
/* determine the crude p-value for the */  
/* associations of ordinal, dichotomous, and */  
/* continuous exposures */  
QUIT;  
%IF &__cat NE 1 THEN %DO;  
ODS OUTPUT ParameterEstimates=_pe;  
PROC LOGISTIC DATA=_logis;  
MODEL &__outcom = &__expo;RUN;  
ODS OUTPUT CLOSE;  
DATA _NULL_;  
SET _pe;  
IF UPCASE(VARIABLE)=UPCASE("&__expo") THEN CALL SYMPUT  
("__crudep", LEFT(PUT(PROBCHISQ,5.4)));RUN;  
END;  
/* determine the crude association for each */  
/* comparison level of the exposure variable */  
/* with the referent level */  
%IF __exp_kt>2 AND &__ctn NE 1 THEN %DO;  
ODS OUTPUT parameterestimates=_par;RUN;  
PROC LOGISTIC DATA=_logis DESCENDING;  
CLASS &__exp (PARAM=REF REF="_reffmt" ORDER=INTERNAL);  
MODEL &__outcom = &__expo;RUN;  
ODS OUTPUT CLOSE;  
DATA _par;  
SET _par;  
IF UPCASE(VARIABLE)=UPCASE("&__expo");  
RENAME CLASSVAL0 = exposure_label;  
RENAME ProbChiSq = crude_p_value;  
%DO i = 1 TO &__exp_kt;  
IF CLASSVAL0="&__fmt&i" THEN  
exposure_value=%&__exp&i.;  
%END;  
LABEL CLASSVAL0 =  
"Exposure Label(Class/Dichotomous Level Format)"  
exposure_value =  
"Dichotomous/Class: Value of Exposure Level";  
DROPT-variable DF ESTIMATE STDErr WAlDCHiSQ;RUN;  
%END;  
/* If the exposure is not continuous, then */  
/* run PROC FREQ to generate counts and */  
/* percents for each level in the exposure */  
/* variable crossed with the outcome variable*/  
%IF &__ctn NE 1 THEN %DO;  
ODS OUTPUT CrosstabFreqs = __ctab;  
PROC FREQ DATA=_logis;  
TABLES &__exp * &__outcom;RUN;  
ODS OUTPUT CLOSE;  
DATA ctab1 ctab2;  
SET ctab (KEEP = colpercent frequency percent &__exp &__outcom);  
exposure_value=&__exp;  
exposure="&__exp";  
outcome="&__outcom";  
outcome_label="&__oclab";  
IF &__outcom &__oc1 AND &__exp. THEN DO;  
n_controls=FREQUENCY;  
pct_controls=COLPERCENT;  
outcome_value1=&__outcom;  
output_label="&__oclab";  
ELSE IF &__outcom &__oc2 AND &__exp. THEN DO;  
n_cases=FREQUENCY;  
pct_cases=COLPERCENT;  
outcome_value2=&__outcom;  
OUTPUT __ctab2;  
END;  
DROP &__exp.;  
%END;  
%IF &__ctn = 0 THEN %DO;  
PROC SORT DATA=ctab1;  
BY exposure_value;RUN;  
PROC SORT DATA=ctab2;  
BY exposure_value;RUN;  
PROC SORT DATA=_par;  
BY exposure_value;RUN;  
DATA _fstats;  
MEREAGE _ctab1 (KEEP=exposure_value n_controls  
pct_cases=COLPERCENT;  
outcome_value1=express_value1  
output_label=express_value1)  
__ctab2 (KEEP=exposure_value n_cases  
pct_cases=COLPERCENT;  
output_value2=express_value2  
output_label=express_value2)  
__par;  
BY exposure_value;  
%DO i = 1 TO &__exp_kt;  
IF exposure=express &__exp&i THEN  
exposure_label="%&__fmt&i";  
%END;  
DROP &__exp.;  
%END;  
/* If the exposure variable passed in the */  
/* macro call contains more than 2 levels and */  
/* is not nominal, then run the adjusted model*/  
/* with the trend or continuous variable. */  
%IF &__exp_kt>2 AND &__cat=0 THEN %DO;  
QUIT;  
ODS OUTPUT parameterestimates=_p  
oddratios=____;RUN;  
/* include the base model exposure variables*/  
/* as well as the additional exposure */  
/* variable for which statistics are being */  
/* generated in the macro */  
PROC LOGISTIC DATA=_logis DESCENDING;  
%IF &__cvkt NE 1 THEN %DO;
DATA _trend;
__o;
DATA _p;
ODS OUTPUT CLOSE
DROP DF ESTIMATE STDERR WALDCHISQ CLASSVAL0;
DROP DF ESTIMATE STDERR WALDCHISQ CLASSVAL0;
RUN;

