```
1
2  ********************************************************************************************************************************
3  *NUMBER OVER TIME, BY EXPOSURE AND AGE GROUPS*********************************************************************************
4  ********************************************************************************************************************************
5  use "...m3_survival_data.dta", clear
6  mdesc
7  keep exp indexdate indexn age_index
8  sum age_index
9  egen float ageg = cut(age_index), at(0 16 28 32 36 40 44 48 100) icodes label
10 tabstat age_index, statistics(min max) by(ageg)
11 gen year_index = year(indexn)
12
13 preserve
14 tab year_index exp, m
15 collapse (count) indexn, by(exp year_index)
16 reshape wide indexn, i(year_index) j(exp)
17 label variable indexn0 "No type 2 diabetes"
18 label variable indexn1 "Type 2 diabetes"
19 set scheme white_tableau
20 graph bar (asis) indexn0 indexn1, over(year_index, gap(25) label(angle(ninety) labsize(small))) stack ytitle(`"No. of individuals"') legend(rows(1) position(12))
21 cap graph export "...Results/Figure_S3A.svg", as(svg) name("Graph") replace
22 graph close _all
23
24 renames year_index indexn0 indexn1 \ year noT2DM T2DM
25 gen total = noT2DM + T2DM
26 gen p_noT2DM = noT2DM*100/total
27 gen p_T2DM = T2DM*100/total
28 cap export excel using   "...Results/Figure_S3A.xls", firstrow(variables)
29 restore
30
31 preserve
32 groups ageg year_index if exp == 1, sep(21)
33 collapse (count) exp if exp == 1, by(ageg year_index)
34 reshape wide exp, i(year_index) j(ageg)
35 label variable exp1 "16-27"
36 label variable exp2 "28-31"
37 label variable exp3 "32-35"
38 label variable exp4 "36-39"
39 label variable exp5 "40-43"
40 label variable exp6 "44-47"
41 label variable exp7 "48-50"
42 set scheme tab2
43 graph bar (asis) exp1-exp7, over(year_index, gap(2) label(angle(ninety) labsize(small))) stack ytitle(`"No. of individuals"') ylabel(0(1000)6000) legend(rows(1) position(12))
44 cap graph export   "...Results/Figure_S3B.svg", as(svg) name("Graph") replace
45 graph close _all
46
47 renames year_index exp1-exp7 \ year age16_27 age28_31 age32_35 age36_39 age40_43 age44_47 age48_50
48 egen float total = rowtotal(age*)
49 foreach var of varlist age* {
50     gen p`var' = `var'*100/total
51 }
52 label variable page16_27 "16-27"
53 label variable page28_31 "28-31"
54 label variable page32_35 "32-35"
55 label variable page36_39 "36-39"
56 label variable page40_43 "40-43"
57 label variable page44_47 "44-47"
58 label variable page48_50 "48-50"
59 graph bar (asis) page16_27-page48_50, over(year, gap(2) label(angle(ninety) labsize(small))) stack ytitle(`"Percent of individuals with type 2 diabetes"') ylabel(0(10)100) legend(rows
```

```
    (1) position(12))
cap graph export   "...Results/Figure_S3C.svg", as(svg) name("Graph") replace
graph close _all
cap export excel using   "...Results/Figure_S3BC.xls", firstrow(variables)
restore


*****************************************************************************************************************************
*SENSITIVITY ANALYSIS: BMI AS CONFOUNDER*************************************************************************************
*****************************************************************************************************************************

***MAIN: All-cause absolute difference***
cap use "...m3_survival_data.dta", clear
gen end_date="31/10/2020"
gen d_end=date(end_date, "DMY")
replace d_end=deathn if died==1
keep patid exp age_index sex eth imd smoke hypertension_5 d_end indexn died
gen time = (d_end-indexn)/365.25
replace time = .00136895 if time==0
stset time, f(died==1)
lab define exp_lab 0 "no" 1 "yes"
lab values exp exp_lab

gen age_exp = age_index*exp
replace sex = sex-1
tab eth, gen(d_eth)
tab imd, gen(d_imd)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5, df(4) scale(hazard) eform nolog
gen timep = 10 in 1

gen age_diag = .,   before(patid)
gen unexp_surv = .,     before(patid)
gen unexp_lci = .,  before(patid)
gen unexp_uci = .,  before(patid)
gen exp_surv = .,   before(patid)
gen exp_lci = .,    before(patid)
gen exp_uci = .,    before(patid)
gen cont = .,       before(patid)
gen cont_lci = .,   before(patid)
gen cont_uci = .,   before(patid)

forval i = 16/50 {
    replace age_diag =`i' in `i'
    standsurv, at1(exp 0 age_index `i' age_exp 0) at2(exp 1 age_index `i' age_exp `i') timevar(timep) ci contrast(difference)
    replace unexp_surv  = _at1[1] in `i'
    replace unexp_lci   = _at1_lci[1] in `i'
    replace unexp_uci   = _at1_uci[1] in `i'
    replace exp_surv    = _at2[1] in `i'
    replace exp_lci     = _at2_lci[1] in `i'
    replace exp_uci     = _at2_uci[1] in `i'
    replace cont        = _contrast2_1[1] in `i'
    replace cont_lci    = _contrast2_1_lci[1] in `i'
    replace cont_uci    = _contrast2_1_uci[1] in `i'
    drop _at1-_contrast2_1_uci
}

keep if age_diag != .
keep age_diag-cont_uci
gen scale = "Absolute"
```

```
gen out   = "All_cause"
gen sens  = "MAIN"
save "...Results/abs_all_main", replace


***SENSITIVITY: All-cause absolute difference + BMI***
cap use "...m3_survival_data.dta", clear
gen end_date="31/10/2020"
gen d_end=date(end_date, "DMY")
replace d_end=deathn if died==1
keep patid exp age_index sex eth imd smoke hypertension_5 bmi d_end indexn died death_cancer-death_other
gen death_cvd=0
replace death_cvd=1 if death_ihd==1 | death_str_cva==1
drop death_ihd death_str_cva
gen death_cr=0
replace death_cr=1 if death_cvd==1 | death_renal==1
drop death_renal death_cvd
mdesc
bys exp: groups death_* died

drop if bmi == .
