

Blood Based Biomarkers in the Health and Retirement Study

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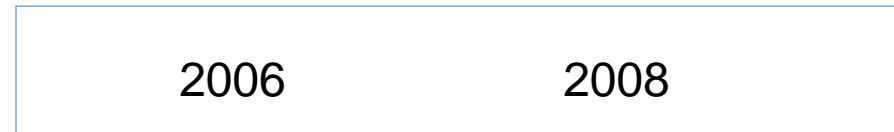
With David Weir, Jecssica Faul, and Jung Ki Kim

The Health and Retirement Study (HRS) has collected samples for blood-based biomarkers since 2006.

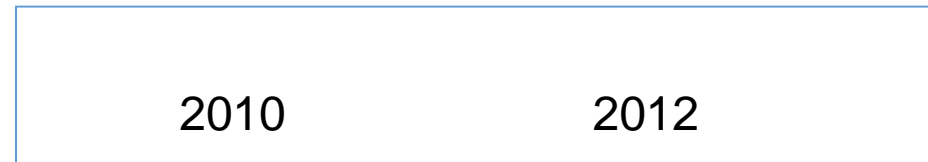
At each wave blood is collected from half the sample. So a combination of two waves is needed for the whole sample.

Blood is collected from sample members at 4 year intervals

Wave 1



Wave 2



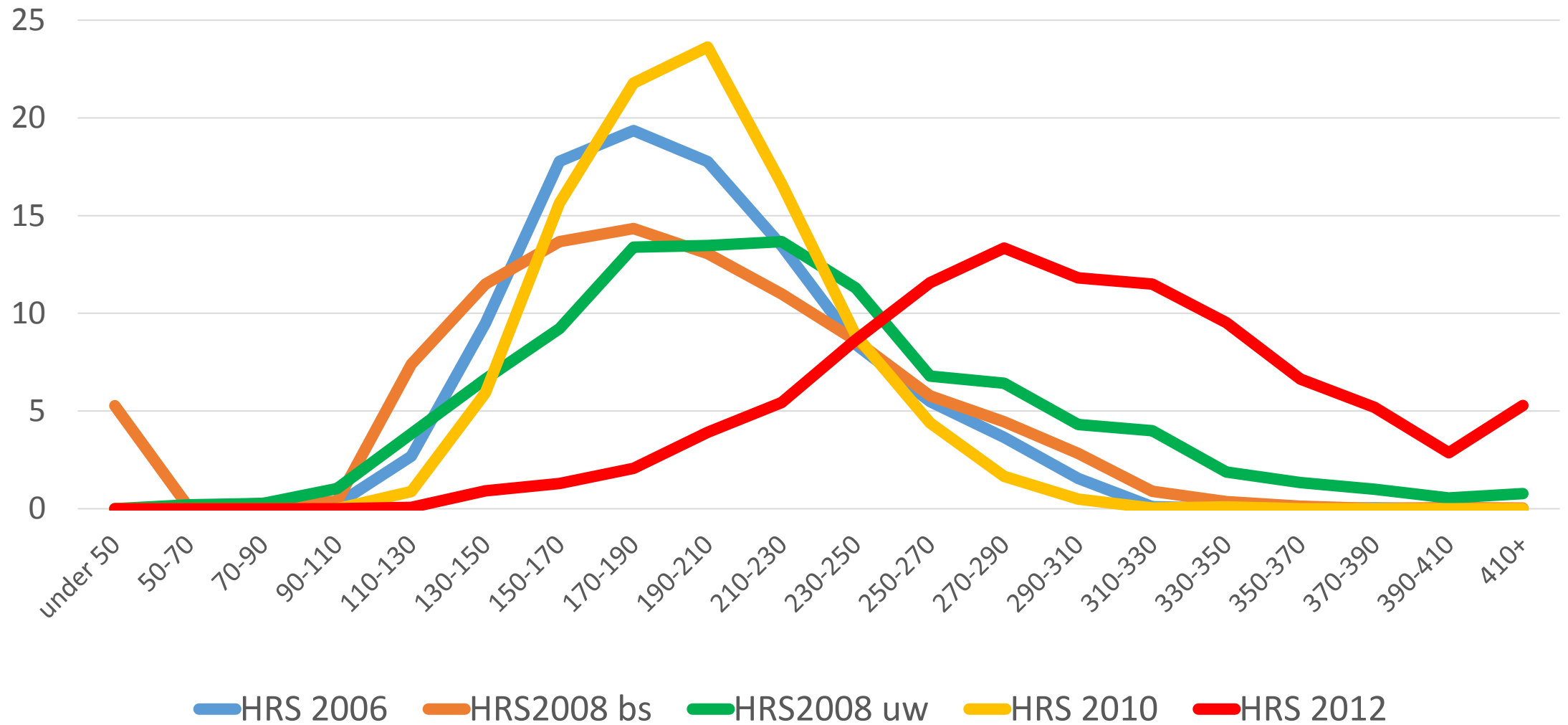
Dried Blood Spots

- Total Cholesterol
- HDL Cholesterol
- C-Reactive Protein
- HbA1c
- Cystatin C

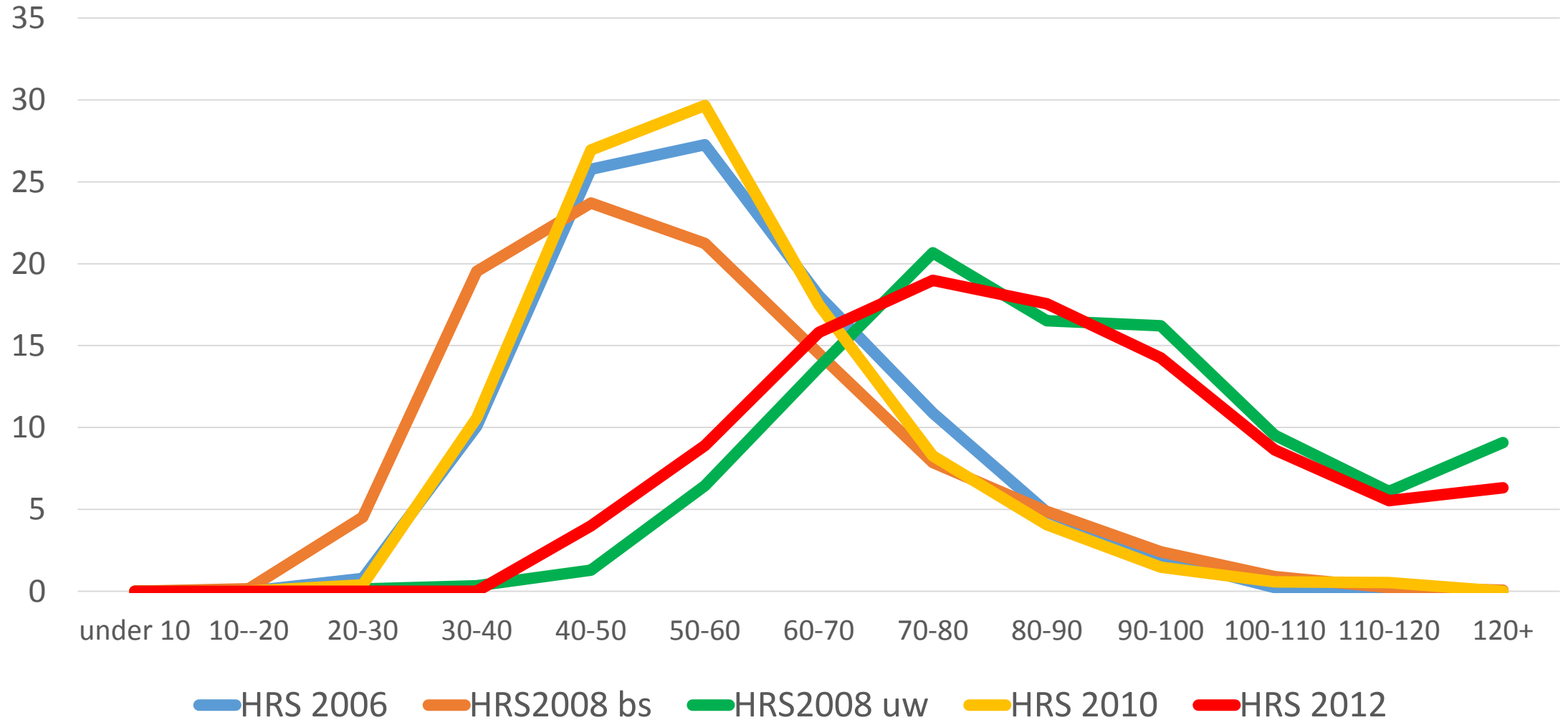
Multiple Laboratories Across Waves and Within Waves