%DO i = 1 %TO __cvkt;
&__cv&i TO &__cvkt;
%END;

DATA __cstats;
PROC SORT DATA __fstats __param __odds;
MERGE
exposure_type $ 11;
LENGTH exposure_value;
BY exposure_value;
FOUND VAR FOUND LABEL;
IF UPCASE (&__fmt&i)) THEN DO;
FIND_LABEL = INDEXW (&__fmt&i); IF found_label=1 THEN
exposure_value=&&__exp&i.;
END;

NAME OF EXPOSURE VARIABLE:
exposure=EXPOSURE;
DROP EFFECT;
RUN;

NAME OF OUTCOME VARIABLE:
outcome=OUTCOME;
DROP VARIABLE DF ESTIMATE STDERR WALDCHISQ CLASSVAL0;
RUN;

PROC FREQ DATA=_freq;
CLASS
&__oclab;
&__outcom;
%END;
PROC FREQ DATA=_freq;
CLASS
&__oclab;
&__outcom;
%END;

RUN;
PROC LOGISTIC DATA=_logis DESCENDING;
CLASS
%END;
PROC LOGISTIC DATA=_logis DESCENDING;
CLASS
%END;

/* Run the PROC LOGISTIC with the CLASS option */
/* for both the dichotomous variables and */
/* variables containing more than 2 levels. */
/* Statistics will be generated and kept for */
/* each level determined to be added by the */
/* CLASS statement. */
QUIT;

%IF &_ctn NE 1 %THEN %DO;
ODS OUTPUT parameterestimates=_param
oddsratios=_odds;
RUN;
/* request class variables for the modeling */
/* of the additional exposure variable in */
/* the model. */
PROC LOGISTIC DATA=_logis DESCENDING;
CLASS

/* exposure variable passed in the macro call, */
/* If there are more than 2 levels to the */
/* CLASS statement. */
/* each level determined to be added by the */
/* variables containing more than 2 levels. */
/* for both the dichotomous variables and */
/* referent level */
/* continue if the class value is not the */
/* / */
/* /* referent level */
%ELSE
exposure_type='Trend';
ELSE
exposure_type='Class';
END
IF CLASSVAL0="&__fmt&i" THEN
EXPOSURE_VALUE=&__exp&i.;
END;

DROP VARIABLE DF ESTIMATE STDERR WALDCHISQ CLASSVAL0;
RUN;
DATA _odds;
SET _odds;
FOUND_VAR=INDEXW
("UPCASE(\$EFFECT), UPCASE("TRIM("\$OUTCOME")");
IF found_var=1;
DO i = 1 %TO &__exp_kt;
IF CLASSVAL0="&__fmt&i") THEN
EXPOSURE_VALUE=&__exp&i.;
END;

END;
/* %DO loop */
LABEL exposure_value = "Dichotomous/Class: Value of Exposure Level";
DROP EFFECT;
PROC SORT DATA=_param;
BY exposure_value;
RUN;
PROC SORT DATA=_fstats;
BY exposure_value;
RUN;
PROC SORT DATA=_odds;
BY exposure_value;
RUN;
DATA _cstats;
LENGTH exposure_type $ 11;
MERGE _fstats _param _odds;
BY exposure_value;
IF &__exp_kt2 THEN exposure_type="Class";
ELSE IF &__exp_kt2 THEN
EXPOSURE_TYPE="Dichotomous";
LABEL oddsratioest = "PROC LOGISTIC Adjusted Odds Ratio Estimate";
PROC FREQ DATA=_freq;
CLASS
&__oclab;
&__outcom;
%END;
RUN;