groups death_* died
tab died
gen time = (d_end-indexn)/365.25
replace time = .00136895 if time==0
stset time, f(died==1)
lab define exp_lab 0 "no" 1 "yes"
lab values exp exp_lab

gen age_exp = age_index*exp
replace sex = sex-1
tab eth, gen(d_eth)
tab imd, gen(d_imd)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5 bmi, df(4) scale(hazard) eform nolog
gen timep = 10 in 1

gen age_diag = .,   before(patid)
gen unexp_surv = .,     before(patid)
gen unexp_lci = .,  before(patid)
gen unexp_uci = .,  before(patid)
gen exp_surv = .,   before(patid)
gen exp_lci = .,    before(patid)
gen exp_uci = .,    before(patid)
gen cont = .,       before(patid)
gen cont_lci = .,   before(patid)
gen cont_uci = .,   before(patid)

forval i = 16/50 {
    replace age_diag =`i' in `i'
    standsurv, at1(exp 0 age_index `i' age_exp 0) at2(exp 1 age_index `i' age_exp `i') timevar(timep) ci contrast(difference)
    replace unexp_surv  = _at1[1] in `i'
    replace unexp_lci   = _at1_lci[1] in `i'
    replace unexp_uci   = _at1_uci[1] in `i'
    replace exp_surv    = _at2[1] in `i'
    replace exp_lci     = _at2_lci[1] in `i'
    replace exp_uci     = _at2_uci[1] in `i'
    replace cont        = _contrast2_1[1] in `i'
    replace cont_lci    = _contrast2_1_lci[1] in `i'
    replace cont_uci    = _contrast2_1_uci[1] in `i'
```

```
    drop _at1-_contrast2_1_uci
}

keep if age_diag != .
keep age_diag-cont_uci
gen scale = "Absolute"
gen out   = "All_cause"
gen sens  = "BMI"
save "...Results/abs_all_bmi", replace


**#*MAIN: Cause-specific absolute difference***
cap use "...m3_survival_data.dta", clear
drop cancer_date-str_cva
gen death_cvd=0
replace death_cvd=1 if death_ihd==1 | death_str_cva==1
drop death_ihd death_str_cva
gen end_date="31/10/2020"
gen d_end=date(end_date, "DMY")
replace d_end=deathn if died==1
gen time = (d_end-indexn)/365.25
replace time = .00136895 if time==0

gen event=.
replace event=0 if died==0
replace event=1 if death_cancer==1
replace event=2 if death_cvd==1 | death_renal==1
replace event=3 if death_other==1
tab event, m

gen age_exp = age_index*exp
replace sex = sex-1
tab eth, gen(d_eth)
tab imd, gen(d_imd)

stset time, failure(event=1)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5, df(4) scale(hazard) eform nolog
estimates store cancer
stset time, failure(event=2)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5, df(4) scale(hazard) eform nolog
estimates store cvd
stset time, failure(event=3)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5, df(4) scale(hazard) eform nolog
estimates store other

gen timep = 10 in 1

gen age_diag= .,            before(patid)
gen exp_cancer = .,         before(patid)
gen exp_cancer_lci = .,     before(patid)
gen exp_cancer_uci = .,     before(patid)
gen unexp_cancer = .,       before(patid)
gen unexp_cancer_lci = .,   before(patid)
gen unexp_cancer_uci = .,   before(patid)
gen cancer_diff= .,         before(patid)
gen cancer_diff_lci= .,     before(patid)
gen cancer_diff_uci= .,     before(patid)
gen exp_cvd = .,            before(patid)
gen exp_cvd_lci = .,        before(patid)
```

```
gen exp_cvd_uci = .,        before(patid)
gen unexp_cvd = .,          before(patid)
gen unexp_cvd_lci = .,      before(patid)
gen unexp_cvd_uci = .,      before(patid)
gen cvd_diff= .,            before(patid)
gen cvd_diff_lci= .,        before(patid)
gen cvd_diff_uci= .,        before(patid)
gen exp_oth = .,            before(patid)
gen exp_oth_lci = .,        before(patid)
gen exp_oth_uci = .,        before(patid)
gen unexp_oth = .,          before(patid)
gen unexp_oth_lci = .,      before(patid)
gen unexp_oth_uci = .,      before(patid)
gen oth_diff= .,            before(patid)
gen oth_diff_lci= .,        before(patid)
gen oth_diff_uci= .,        before(patid)

forval i=16/50 {
    qui replace age_diag =`i' in `i'
    qui standsurv, crmodels(cancer cvd other) cif ci timevar(timep)                                    ///
    at1(exp 0 age_index `i' age_exp 0) at2(exp 1 age_index `i' age_exp `i') atvar(F_unexp F_exp) contrast(difference) contrastvar(cif_diff)
    qui replace exp_cancer          = F_exp_cancer[1]           in `i'
    qui replace exp_cancer_lci      = F_exp_cancer_lci[1]       in `i'
    qui replace exp_cancer_uci      = F_exp_cancer_uci[1]       in `i'
    qui replace unexp_cancer        = F_unexp_cancer[1]         in `i'
    qui replace unexp_cancer_lci    = F_unexp_cancer_lci[1]     in `i'
    qui replace unexp_cancer_uci    = F_unexp_cancer_uci[1]     in `i'
    qui replace cancer_diff         = cif_diff_cancer[1]        in `i'
    qui replace cancer_diff_lci     = cif_diff_cancer_lci[1]    in `i'
    qui replace cancer_diff_uci     = cif_diff_cancer_uci[1]    in `i'
    qui replace exp_cvd             = F_exp_cvd[1]              in `i'
    qui replace exp_cvd_lci         = F_exp_cvd_lci[1]          in `i'
    qui replace exp_cvd_uci         = F_exp_cvd_uci[1]          in `i'
    qui replace unexp_cvd           = F_unexp_cvd[1]            in `i'
    qui replace unexp_cvd_lci       = F_unexp_cvd_lci[1]        in `i'
    qui replace unexp_cvd_uci       = F_unexp_cvd_uci[1]        in `i'
    qui replace cvd_diff            = cif_diff_cvd[1]           in `i'
    qui replace cvd_diff_lci        = cif_diff_cvd_lci[1]       in `i'
    qui replace cvd_diff_uci        = cif_diff_cvd_uci[1]       in `i'
    qui replace exp_oth             = F_exp_other[1]            in `i'
    qui replace exp_oth_lci         = F_exp_other_lci[1]        in `i'
    qui replace exp_oth_uci         = F_exp_other_uci[1]        in `i'
    qui replace unexp_oth           = F_unexp_other[1]          in `i'
    qui replace unexp_oth_lci       = F_unexp_other_lci[1]      in `i'
    qui replace unexp_oth_uci       = F_unexp_other_uci[1]      in `i'
    qui replace oth_diff            = cif_diff_other[1]         in `i'
    qui replace oth_diff_lci        = cif_diff_other_lci[1]     in `i'
    qui replace oth_diff_uci        = cif_diff_other_uci[1]     in `i'
    qui drop F_unexp_cancer- cif_diff_other_uci

    di "Age = `i' | sens = MAIN --- $S_TIME  $S_DATE"
}

keep if age_diag != .
keep age_diag-oth_diff_uci
gen scale = "Absolute"
gen out   = "Cause_specific"
gen sens  = "MAIN"
save "...abs_cs_main", replace
```

```
295
296
297  **#*SENSITIVITY: Cause-specific absolute difference + BMI***
298  cap use "...m3_survival_data.dta", clear
299  drop cancer_date-str_cva
300  drop if bmi == .