	HbA1c	Total Cholesterol	HDL Cholesterol	CRP	Cystatin C
Biosafe	2006 ½ 2008	2006 ½ 2008	2006 ½ 2008		
FlexSite	½ 2008				
University of Vermont				2006 2008	2006 2008
The University of Washington	2012 2014	½ 2008 2012 2014	½ 2008 2012 2014	2010 2012 2014	2010 2012 2014
Heritage	2010	2010	2010		

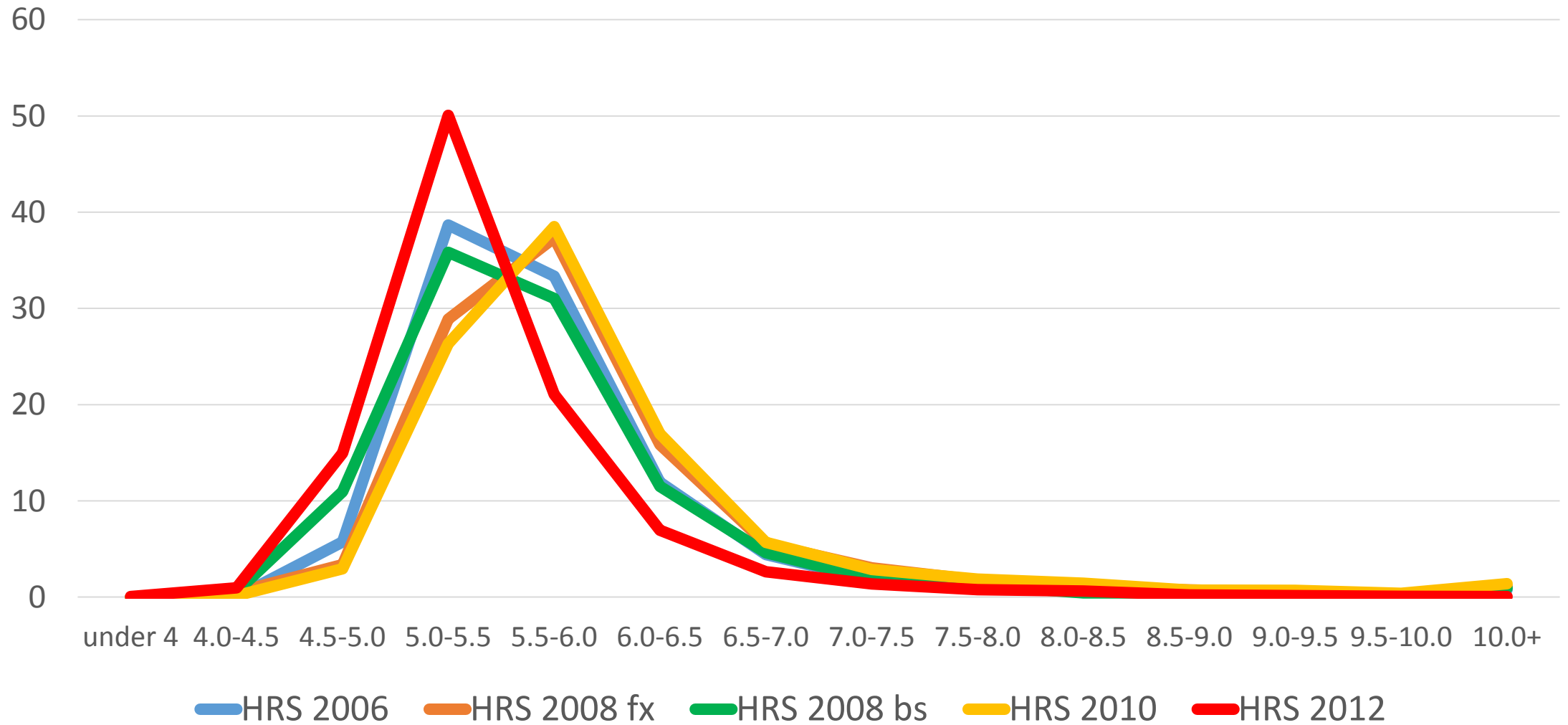
Distribution of Initial Assay Values - Total Cholesterol – HRS 2006, 2008, 2010, 2012



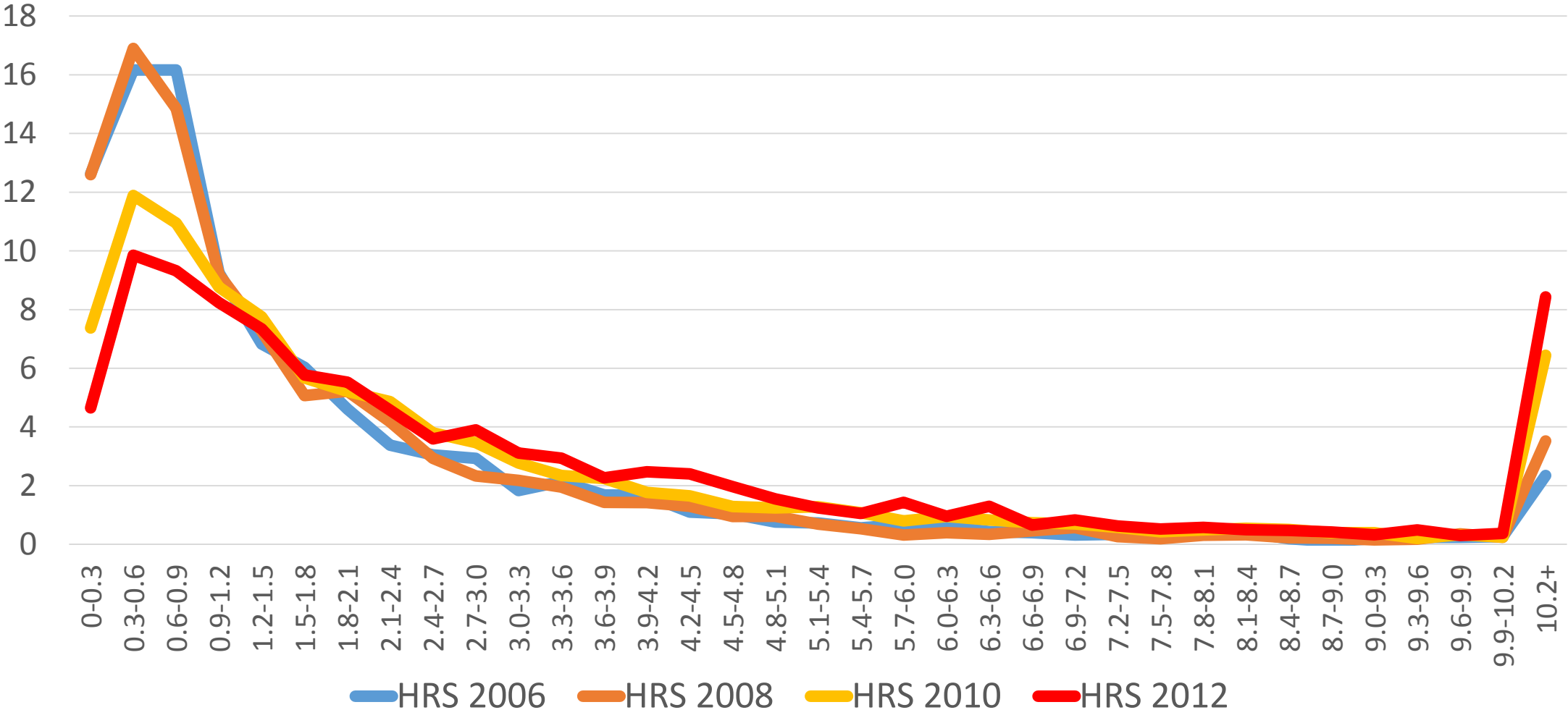
HDL Cholesterol – HRS 2006, 2008, 2010, 2012