/* exposure variable passed in the macro call */
/* then the trend model was performed. Add */
/* the statistics from the trend model to the */
/* dataset containing the statistics from the */
/* model with the 'CLASS' statement. */
%IF &__exp_kt>2 AND &__ctn = 0 AND &__cat NE 1
%THEN %DO;
   DATA __cstats;
   SET __trend __cstats;RUN;
%END;
%ELSE %IF &__ctn = 1 %THEN %DO;
   DATA __cstats;
   SET __trend;RUN;
%END;
%IF %SYSFUNC(EXIST(__sumary)) %THEN %DO;
   DATA __sumary;
   SET __sumary __cstats;RUN;
%END; %ELSE %DO;
   DATA __sumary;
   SET __cstats;
   %END;RUN;
%MEND summary;

Appendix 2. Example SAS program

%LET log_vars= age @state @smoking_status
  asthma atopy); /* Include the file that contains the code for*/
/* the macro. */
%INCLUDE 'd:\studies\macros\summary.sas'; /* The dataset '__sumary' will need to be */
/* removed from the working library if it */
/* has been created by previous runs of the */
/* MACRO summary. */
PROC DATASETS;
  DELETE __sumary;RUN;QUIT;
/*dataset | outcome | exposure| referent | BaseModel*/
/*variable | variable| level | variables*/
/* -------------------------------------------*/
%summary (sasdsset, WHEEZE, farmsize, 0 ,&log_vars)
%summary (sasdsset, WHEEZE, MilkCows, 0 ,&log_vars)
%summary (sasdsset, WHEEZE, #yrsonfarm, 1 ,&log_vars)
%summary (sasdsset, WHEEZE, @eyecolor, 2 ,&log_vars)
Appendix 3. PROC CONTENTS of __summary dataset created by the macro

<table>
<thead>
<tr>
<th>#</th>
<th>Variable</th>
<th>Type</th>
<th>Format</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>exposure</td>
<td>Char</td>
<td></td>
<td>Name of Exposure Variable</td>
</tr>
<tr>
<td></td>
<td>exposure_label</td>
<td>Char</td>
<td></td>
<td>Exposure Label(Class/Dichotomous:Format)</td>
</tr>
<tr>
<td></td>
<td>exposure_type</td>
<td>Char</td>
<td></td>
<td>Dichotomous/Trend/Class/Continuous</td>
</tr>
<tr>
<td></td>
<td>exposure_value</td>
<td>Num</td>
<td></td>
<td>Dichotomous/Class: Value of Exposure Level</td>
</tr>
<tr>
<td></td>
<td>outcome</td>
<td>Char</td>
<td></td>
<td>Name of Dependent Outcome Variable</td>
</tr>
<tr>
<td></td>
<td>outcome_label</td>
<td>Char</td>
<td></td>
<td>Label of Outcome Variable</td>
</tr>
<tr>
<td></td>
<td>outcome_value1</td>
<td>Num</td>
<td>_NY.</td>
<td>Value of first level for outcome variable</td>
</tr>
<tr>
<td></td>
<td>outcome_value2</td>
<td>Num</td>
<td>_NY.</td>
<td>Value of second level for outcome variable</td>
</tr>
<tr>
<td></td>
<td>n_cases</td>
<td>Num</td>
<td></td>
<td>PROC FREQ Frequency of Cases(Column 2)</td>
</tr>
<tr>
<td></td>
<td>pct_cases</td>
<td>Num</td>
<td></td>
<td>PROC FREQ Percent of Cases</td>
</tr>
<tr>
<td></td>
<td>n_controls</td>
<td>Num</td>
<td></td>
<td>PROC FREQ Frequency of Controls(Column 1)</td>
</tr>
<tr>
<td></td>
<td>pct_controls</td>
<td>Num</td>
<td></td>
<td>PROC FREQ Percent of Controls</td>
</tr>
<tr>
<td></td>
<td>crude_p_value</td>
<td>Num</td>
<td></td>
<td>PROC LOGISTIC unadjusted p-value</td>
</tr>
<tr>
<td></td>
<td>ProbChiSq</td>
<td>Num</td>
<td></td>
<td>PROC LOGISTIC Adjusted p-value</td>
</tr>
<tr>
<td></td>
<td>OddsRatioEst</td>
<td>Num</td>
<td>ODDSR8.3</td>
<td>PROC LOGISTIC Adjusted Odds Ratio Estimate</td>
</tr>
<tr>
<td></td>
<td>LowerCL</td>
<td>Num</td>
<td>ODDSR8.3</td>
<td>Lower 95% Confidence Limit for Odds Ratio</td>
</tr>
<tr>
<td></td>
<td>UpperCL</td>
<td>Num</td>
<td>ODDSR8.3</td>
<td>Upper 95% Confidence Limit for Odds Ratio</td>
</tr>
</tbody>
</table>