301
302  gen death_cvd=0
303  replace death_cvd=1 if death_ihd==1 | death_str_cva==1
304  drop death_ihd death_str_cva
305  gen end_date="31/10/2020"
306  gen d_end=date(end_date, "DMY")
307  replace d_end=deathn if died==1
308  gen time = (d_end-indexn)/365.25
309  replace time = .00136895 if time==0
310
311  gen event=.
312  replace event=0 if died==0
313  replace event=1 if death_cancer==1
314  replace event=2 if death_cvd==1 | death_renal==1
315  replace event=3 if death_other==1
316  tab event, m
317
318  gen age_exp = age_index*exp
319  replace sex = sex-1
320  tab eth, gen(d_eth)
321  tab imd, gen(d_imd)
322
323  stset time, failure(event=1)
324  stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5 bmi, df(4) scale(hazard) eform nolog
325  estimates store cancer
326  stset time, failure(event=2)
327  stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5 bmi, df(4) scale(hazard) eform nolog
328  estimates store cvd
329  stset time, failure(event=3)
330  stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke hypertension_5 bmi, df(4) scale(hazard) eform nolog
331  estimates store other
332
333  gen timep = 10 in 1
334
335  gen age_diag= .,            before(patid)
336  gen exp_cancer = .,         before(patid)
337  gen exp_cancer_lci = .,     before(patid)
338  gen exp_cancer_uci = .,     before(patid)
339  gen unexp_cancer = .,       before(patid)
340  gen unexp_cancer_lci = .,   before(patid)
341  gen unexp_cancer_uci = .,   before(patid)
342  gen cancer_diff= .,         before(patid)
343  gen cancer_diff_lci= .,     before(patid)
344  gen cancer_diff_uci= .,     before(patid)
345  gen exp_cvd = .,            before(patid)
346  gen exp_cvd_lci = .,        before(patid)
347  gen exp_cvd_uci = .,        before(patid)
348  gen unexp_cvd = .,          before(patid)
349  gen unexp_cvd_lci = .,      before(patid)
350  gen unexp_cvd_uci = .,      before(patid)
351  gen cvd_diff= .,            before(patid)
352  gen cvd_diff_lci= .,        before(patid)
353  gen cvd_diff_uci= .,        before(patid)
```

```
gen exp_oth = .,            before(patid)
gen exp_oth_lci = .,        before(patid)
gen exp_oth_uci = .,        before(patid)
gen unexp_oth = .,          before(patid)
gen unexp_oth_lci = .,      before(patid)
gen unexp_oth_uci = .,      before(patid)
gen oth_diff= .,            before(patid)
gen oth_diff_lci= .,        before(patid)
gen oth_diff_uci= .,        before(patid)

forval i=16/50 {
    qui replace age_diag =`i' in `i'
    qui standsurv, crmodels(cancer cvd other) cif ci timevar(timep)                                    ///
    at1(exp 0 age_index `i' age_exp 0) at2(exp 1 age_index `i' age_exp `i') atvar(F_unexp F_exp) contrast(difference) contrastvar(cif_diff)
    qui replace exp_cancer          = F_exp_cancer[1]           in `i'
    qui replace exp_cancer_lci      = F_exp_cancer_lci[1]       in `i'
    qui replace exp_cancer_uci      = F_exp_cancer_uci[1]       in `i'
    qui replace unexp_cancer        = F_unexp_cancer[1]         in `i'
    qui replace unexp_cancer_lci    = F_unexp_cancer_lci[1]     in `i'
    qui replace unexp_cancer_uci    = F_unexp_cancer_uci[1]     in `i'
    qui replace cancer_diff         = cif_diff_cancer[1]        in `i'
    qui replace cancer_diff_lci     = cif_diff_cancer_lci[1]    in `i'
    qui replace cancer_diff_uci     = cif_diff_cancer_uci[1]    in `i'
    qui replace exp_cvd             = F_exp_cvd[1]              in `i'
    qui replace exp_cvd_lci         = F_exp_cvd_lci[1]          in `i'
    qui replace exp_cvd_uci         = F_exp_cvd_uci[1]          in `i'
    qui replace unexp_cvd           = F_unexp_cvd[1]            in `i'
    qui replace unexp_cvd_lci       = F_unexp_cvd_lci[1]        in `i'
    qui replace unexp_cvd_uci       = F_unexp_cvd_uci[1]        in `i'
    qui replace cvd_diff            = cif_diff_cvd[1]           in `i'
    qui replace cvd_diff_lci        = cif_diff_cvd_lci[1]       in `i'
    qui replace cvd_diff_uci        = cif_diff_cvd_uci[1]       in `i'
    qui replace exp_oth             = F_exp_other[1]            in `i'
    qui replace exp_oth_lci         = F_exp_other_lci[1]        in `i'
    qui replace exp_oth_uci         = F_exp_other_uci[1]        in `i'
    qui replace unexp_oth           = F_unexp_other[1]          in `i'
    qui replace unexp_oth_lci       = F_unexp_other_lci[1]      in `i'
    qui replace unexp_oth_uci       = F_unexp_other_uci[1]      in `i'
    qui replace oth_diff            = cif_diff_other[1]         in `i'
    qui replace oth_diff_lci        = cif_diff_other_lci[1]     in `i'
    qui replace oth_diff_uci        = cif_diff_other_uci[1]     in `i'
    qui drop F_unexp_cancer- cif_diff_other_uci

    di "Age = `i' | sens = BMI --- $S_TIME  $S_DATE"

}

keep if age_diag != .