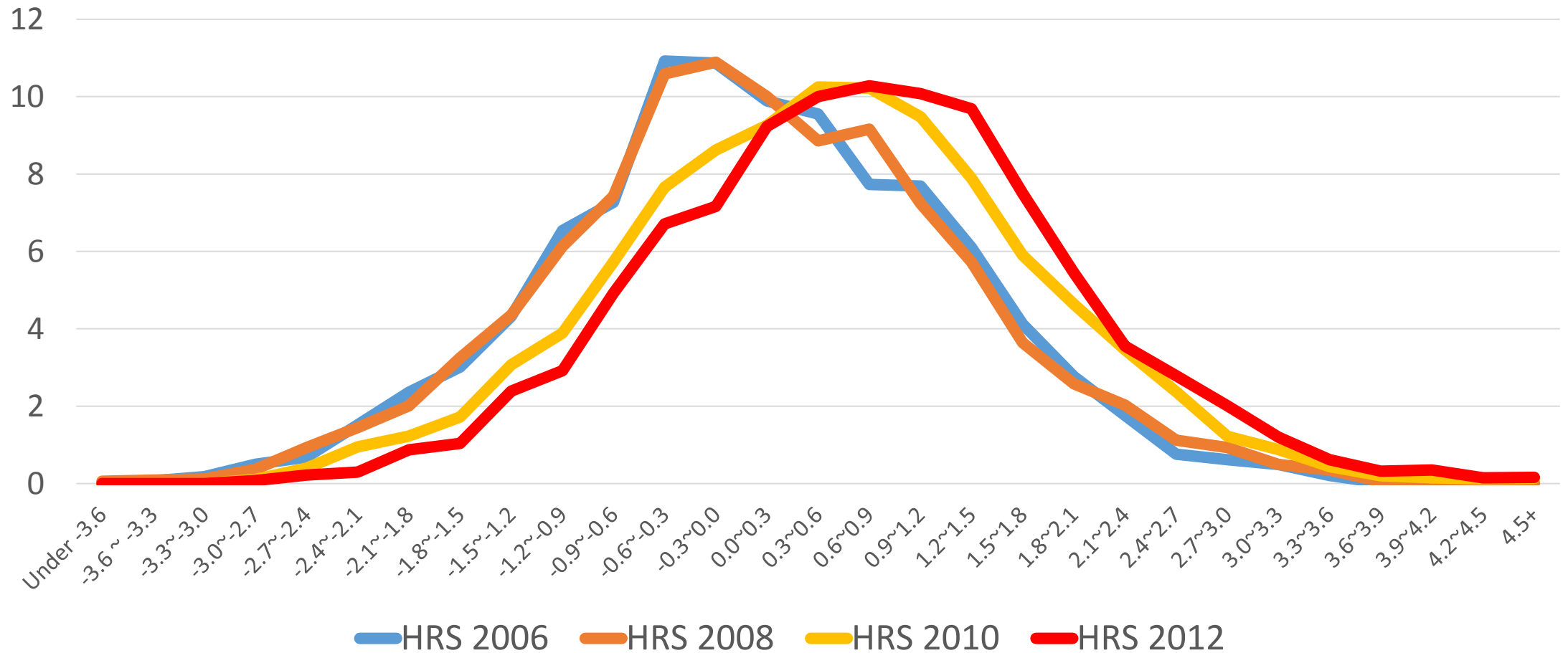
HbA1c – HRS 2006, 2008, 2010, 2012



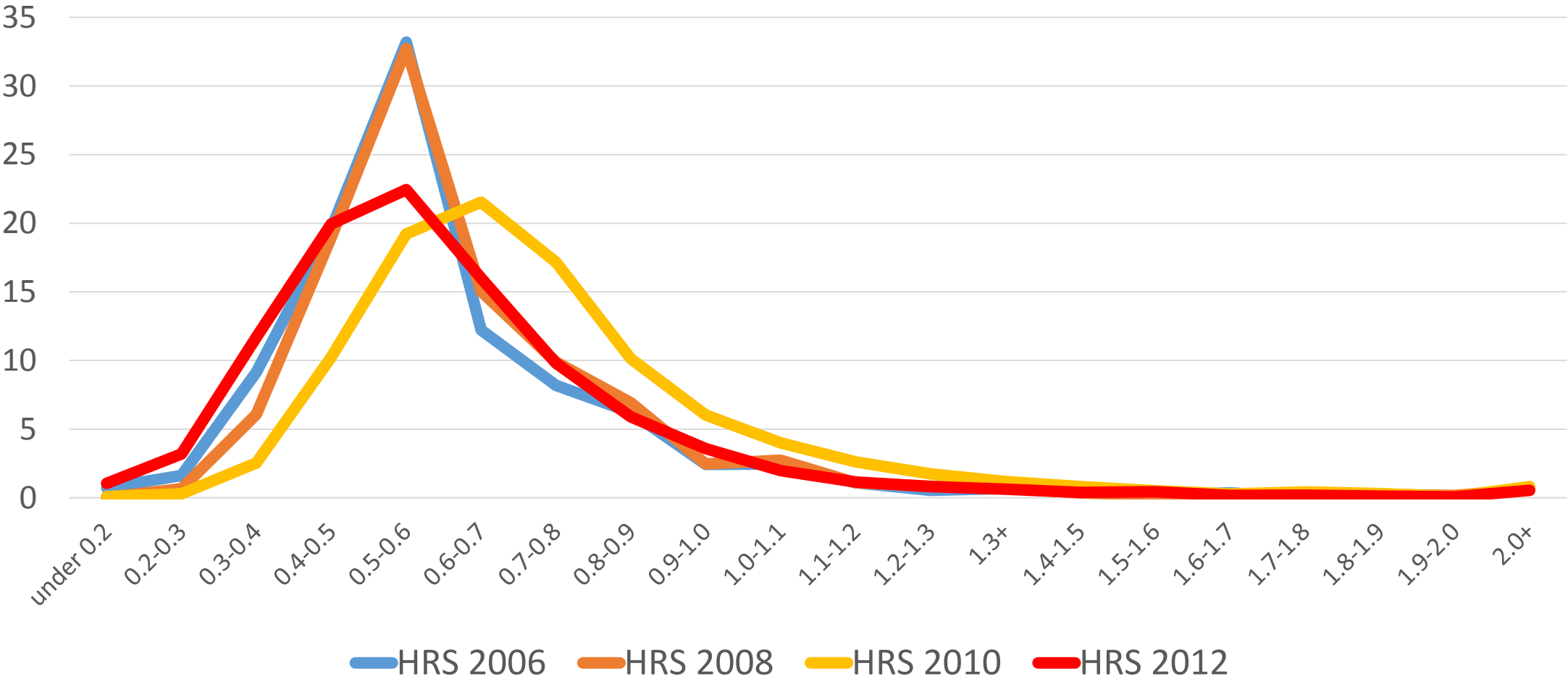
CRP – HRS 2006, 2008, 2010, 2012



Logged CRP – HRS 2006, 2008, 2010, 2012



Cystatin C– HRS 2006, 2008, 2010, 2012

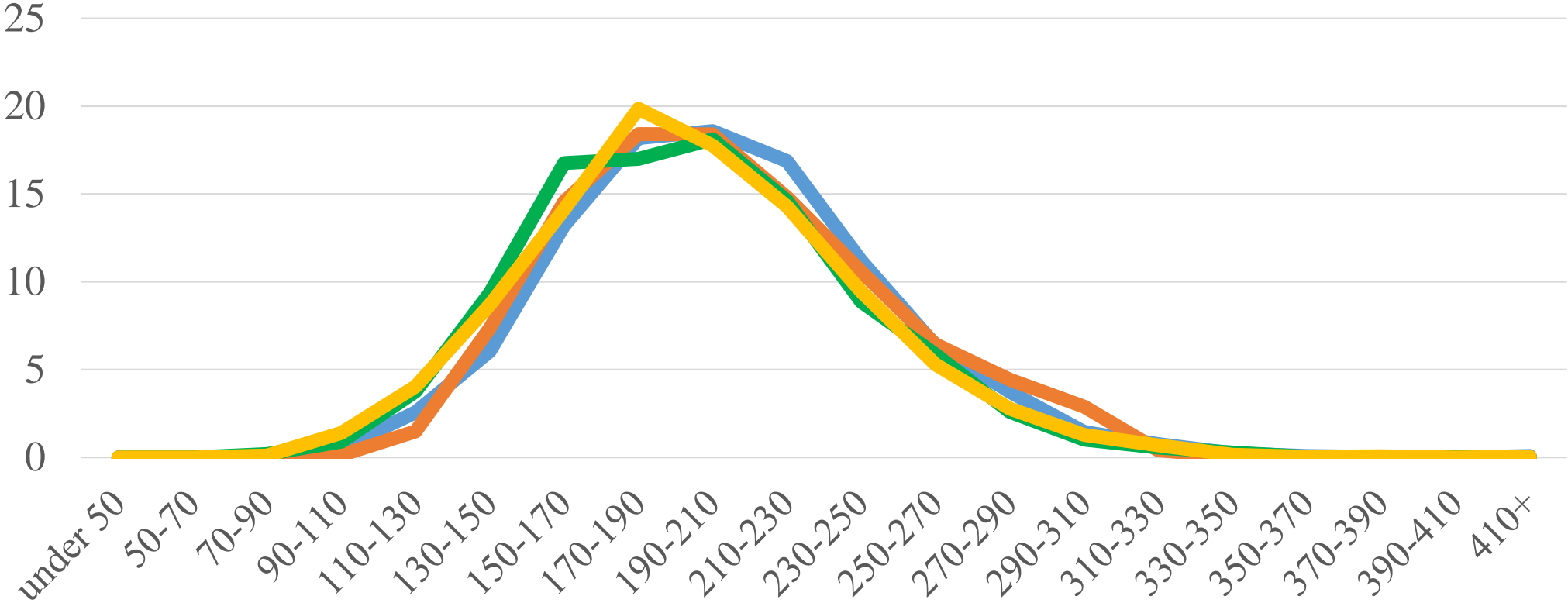


To compare across waves HRS has developed HRS NHANES Equivalent measures.

The HRS NHANES equivalent values make the assay levels for the HRS data based on DBS similar to the level in NHANES where values are based on conventional venous blood assays. This preserves the variability in the HRS sample and allows