Appendix 4. Example of summary table created using DATA _NULL_

<table>
<thead>
<tr>
<th>Variable Label/Format</th>
<th>Test Type</th>
<th>WHEEZE Yes N</th>
<th>%</th>
<th>WHEEZE No N</th>
<th>%</th>
<th>P-Value Crude</th>
<th>Adjusted</th>
<th>OR</th>
<th>95% CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of Farm</td>
<td>Trend</td>
<td>3831</td>
<td>100</td>
<td>16672</td>
<td>100</td>
<td>0.0001</td>
<td>0.0008</td>
<td>1.071</td>
<td>1.029</td>
</tr>
<tr>
<td>1) No Farm</td>
<td>Class</td>
<td>235</td>
<td>6.1</td>
<td>1055</td>
<td>6.3</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>2) 1-99 acres</td>
<td>Class</td>
<td>914</td>
<td>23.9</td>
<td>4215</td>
<td>25.3</td>
<td>0.7396</td>
<td>0.4578</td>
<td>1.067</td>
<td>0.900</td>
</tr>
<tr>
<td>3) 100-499 acres</td>
<td>Class</td>
<td>1545</td>
<td>40.3</td>
<td>7134</td>
<td>42.8</td>
<td>0.7162</td>
<td>0.2008</td>
<td>1.114</td>
<td>0.944</td>
</tr>
<tr>
<td>4) 500-999 acres</td>
<td>Class</td>
<td>998</td>
<td>26.1</td>
<td>3736</td>
<td>22.4</td>
<td>0.0239</td>
<td>0.0037</td>
<td>1.286</td>
<td>1.085</td>
</tr>
<tr>
<td>5) 1000+ acres</td>
<td>Class</td>
<td>139</td>
<td>3.6</td>
<td>532</td>
<td>3.2</td>
<td>0.1818</td>
<td>0.3988</td>
<td>1.114</td>
<td>0.867</td>
</tr>
<tr>
<td>Milk Cows(Yes)</td>
<td>Dichotomous</td>
<td>239</td>
<td>6.3</td>
<td>908</td>
<td>5.5</td>
<td>0.0543</td>
<td>0.0011</td>
<td>1.297</td>
<td>1.109</td>
</tr>
<tr>
<td>Years lived on farm</td>
<td>Continuous</td>
<td>3438</td>
<td>100</td>
<td>14850</td>
<td>100</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>1.066</td>
<td>1.057</td>
</tr>
<tr>
<td>Eyes=Blue</td>
<td>Class</td>
<td>2392</td>
<td>63.2</td>
<td>11555</td>
<td>70.1</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>0.780</td>
<td>0.707</td>
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<tr>
<td>Eyes=Brown</td>
<td>Class</td>
<td>831</td>
<td>22.0</td>
<td>2963</td>
<td>18.0</td>
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<tr>
<td>Eyes=Green</td>
<td>Class</td>
<td>338</td>
<td>8.9</td>
<td>1209</td>
<td>7.3</td>
<td>0.9653</td>
<td>0.2818</td>
<td>0.918</td>
<td>0.786</td>
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<tr>
<td>Eyes=Hazel</td>
<td>Class</td>
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<td>2.9</td>
<td>0.4046</td>
<td>0.2928</td>
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<tr>
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<td>1.7</td>
<td>0.7957</td>
<td>0.0941</td>
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</table>

Acknowledgments
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