keep age_diag-oth_diff_uci
gen scale = "Absolute"
gen out   = "Cause_specific"
gen sens  = "BMI"
save "...abs_cs_bmi", replace


***MAIN/SENSITIVITY: All-cause & cause-specific relative hazard MAIN + BMI***
cap use "...m3_survival_data.dta", clear
egen float agegr = cut(age_index), at(16 28 32 36 40 44 48 51) icodes
lab define agegr_l  0 "16-27" 1 "28-31" 2 "32-35" 3 "36-39" 4 "40-43" 5 "44-47" 6 "48-50"
```

```
lab values agegr agegr_l
tab agegr, m
tabstat age_index, statistics(mean median min max count) by(agegr)
gen end_date="31/10/2020"
gen d_end=date(end_date, "DMY")
replace d_end=deathn if died==1
gen time = (d_end-indexn)/365.25
replace time = .00136895 if time==0
keep patid time died exp age_index sex eth imd smoke hypertension_5 agegr bmi death_str_cva death_ihd death_renal death_cancer death_other
lab define exp_lab 0 "no" 1 "yes"
lab values exp exp_lab
gen death_cardioren=0
replace death_cardioren=1 if death_str_cva==1 | death_ihd==1 | death_renal==1

foreach nm in died death_cancer death_cardioren death_other {

    stset time, f(`nm'==1)

    preserve
    set showbaselevels on
    stpm2 i.exp#i.agegr i.agegr sex i.eth i.imd smoke hypertension_5, df(4) scale(hazard) eform nolog
    parmest, fast eform
    split parm, p(#)
    keep if parm1 == "1.exp"
    sencode parm2, replace
    replace parm2 = parm2 - 1
    drop parm1
    gen agegr     = "16-27" if parm2 == 0
    replace agegr = "28-31" if parm2 == 1
    replace agegr = "32-35" if parm2 == 2
    replace agegr = "36-39" if parm2 == 3
    replace agegr = "40-43" if parm2 == 4
    replace agegr = "44-47" if parm2 == 5
    replace agegr = "48-50" if parm2 == 6
    drop parm2 parm eq
    gen scale = "Relative"
    gen out   = "`nm'"
    gen sens  = "MAIN"
    tempfile rel_`nm'_main
    save `rel_`nm'_main', replace
    restore

    preserve
    drop if bmi == .
    set showbaselevels on
    stpm2 i.exp#i.agegr i.agegr sex i.eth i.imd smoke hypertension_5 bmi, df(4) scale(hazard) eform nolog
    parmest, fast eform
    split parm, p(#)
    keep if parm1 == "1.exp"
    sencode parm2, replace
    replace parm2 = parm2 - 1
    drop parm1
    gen agegr     = "16-27" if parm2 == 0
    replace agegr = "28-31" if parm2 == 1
    replace agegr = "32-35" if parm2 == 2
    replace agegr = "36-39" if parm2 == 3
    replace agegr = "40-43" if parm2 == 4
    replace agegr = "44-47" if parm2 == 5
    replace agegr = "48-50" if parm2 == 6
```

```
    drop parm2 parm eq
    gen scale = "Relative"
    gen out   = "`nm'"
    gen sens  = "BMI"
    tempfile rel_`nm'_bmi
    save `rel_`nm'_bmi', replace
    restore
}

************************
*COMBINED RELATIVE - BMI*
************************
clear
foreach nm in died death_cancer death_cardioren death_other {
    append using `rel_`nm'_main'
    append using `rel_`nm'_bmi'
}
save "...Results/Relative_all_cs_main_BMI", replace


*********************************************************************************************************************
*SENSITIVITY ANALYSIS: HYPERTENSION WITH MEDICATIONS*****************************************************************
*********************************************************************************************************************

***SENSITIVITY: All-cause absolute difference + hypertension***
cap use "...m3_survival_data.dta", clear
gen end_date="31/10/2020"
gen d_end=date(end_date, "DMY")
replace d_end=deathn if died==1
keep patid exp age_index sex eth imd smoke hypertension_5 bmi d_end indexn died death_cancer-death_other antihyp
gen death_cvd=0
replace death_cvd=1 if death_ihd==1 | death_str_cva==1
drop death_ihd death_str_cva
gen death_cr=0
replace death_cr=1 if death_cvd==1 | death_renal==1
drop death_renal death_cvd
mdesc
gen time = (d_end-indexn)/365.25
replace time = .00136895 if time==0
stset time, f(died==1)

gen age_exp = age_index*exp
replace sex = sex-1
tab eth, gen(d_eth)
tab imd, gen(d_imd)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke antihyp, df(4) scale(hazard) eform nolog
gen timep = 10 in 1

gen age_diag = .,   before(patid)
gen unexp_surv = .,     before(patid)
gen unexp_lci = .,  before(patid)
gen unexp_uci = .,  before(patid)
gen exp_surv = .,   before(patid)
gen exp_lci = .,    before(patid)
gen exp_uci = .,    before(patid)
gen cont = .,       before(patid)
gen cont_lci = .,   before(patid)
gen cont_uci = .,   before(patid)

```

```
forval i = 16/50 {
    replace age_diag =`i' in `i'
    standsurv, at1(exp 0 age_index `i' age_exp 0) at2(exp 1 age_index `i' age_exp `i') timevar(timep) ci contrast(difference)
    replace unexp_surv  = _at1[1] in `i'
    replace unexp_lci   = _at1_lci[1] in `i'
    replace unexp_uci   = _at1_uci[1] in `i'
    replace exp_surv    = _at2[1] in `i'
    replace exp_lci     = _at2_lci[1] in `i'
    replace exp_uci     = _at2_uci[1] in `i'
    replace cont        = _contrast2_1[1] in `i'
    replace cont_lci    = _contrast2_1_lci[1] in `i'
    replace cont_uci    = _contrast2_1_uci[1] in `i'
    drop _at1-_contrast2_1_uci
}

keep if age_diag != .
keep age_diag-cont_uci
gen scale = "Absolute"
gen out   = "All_cause"
gen sens  = "HYP"
cap save "...Results/abs_all_hyp", replace


**#*SENSITIVITY: Cause-specific absolute difference + hypertension***
cap use "...m3_survival_data.dta", clear
drop cancer_date-str_cva
gen death_cvd=0
replace death_cvd=1 if death_ihd==1 | death_str_cva==1
drop death_ihd death_str_cva
gen end_date="31/10/2020"
gen d_end=date(end_date, "DMY")
replace d_end=deathn if died==1
gen time = (d_end-indexn)/365.25
replace time = .00136895 if time==0

gen event=.