the results to be comparable to those based on venous blood assays and to use conventional cutoff values..

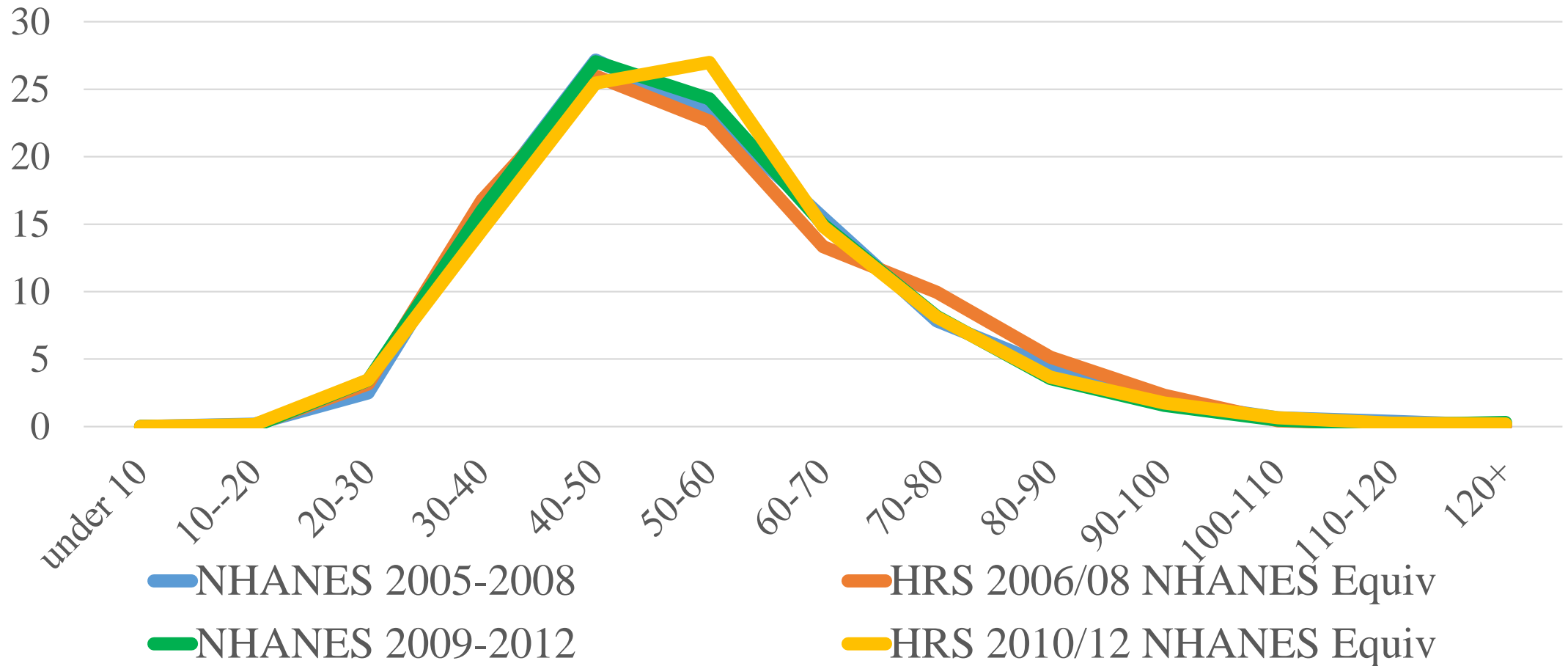
- Our approach is to calculate the values of the assays corresponding to (weighted) 100 percentiles in HRS and in NHANES.
- We then regress the HRS value on the NHANES value to create an equation that can be used to convert individual HRS values into NHANES Equivalent values.
- Each HRS wave and lab is done separately
- 2006-2008 are equivalent to NHANES (2005-2006, 2007-2008)
- 2010-2012 are equivalent to NHANES (2009-2010, 2011-2012)

