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*****
* Title: BRINDA Inflammation Correction for nutritional biomarkers
* for preschool children Aged 6-59 months
*****;

%macro BrindaRC_noM (LABEL=, RES_DATALIB =, DATA_IN =, id=, crp=, agp=, biomarker=,
outdata= );

/* 1. Set up library with your research data */
libname _datalib "&res_datalib";
data _data_in;
    set _datalib.&data_in;
    **Contingency for zero APPS before log transformation;
    if &crp=0 then &crp=&crp+ 0.001;
    else &crp=&crp;
    if &agp=0 then &agp=&agp+ 0.001;
    else &agp=&agp;
    **Log tranforming estimates;
    if &crp ne . then lncrp = log(&crp) ;
    if &agp ne . then lnagp = log(&agp) ;
    if &biomarker ne . then ln&biomarker = log(&biomarker);
    keep &id &crp &agp &biomarker lncrp lnagp ln&biomarker;
run;

/* 2. Set brinda reference deciles for children */
%let lncrp_refdecile = -2.26; *ln CRP decile for children;
%let lnagp_refdecile = -0.52; *ln AGP decile for children;

/* 3. Run regression and capture internal pop beta coefficients for CRP and AGP */
ods output ParameterEstimates = betas_crpagp_psc;
proc reg data=_data_in;
    model ln&biomarker = lncrp lnagp ;
run; quit;

/* 4. Declaring a macro for population APP regression coefficients */
data _null_;
    set betas_crpagp_psc;
    if Variable ="lncrp" then call symput ('lncrpbeta',estimate);
    if Variable ="lnagp" then call symput ('lnagpbeta',estimate);
run;

/* 5. Applying regression adjustment equation to raw biomarker values */
data &outdata;
    set _data_in;
    if &crp ne . and &agp ne . then
        ln&biomarker.adjpsc = ln&biomarker - &lncrpbeta*max(lncrp-&lncrp_refdecile,0) -
&lnagpbeta*max(lnagp-&lnagp_refdecile,0);
        &biomarker.adjpsc = exp(ln&biomarker.adjpsc);
        popbeta_&biomarker.&agp=&lnagpbeta;
        popbeta_&biomarker.&crp=&lncrpbeta;
        brcref_&crp=&lncrp_refdecile;
        brcref_&agp=&lnagp_refdecile;
    label &biomarker.adjpsc='brinda reg_corrected(BRC) biomaker'
        ln&biomarker.adjpsc='brinda reg_corrected biomaker-nat_log units'
        popbeta_&biomarker.&crp='Pop reg coeff: crp(x1) against biomarker(Y)'
        popbeta_&biomarker.&agp='Pop reg coeff: agp(x2) against biomarker(Y)'
        brcref_&crp='Brinda inflamm ref decile crp-psc'
        brcref_&agp='Brinda inflamm ref decile agp-psc';
run;

%mend BrindaRC_noM;

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