replace event=0 if died==0
replace event=1 if death_cancer==1
replace event=2 if death_cvd==1 | death_renal==1
replace event=3 if death_other==1
tab event, m

gen age_exp = age_index*exp
replace sex = sex-1
tab eth, gen(d_eth)
tab imd, gen(d_imd)

stset time, failure(event=1)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke antihyp, df(4) scale(hazard) eform nolog
estimates store cancer
stset time, failure(event=2)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke antihyp, df(4) scale(hazard) eform nolog
estimates store cvd
stset time, failure(event=3)
stpm2 exp age_index age_exp sex d_eth2-d_eth11 d_imd2-d_imd5 smoke antihyp, df(4) scale(hazard) eform nolog
estimates store other

gen timep = 10 in 1

```

```
gen age_diag= .,            before(patid)
gen exp_cancer = .,         before(patid)
gen exp_cancer_lci = .,     before(patid)
gen exp_cancer_uci = .,     before(patid)
gen unexp_cancer = .,       before(patid)
gen unexp_cancer_lci = .,   before(patid)
gen unexp_cancer_uci = .,   before(patid)
gen cancer_diff= .,         before(patid)
gen cancer_diff_lci= .,     before(patid)
gen cancer_diff_uci= .,     before(patid)
gen exp_cvd = .,            before(patid)
gen exp_cvd_lci = .,        before(patid)
gen exp_cvd_uci = .,        before(patid)
gen unexp_cvd = .,          before(patid)
gen unexp_cvd_lci = .,      before(patid)
gen unexp_cvd_uci = .,      before(patid)
gen cvd_diff= .,            before(patid)
gen cvd_diff_lci= .,        before(patid)
gen cvd_diff_uci= .,        before(patid)
gen exp_oth = .,            before(patid)
gen exp_oth_lci = .,        before(patid)
gen exp_oth_uci = .,        before(patid)
gen unexp_oth = .,          before(patid)
gen unexp_oth_lci = .,      before(patid)
gen unexp_oth_uci = .,      before(patid)
gen oth_diff= .,            before(patid)
gen oth_diff_lci= .,        before(patid)
gen oth_diff_uci= .,        before(patid)

forval i=16/50{
    qui replace age_diag =`i' in `i'
    qui standsurv, crmodels(cancer cvd other) cif ci timevar(timep)                                    ///
    at1(exp 0 age_index `i' age_exp 0) at2(exp 1 age_index `i' age_exp `i') atvar(F_unexp F_exp) contrast(difference) contrastvar(cif_diff)
    qui replace exp_cancer          = F_exp_cancer[1]           in `i'
    qui replace exp_cancer_lci      = F_exp_cancer_lci[1]       in `i'
    qui replace exp_cancer_uci      = F_exp_cancer_uci[1]       in `i'
    qui replace unexp_cancer        = F_unexp_cancer[1]         in `i'
    qui replace unexp_cancer_lci    = F_unexp_cancer_lci[1]     in `i'
    qui replace unexp_cancer_uci    = F_unexp_cancer_uci[1]     in `i'
    qui replace cancer_diff         = cif_diff_cancer[1]        in `i'
    qui replace cancer_diff_lci     = cif_diff_cancer_lci[1]    in `i'
    qui replace cancer_diff_uci     = cif_diff_cancer_uci[1]    in `i'
    qui replace exp_cvd             = F_exp_cvd[1]              in `i'
    qui replace exp_cvd_lci         = F_exp_cvd_lci[1]          in `i'
    qui replace exp_cvd_uci         = F_exp_cvd_uci[1]          in `i'
    qui replace unexp_cvd           = F_unexp_cvd[1]            in `i'
    qui replace unexp_cvd_lci       = F_unexp_cvd_lci[1]        in `i'
    qui replace unexp_cvd_uci       = F_unexp_cvd_uci[1]        in `i'
    qui replace cvd_diff            = cif_diff_cvd[1]           in `i'
    qui replace cvd_diff_lci        = cif_diff_cvd_lci[1]       in `i'
    qui replace cvd_diff_uci        = cif_diff_cvd_uci[1]       in `i'
    qui replace exp_oth             = F_exp_other[1]            in `i'
    qui replace exp_oth_lci         = F_exp_other_lci[1]        in `i'
    qui replace exp_oth_uci         = F_exp_other_uci[1]        in `i'
    qui replace unexp_oth           = F_unexp_other[1]          in `i'
    qui replace unexp_oth_lci       = F_unexp_other_lci[1]      in `i'
    qui replace unexp_oth_uci       = F_unexp_other_uci[1]      in `i'
    qui replace oth_diff            = cif_diff_other[1]         in `i'
    qui replace oth_diff_lci        = cif_diff_other_lci[1]     in `i'
```

```
649       qui replace oth_diff_uci        = cif_diff_other_uci[1]     in `i'
650       qui drop F_unexp_cancer- cif_diff_other_uci
651
652       di "Age = `i' | sens = HYP --- $S_TIME  $S_DATE"
653   }
654
655   keep if age_diag != .
656   keep age_diag-oth_diff_uci
657   gen scale = "Absolute"
658   gen out   = "Cause_specific"
659   gen sens  = "HYP"
660   save "...Results/abs_cs_hyp", replace
661
662
663   ***SENSITIVITY: All-cause & cause-specific relative hazard hypertension***
664   cap use "...m3_survival_data.dta", clear
665   egen float agegr = cut(age_index), at(16 28 32 36 40 44 48 51) icodes
666   lab define agegr_l  0 "16-27" 1 "28-31" 2 "32-35" 3 "36-39" 4 "40-43" 5 "44-47" 6 "48-50"
667   lab values agegr agegr_l
668   tab agegr, m
669   tabstat age_index, statistics(mean median min max count) by(agegr)
670   gen end_date="31/10/2020"
671   gen d_end=date(end_date, "DMY")
672   replace d_end=deathn if died==1
673   gen time = (d_end-indexn)/365.25
674   replace time = .00136895 if time==0
675   keep patid time died exp age_index sex eth imd smoke hypertension_5 agegr bmi death_str_cva death_ihd death_renal death_cancer death_other antihyp
676   lab define exp_lab 0 "no" 1 "yes"
677   lab values exp exp_lab
678   gen death_cardioren=0
679   replace death_cardioren=1 if death_str_cva==1 | death_ihd==1 | death_renal==1
680
681   foreach nm in died death_cancer death_cardioren death_other {
682
683       stset time, f(`nm'==1)
684
685       preserve
686       set showbaselevels on
687       stpm2 i.exp#i.agegr i.agegr sex i.eth i.imd smoke antihyp, df(4) scale(hazard) eform nolog
688       parmest, fast eform
689       split parm, p(#)
690       keep if parm1 == "1.exp"
691       sencode parm2, replace
692       replace parm2 = parm2 - 1
693       drop parm1
694       gen agegr     = "16-27" if parm2 == 0
695       replace agegr = "28-31" if parm2 == 1
696       replace agegr = "32-35" if parm2 == 2
697       replace agegr = "36-39" if parm2 == 3
698       replace agegr = "40-43" if parm2 == 4
699       replace agegr = "44-47" if parm2 == 5
700       replace agegr = "48-50" if parm2 == 6
701       drop parm2 parm eq
702       gen scale = "Relative"
703       gen out   = "`nm'"
704       gen sens  = "HYP"