Total Cholesterol – NHANES and HRS NHANES Equiv

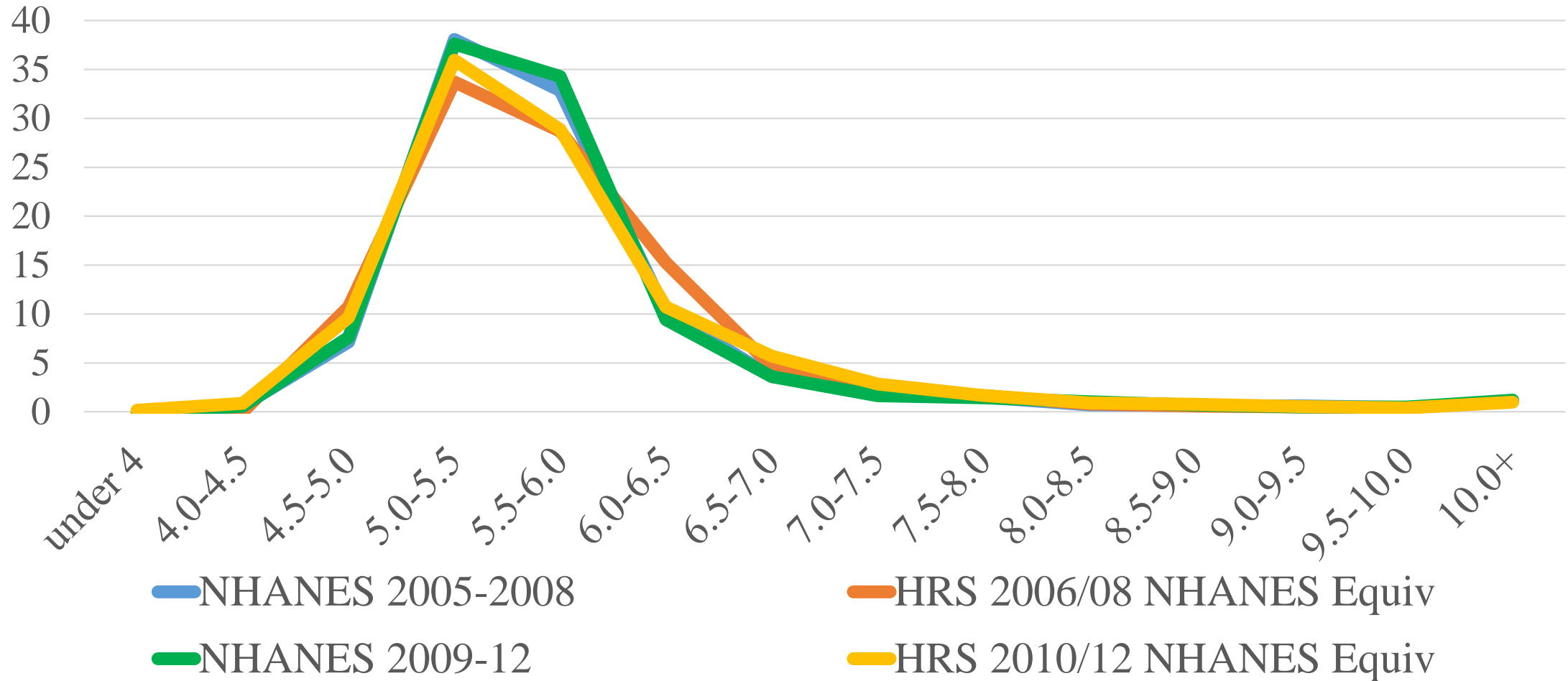


- NHANES 2005-2008
- NHANES 2009-2012
- HRS 2006/08 NHANES Equiv
- HRS 2010/12 NHANES Equiv

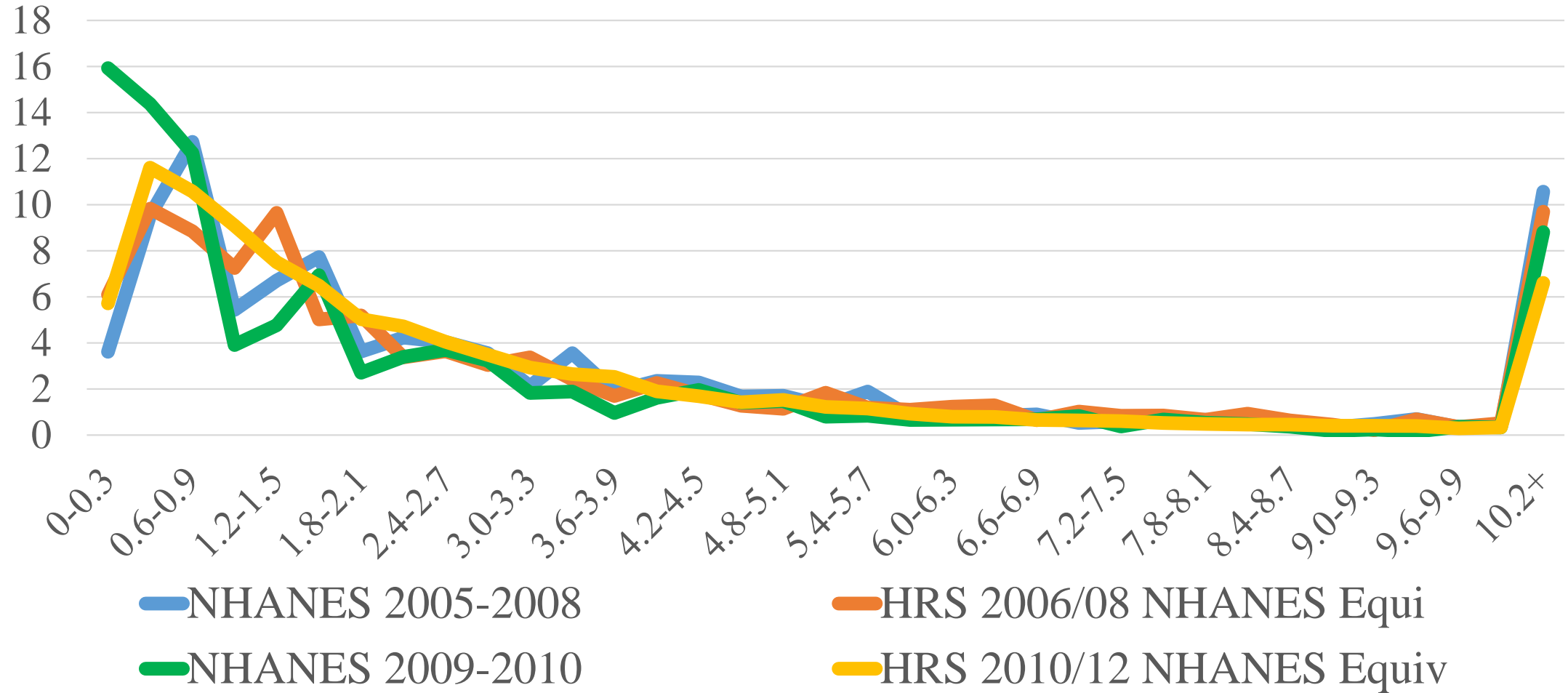
HDL Cholesterol – NHANES and HRS NHANES Equiv



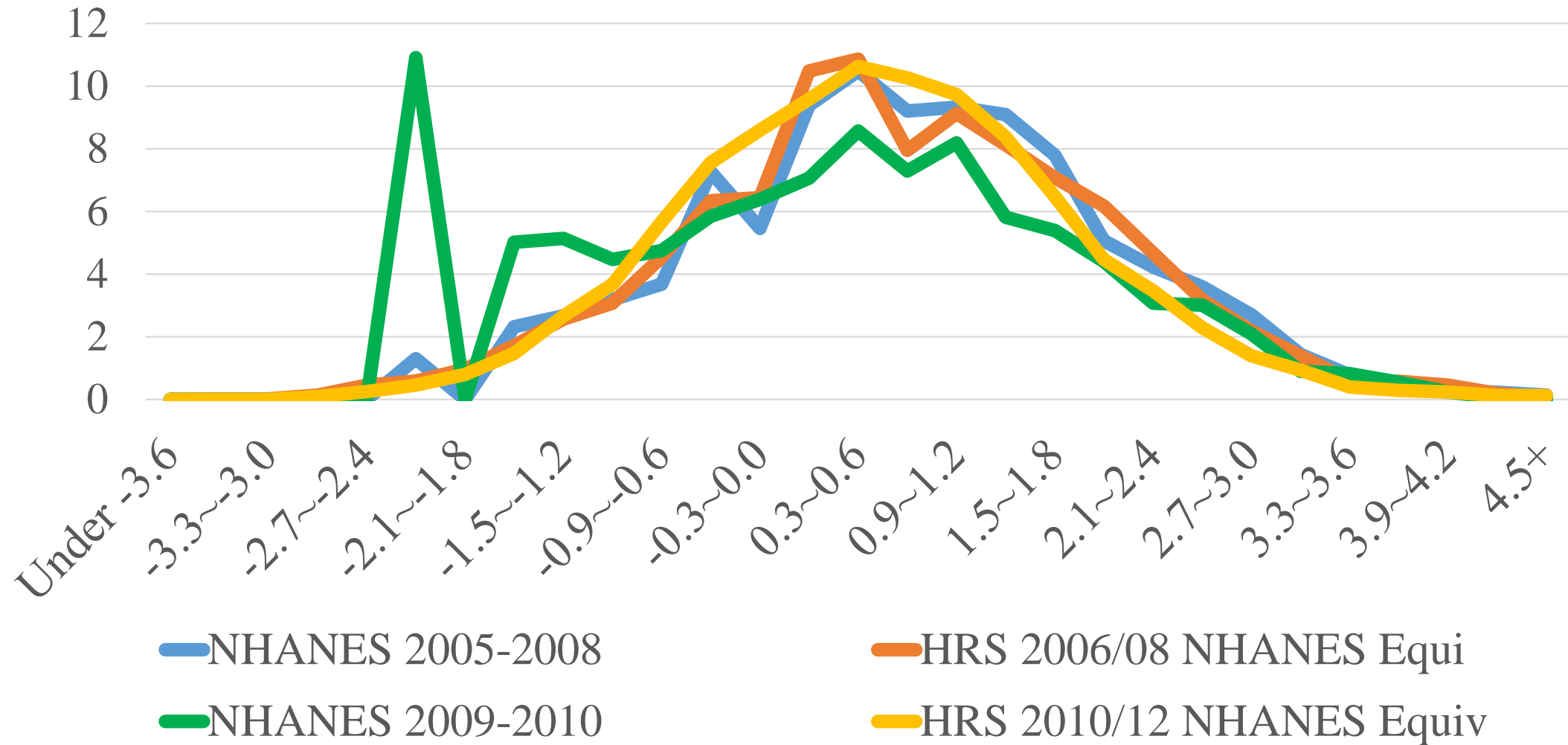
HbA1c – NHANES and NHANES Equiv.



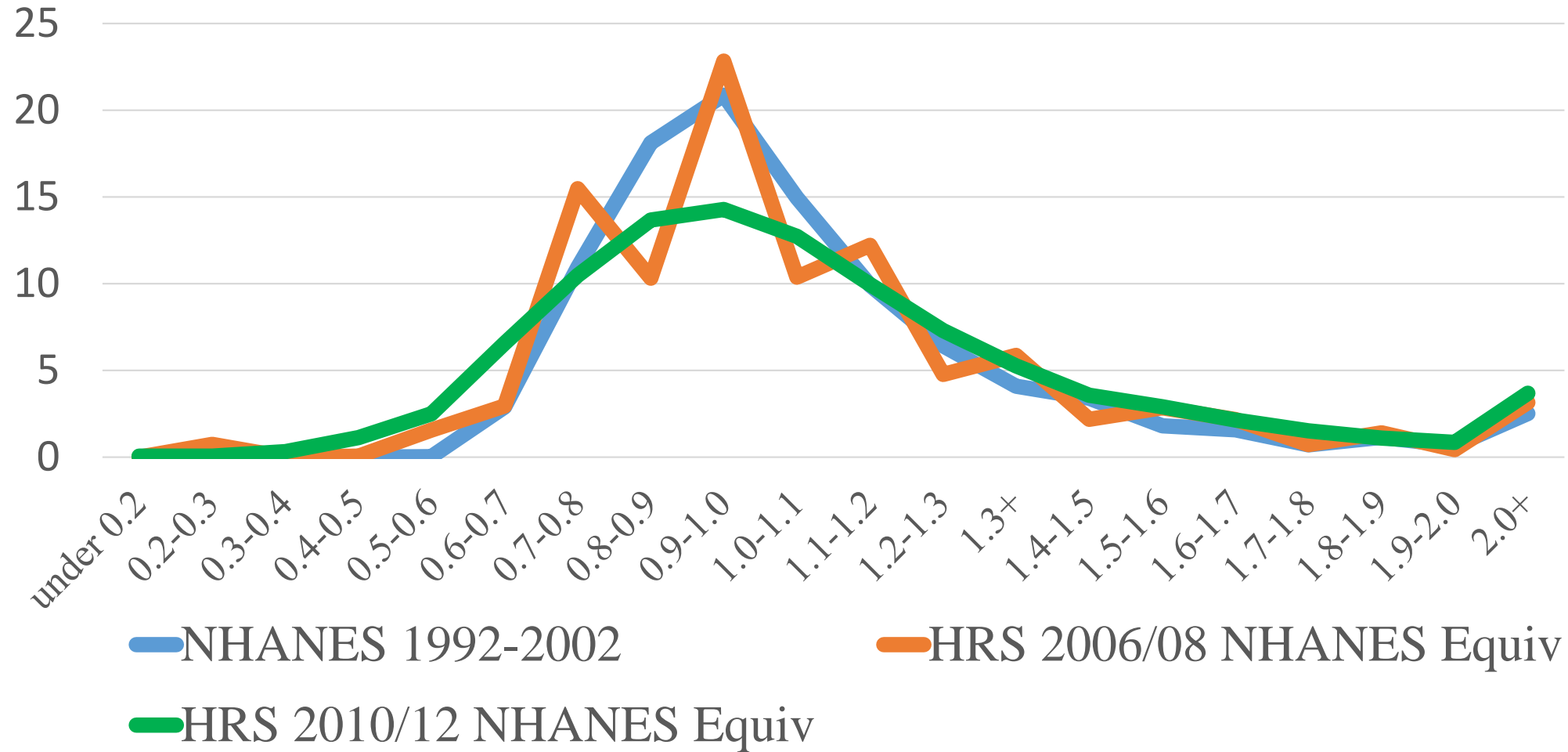
CRP – NHANES and NHANES Equiv



Logged CRP – NHANES and NHANES Equi.