705       tempfile rel_`nm'_hyp
706       save `rel_`nm'_hyp', replace
707       restore
```

```
}

*********************************
*COMBINED RELATIVE - HYPERTENSION*
*********************************
clear
foreach nm in died death_cancer death_cardioren death_other {
    append using `rel_`nm'_hyp'
}
save "...Results/Relative_all_cs_HYP", replace

*********************************************
***Figure 2 | Absolute - All-cause by group**
use "...Results/Absolute_all_main_BMI_HYP", clear
foreach var of varlist unexp_surv-cont_uci {
    replace `var' = `var'*100
}
keep if sens == "MAIN"
set scheme white_tableau
twoway (line unexp_surv age_diag, sort lcolor(red)) (rarea unexp_lci unexp_uci age_diag, sort fcolor(red%30) lwidth(none))  ///
       (line exp_surv age_diag, sort lcolor(blue)) (rarea exp_lci exp_uci age_diag, sort fcolor(blue%30) lwidth(none))      ///
       , ytitle("10-year survival (%)") ylabel(93(1)100) xtitle("Age at diagnosis (years)") xlabel(16(2)50)                ///
       legend(order(3 "Type 2 diabetes" 1 "No type 2 diabetes") rows(1) position(7)) xsize(5) ysize(4)
graph save "Graph" "...Figure_2_R1.gph", replace
graph close _all

************************************************
***Figure 3 | Absolute - Cause-specific by group**
use "...Results/Absolute_cs_main_BMI_HYP", clear
foreach var of varlist exp_cancer-oth_diff_uci {
    replace `var' = `var'*100
}
keep if sens == "MAIN"
keep age_diag exp* unexp*
foreach nm in cancer cvd oth {
    rename exp_`nm'   exp_`nm'_est
    rename unexp_`nm' unexp_`nm'_est
}
foreach nm in cancer cvd oth {
    foreach j in est lci uci {
        rename exp_`nm'_`j'   exp_`j'_`nm'
        rename unexp_`nm'_`j' unexp_`j'_`nm'
    }
}
reshape long exp_est_ exp_lci_ exp_uci_ unexp_est_ unexp_lci_ unexp_uci_, i(age_diag) j(cause) string
replace cause = "Cardiorenal" if cause == "cvd"
replace cause = "Noncancer/cardiorenal" if cause == "oth"
replace cause = "Cancer" if cause == "cancer"
set scheme white_tableau
sencode cause, replace
twoway (line unexp_est_ age_diag, sort lcolor(red))  (rarea unexp_lci_ unexp_uci_ age_diag, sort fcolor(red%30)  lwidth(none))              ///
       (line exp_est_   age_diag, sort lcolor(blue)) (rarea exp_lci_   exp_uci_   age_diag, sort fcolor(blue%30) lwidth(none))              ///
       , ytitle("10-year cumulative incidence (%)") xtitle("Age at diagnosis (years)") xlabel(16(2)50, labsize(7pt)) ylab(0(0.5)4, format(%3.1f)) ///
       by(cause, cols(3) note("")) legend(order(3 "Type 2 diabetes" 1 "No type 2 diabetes") rows(1) position(7)) xsize(8) ysize(4)
graph save "Graph" "...Figure_3_R1.gph", replace
graph close _all

*********************************************
***Figure S4 | Absolute - All-cause difference**
```

```
use "...Results/Absolute_all_main_BMI_HYP", clear
foreach var of varlist unexp_surv-cont_uci {
    replace `var' = `var'*100
}
keep if sens == "MAIN"
keep age_diag cont*
twoway (line cont age_diag, sort lcolor(red)) (rarea cont_lci cont_uci age_diag, sort fcolor(red%30) lwidth(none))   ///
       , ytitle("10-year survival difference (%), T2DM vs noT2DM") xtitle("Age at diagnosis (years)")                ///
       xlabel(16(2)50, labsize(7pt)) ylab(0(-0.2)-2.6, format(%3.1f) gmax labsize(8pt)) legend(off) xsize(6) ysize(5)
graph save "Graph" "...Figure_S4_R1.gph", replace
graph close _all

*************************************************
***Figure S5 | Absolute - Cause-specific difference**
use "...Results/Absolute_cs_main_BMI_HYP", clear
foreach var of varlist exp_cancer-oth_diff_uci {
    replace `var' = `var'*100
}
keep if sens == "MAIN"
keep age_diag cancer* cvd* oth*
foreach nm in cancer cvd oth {
    rename `nm'_diff `nm'_diff_est
}
foreach nm in cancer cvd oth {
    rename `nm'_diff_* *_`nm'
}
reshape long est_ lci_ uci_, i(age_diag) j(cause) string
replace cause = "Cardiorenal" if cause == "cvd"
replace cause = "Noncancer/cardiorenal" if cause == "oth"
replace cause = "Cancer" if cause == "cancer"
set scheme white_tableau
sencode cause, replace
twoway (line est_ age_diag, sort lcolor(red)) (rarea lci_ uci_ age_diag, sort fcolor(red%30)  lwidth(none))         ///
       , ytitle("10-year cumulative incidence difference (%), T2DM vs noT2DM") xtitle("Age at diagnosis (years)")   ///
       xlabel(16(2)50, labsize(7pt)) ylab(0(0.25)2, format(%3.2f) gmax) by(cause, cols(3) note("") legend(off)) xsize(8) ysize(4)
graph save "Graph" "...Figure_S5_R1.gph", replace
graph close _all

*****************************************************************************************
***Figure S7 | Absolute - SENSITIVITY: All-cause and cause-specific difference, MAIN/BMI/HYP**
use "...Results/Absolute_cs_main_BMI_HYP", clear
foreach var of varlist exp_cancer-oth_diff_uci {
    replace `var' = `var'*100
}
keep age_diag cancer* cvd* oth* sens
foreach nm in cancer cvd oth {
    rename `nm'_diff `nm'_diff_est
}
foreach nm in cancer cvd oth {
    rename `nm'_diff_* *_`nm'
}
reshape long est_ lci_ uci_, i(age_diag sens) j(cause) string
replace cause = "Cardiorenal" if cause == "cvd"
replace cause = "Noncancer/cardiorenal" if cause == "oth"
replace cause = "Cancer" if cause == "cancer"
tempfile cs_sens
save `cs_sens', replace

use "...Results/Absolute_all_main_BMI_HYP", clear
```

```
foreach var of varlist unexp_surv-cont_uci {
    replace `var' = `var'*100
}
keep age_diag sens out cont*
renames cont cont_lci cont_uci out \ est_ lci_ uci_ cause
order age_diag sens cause est_ lci_ uci_

append using `cs_sens'
sencode cause, replace
sencode sens, replace
sort cause sens age_diag
set scheme white_tableau

keep if inlist(age_diag, 16, 20, 30, 40, 50)
sort cause age_diag sens
label variable age_diag "Age (years)"
replace age_diag = . if sens != 1

forestplot est_ lci_ uci_ if cause == 1, effect("Difference, %") lcols(age_diag)                                                                    ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                                                       ///
   spacing(2) yline(3.5(3)12.5, lwidth(vthin) lpattern(vshortdash)) xtitle("10-year survival difference (%), T2DM vs noT2DM", size(5pt))          ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(0(-0.4)-2.6, force labsize(4pt) nogrid format(%3.1f))                                     ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue))          ///