Cystatin C– NHANES and NHANES Equiv



Average change over time in HRS reflects change in NHANES

Individual HRS values across waves are comparable

Initial insights into what we will find when data are out -

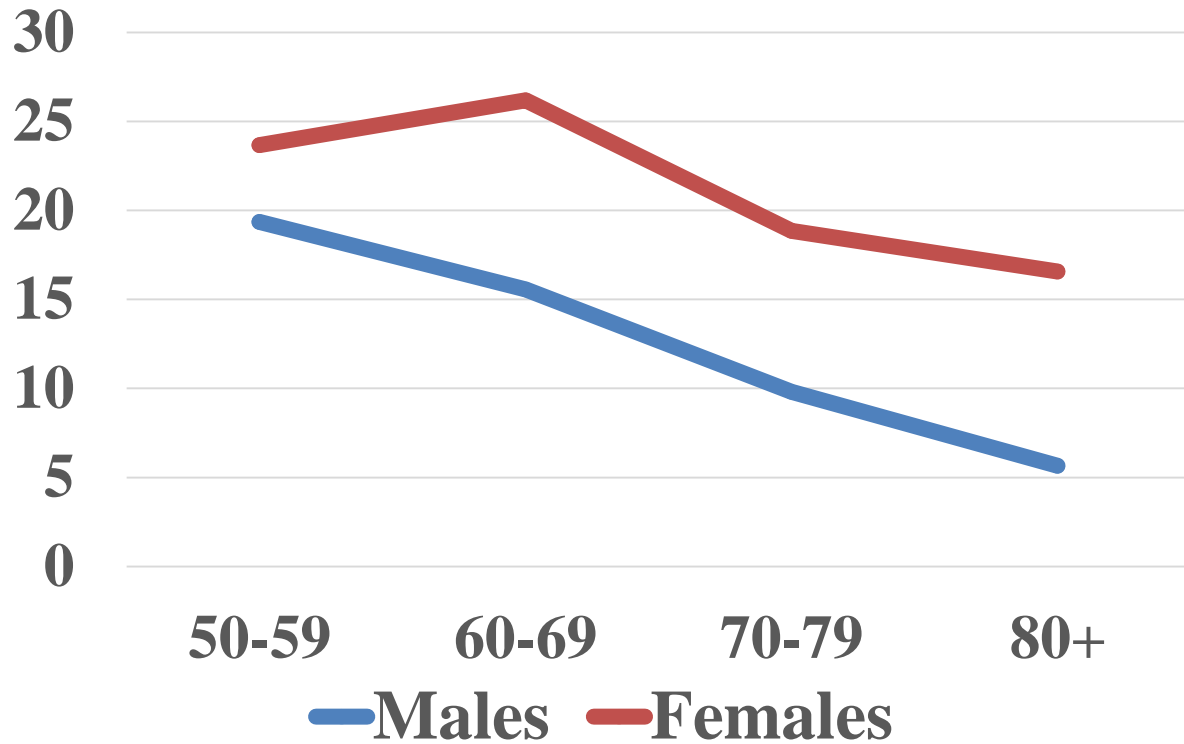
Rate of onset of high risk levels among those who are not at risk in the first wave is not strongly positively related to age for most of these markers (cystatin C is the exception).

Rates of onset by gender are quite similar for all but high cholesterol.

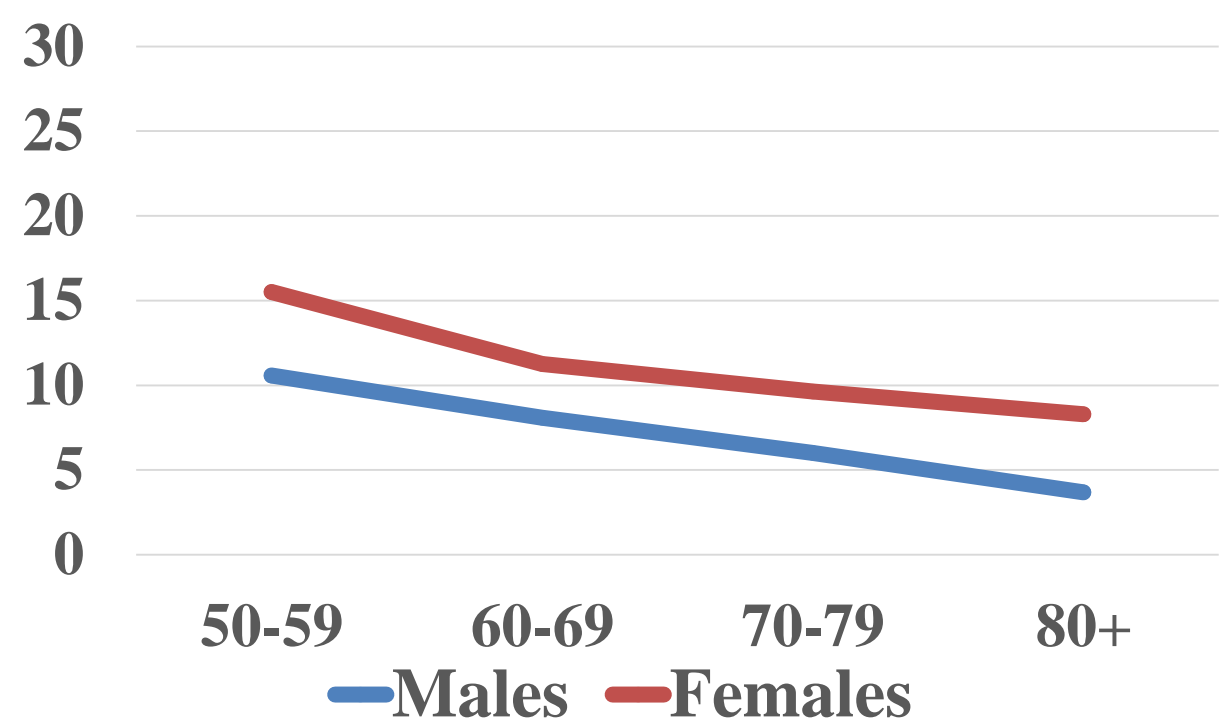
Gender onset rates are more similar than cross-sectional prevalence for many markers.

High Total Cholesterol Prevalence (2006/08) and Onset (2006/08 - 2010/12)