   title("All-cause", size(small)) name("All_s", replace) xsize(4) ysize(5) scale(1.15) nodraw

forestplot est_ lci_ uci_ if cause == 2, effect("Difference, %") lcols(age_diag)                                                                                  ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                                                                     ///
   spacing(2) yline(3.5(3)12.5, lwidth(vthin) lpattern(vshortdash)) xtitle("10-year cumulative incidence difference (%), T2DM vs noT2DM", size(5pt))          ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(0(0.2)0.8, force labsize(4pt) nogrid format(%3.1f))                                                      ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue))                        ///
   title("Cancer", size(small)) name("Cancer_s", replace) xsize(4) ysize(5) scale(1.15) nodraw

forestplot est_ lci_ uci_ if cause == 3, effect("Difference, %") lcols(age_diag)                                                                                  ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                                                                     ///
   spacing(2) yline(3.5(3)12.5, lwidth(vthin) lpattern(vshortdash)) xtitle("10-year cumulative incidence difference (%), T2DM vs noT2DM", size(5pt))          ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(0(0.1)0.5, force labsize(4pt) nogrid format(%3.1f))                                                      ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue))                        ///
   title("Cardiorenal", size(small)) name("Cardiorenal_s", replace) xsize(4) ysize(5) scale(1.15) nodraw

forestplot est_ lci_ uci_ if cause == 4, effect("Difference, %") lcols(age_diag)                                                                                  ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                                                                     ///
   spacing(2) yline(3.5(3)12.5, lwidth(vthin) lpattern(vshortdash)) xtitle("10-year cumulative incidence difference (%), T2DM vs noT2DM", size(5pt))          ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(0(0.2)1.8, force labsize(4pt) nogrid format(%3.1f))                                                      ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue))                        ///
   title("Noncancer/cardiorenal", size(small)) name("NCNC_s", replace) xsize(4) ysize(5) scale(1.15) nodraw

graph combine All_s Cancer_s Cardiorenal_s NCNC_s, cols(4) xsize(8) ysize(2.5)
graph save "Graph" "...Figure_S7_R1.gph", replace
graph close _all


*************************************************
*ALL COMBINED RELATIVE -- GRAPHS*****************
*************************************************

***Fig 1***
cap use "...Results/Relative_all_cs_main_BMI.dta", clear
append using "...Results/Relative_all_cs_HYP.dta"
drop if sens != "MAIN"
```

```
drop sens
drop stderr z p scale
replace out = "All-cause"            if out == "died"
replace out = "Cancer"               if out == "death_cancer"
replace out = "Cardiorenal"          if out == "death_cardioren"
replace out = "Noncancer/cardiorenal" if out == "death_other"
sencode out, replace
sencode agegr, replace

set scheme white_tableau
twoway (scatter estimate agegr, sort mcolor(black) msize(small) msymbol(square)) (rspike min95 max95 agegr, sort lcolor(black)),                        ///
       ytitle("Hazard Ratio") yscale(log) xtitle("Age group (years)") xlabel(1 "16-27" 2 "28-31" 3 "32-35" 4 "36-39" 5 "40-43" 6 "44-47" 7 "48-50")    ///
       by(, legend(off) note("")) by(out, cols(2) yrescale) yline(1, lcolor(blue) lpattern(shortdash))
graph save "Graph" "...Figure_1_R1.gph", replace

***Fig S6***
cap use "...Results/Relative_all_cs_main_BMI.dta", clear
append using "...Results/Relative_all_cs_HYP.dta"
drop stderr z p scale
replace out = "All-cause"            if out == "died"
replace out = "Cancer"               if out == "death_cancer"
replace out = "Cardiorenal"          if out == "death_cardioren"
replace out = "Noncancer/cardiorenal" if out == "death_other"
sencode sens, replace
sort out agegr sens
foreach var of varlist estimate-max95 {
    gen ln_`var' = ln(`var')
}
replace agegr = "" if sens != 1
label variable agegr "Age group at diagnosis (years)"

set scheme white_tableau

forestplot ln_estimate ln_min95 ln_max95 if out == "All-cause", eform effect("HR") lcols(agegr)                              ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                               ///
   spacing(2.5) yline(3.5(3)18.5, lwidth(vthin) lpattern(vshortdash)) xtitle("Hazard ratio, T2DM vs noT2DM", size(6pt))     ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(1 2 4 8, force labsize(6pt) nogrid)                                ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue)) ///
   title("All-cause", size(small)) name("All", replace) xsize(4) ysize(5) scale(1) nodraw

forestplot ln_estimate ln_min95 ln_max95 if out == "Cancer", eform effect("HR") lcols(agegr)                                ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                               ///
   spacing(2.5) yline(3.5(3)18.5, lwidth(vthin) lpattern(vshortdash)) xtitle("Hazard ratio, T2DM vs noT2DM", size(6pt))     ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(0.5 1 2 4 8 16, force labsize(6pt) nogrid)                         ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue)) ///
   title("Cancer", size(small)) name("Cancer", replace) xsize(4) ysize(5) scale(1) nodraw

forestplot ln_estimate ln_min95 ln_max95 if out == "Cardiorenal", eform effect("HR") lcols(agegr)                           ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                               ///
   spacing(2.5) yline(3.5(3)18.5, lwidth(vthin) lpattern(vshortdash)) xtitle("Hazard ratio, T2DM vs noT2DM", size(6pt))     ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(1 2 4 8 16 32, force labsize(6pt) nogrid)                          ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue)) ///
   title("Cardiorenal", size(small)) name("Cardiorenal", replace) xsize(4) ysize(5) scale(1) nodraw

forestplot ln_estimate ln_min95 ln_max95 if out == "Noncancer/cardiorenal", eform effect("HR") lcols(agegr)                ///
   nonames noov nosu nowt dp(2) classic boxscale(60) astext(40) textsize(105)                                               ///
   spacing(2.5) yline(3.5(3)18.5, lwidth(vthin) lpattern(vshortdash)) xtitle("Hazard ratio, T2DM vs noT2DM", size(6pt))     ///
   leftjustify ciopts(lwidth(vthin)) plotid(sens) xlabel(1 2 4 8, force labsize(6pt) nogrid)                                ///
   box1opts(mcolor(red)) ci1opts(lcolor(red)) box2opts(mcolor(black)) ci2opts(lcolor(black)) box3opts(mcolor(blue)) ci3opts(lcolor(blue)) ///
```

```
    title("Noncancer/cardiorenal", size(small)) name("NCNC", replace) xsize(4) ysize(5) scale(1) nodraw

graph combine All Cancer Cardiorenal NCNC, rows(1) scale(0.9) xsize(6) ysize(4) name("FigS6", replace) nocopies
graph export "...Figure_S6_R1.svg", as(svg) name("FigS6")
graph close _all


*************************************************************************************************************************
*DURATION (IQR) BY AGE GROUP, ALL INDIVIDUALS*****************************************************************************
*************************************************************************************************************************
cap use "...m3_survival_data.dta", clear
gen end_date="31/10/2020"
gen d_end=date(end_date, "DMY")
replace d_end=deathn if died==1
gen time = (d_end-indexn)/365.25
replace time = .00136895 if time==0
keep exp age_index died time
sum age_index
egen float ageg = cut(age_index), at(0 16 28 32 36 40 44 48 100) icodes label

preserve
gen t25 = time
gen t50 = time
gen t75 = time
collapse (p25) t25 (p50) t50 (p75) t75, by(ageg)
foreach var of varlist t25 t50 t75 {
    tostring `var', format(%3.1f) force replace
}
gen m_iqr = t50 + " (" + t25 + "-" + t75 + ")"
gen agegr     = "16-27" if ageg == 1
replace agegr = "28-31" if ageg == 2
replace agegr = "32-35" if ageg == 3
replace agegr = "36-39" if ageg == 4
replace agegr = "40-43" if ageg == 5
replace agegr = "44-47" if ageg == 6
replace agegr = "48-50" if ageg == 7
order agegr m_iqr, first
cap export excel using   "...FollowUp_Agegroups.xls", firstrow(variables) replace
restore

sort ageg
gen agegr     = "16-27" if ageg == 1
replace agegr = "28-31" if ageg == 2
replace agegr = "32-35" if ageg == 3
replace agegr = "36-39" if ageg == 4
replace agegr = "40-43" if ageg == 5
replace agegr = "44-47" if ageg == 6
replace agegr = "48-50" if ageg == 7
tab ageg agegr
set scheme tab2
distplot time, over(agegr) ylabel(0(10)100, labsize(8pt)) legend(rows(1) position(12)) trscale(100*@) xlabel(0(2)20, labsize(8pt)) xsize(5) ysize(5) xtitle("Follow-up time (years)")
ytitle("Cumulative probability (%)")
cap graph export "...FollowUp_Agegroups.emf", as(emf) name("Graph") replace
graph close _all


*************************************************************************************************************************
*SEPARATE CARDIO AND RENAL************************************************************************************************
*************************************************************************************************************************
```

```
1002
1003  ***RELATIVE: Cause-specific difference***
1004  cap use "...m3_survival_data.dta", clear
1005  egen float agegr = cut(age_index), at(16 28 32 36 40 44 48 51) icodes
1006  lab define agegr_l  0 "16-27" 1 "28-31" 2 "32-35" 3 "36-39" 4 "40-43" 5 "44-47" 6 "48-50"
1007  lab values agegr agegr_l
1008  tab agegr, m
1009  tabstat age_index, statistics(mean median min max count) by(agegr)
1010  gen end_date="31/10/2020"
1011  gen d_end=date(end_date, "DMY")
1012  replace d_end=deathn if died==1
1013  gen time = (d_end-indexn)/365.25
1014  replace time = .00136895 if time==0
1015  keep patid time died exp age_index sex eth imd smoke hypertension_5 agegr bmi death_str_cva death_ihd death_renal death_cancer death_other
1016  lab define exp_lab 0 "no" 1 "yes"
1017  lab values exp exp_lab
1018  gen death_cvd=0
1019  replace death_cvd=1 if death_ihd==1 | death_str_cva==1
1020  drop death_ihd death_str_cva
1021  groups death_cvd death_renal died
1022  renames death_cvd death_renal \ sdeath_cvd sdeath_renal
1023
1024  groups sdeath_cvd agegr   if sdeath_cvd == 1, clean
1025  groups sdeath_renal agegr if sdeath_renal == 1, clean
1026
1027  foreach nm in sdeath_cvd sdeath_renal {
1028
1029      stset time, f(`nm'==1)
1030
1031      preserve
1032      set showbaselevels on
1033      stpm2 i.exp#i.agegr i.agegr sex i.eth i.imd smoke hypertension_5, df(4) scale(hazard) eform nolog
1034      parmest, fast eform
1035      split parm, p(#)
1036      keep if parm1 == "1.exp"
1037      sencode parm2, replace
1038      replace parm2 = parm2 - 1
1039      drop parm1
1040      gen agegr     = "16-27" if parm2 == 0
1041      replace agegr = "28-31" if parm2 == 1
1042      replace agegr = "32-35" if parm2 == 2
1043      replace agegr = "36-39" if parm2 == 3
1044      replace agegr = "40-43" if parm2 == 4
1045      replace agegr = "44-47" if parm2 == 5
1046      replace agegr = "48-50" if parm2 == 6
1047      drop parm2 parm eq
1048      gen scale = "Relative"
1049      gen out   = "`nm'"
1050      gen sens  = "MAIN"
1051      tempfile rel_`nm'_main
1052      save `rel_`nm'_main', replace
1053      restore
1054  }
1055
1056  *********************************
1057  *COMBINED RELATIVE - CARDIO_RENAL*
1058  *********************************
1059  clear
1060  foreach nm in sdeath_cvd sdeath_renal {
```

```
1061        append using `rel_`nm'_main'
1062    }
1063    save "...Results/Relative_CR_main", replace
1064
1065
1066    ********************************
1067    *TABLE RELATIVE - CARDIO_RENAL*
1068    ********************************
1069    cap use "...Results/Relative_CR_main", clear
1070    keep estimate min95 max95 agegr out
1071    foreach var of varlist estimate-max95 {
1072        tostring `var', replace force format(%20.2f)
1073    }
1074    gen hr_ci = estimate + " (" + min95 + " to " + max95 + ")"
1075    order out agegr hr_ci
1076    drop estimate-max95
1077    replace out = "CVD only"   if out == "sdeath_cvd"
1078    replace out = "Renal only" if out == "sdeath_renal"
1079    cap export excel using "...Cardio_Renal_Separate.xls", firstrow(variables) replace
```