Prevalence

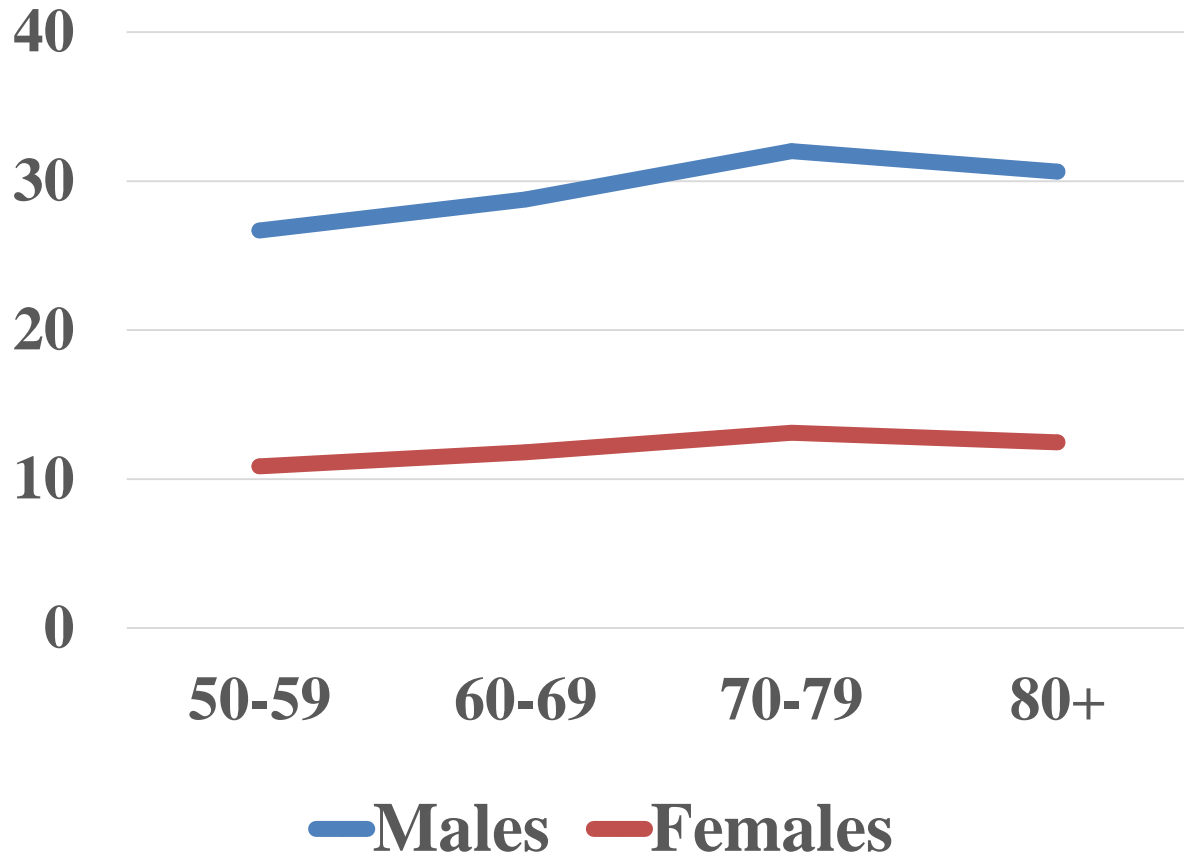


Onset

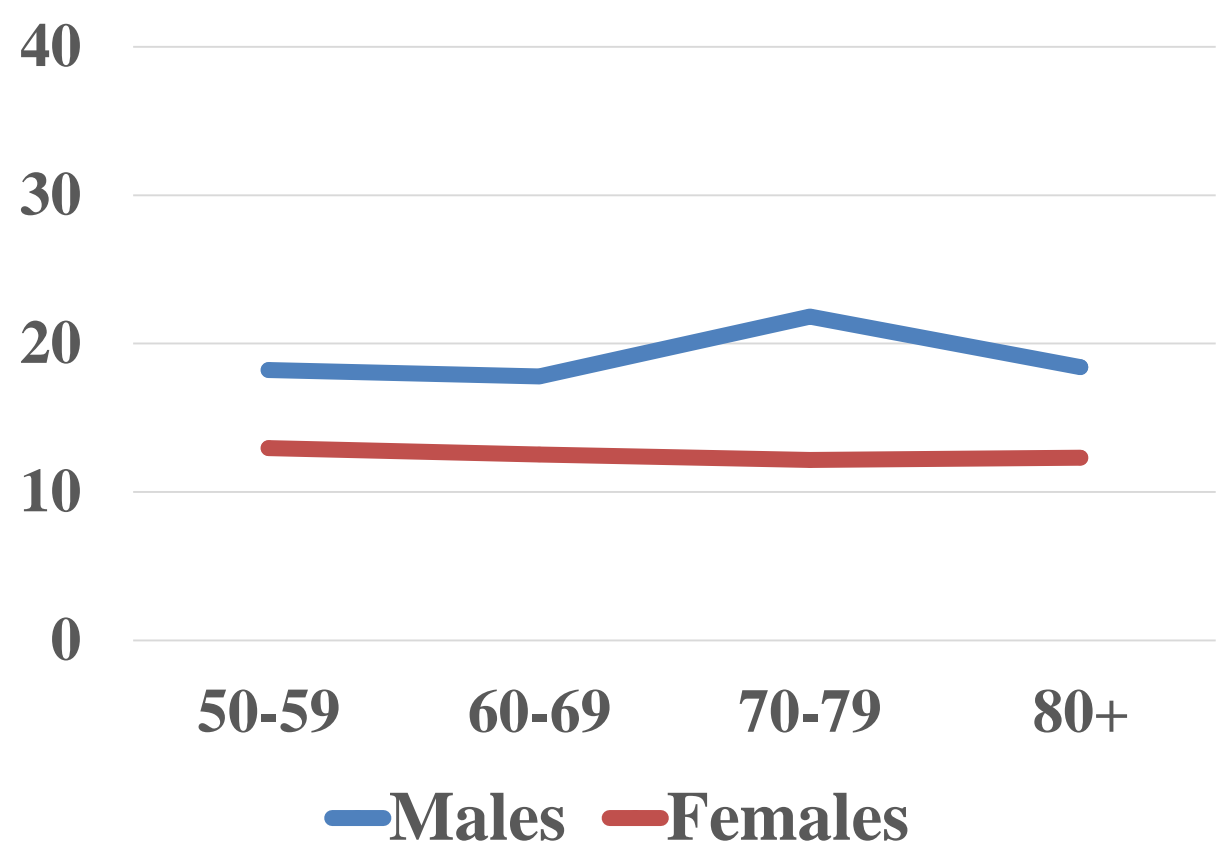


Low HDL Prevalence (2006/08) and Onset (2006/08-2010/12)

Prevalence

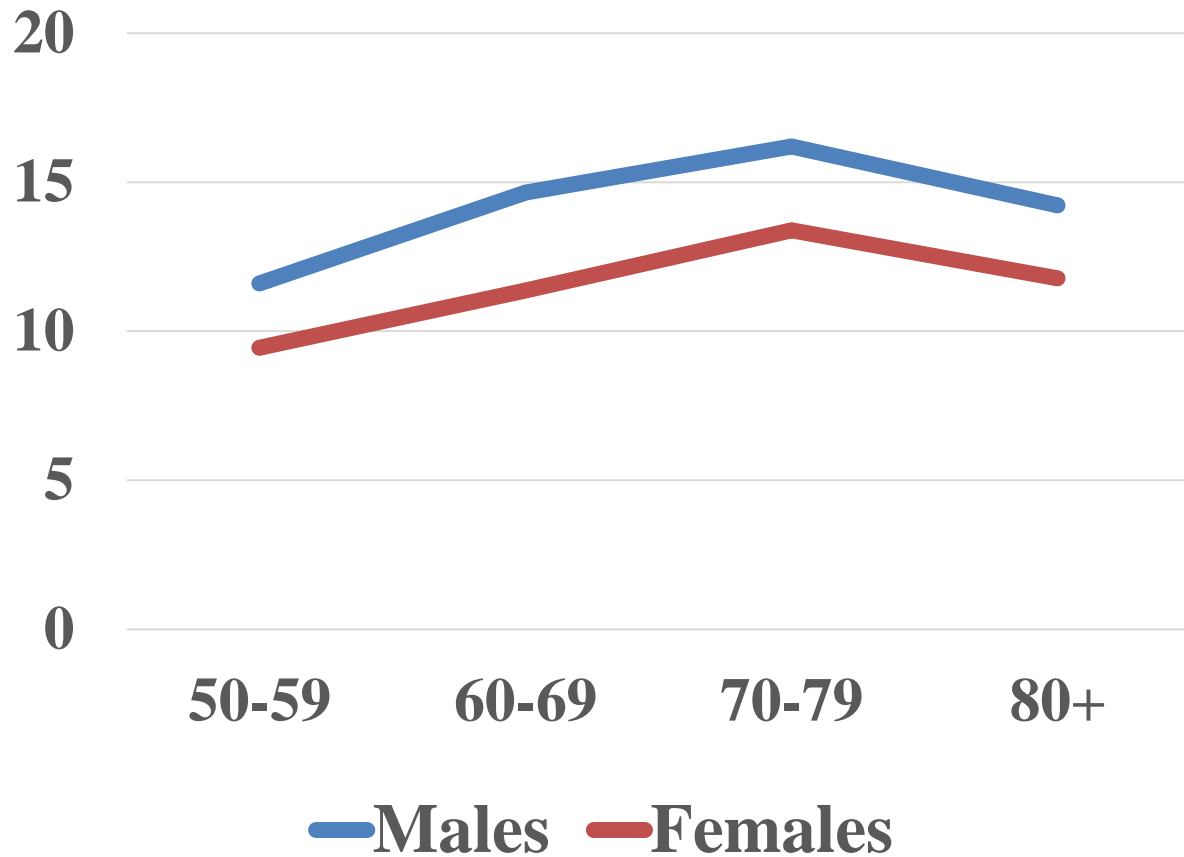


Onset

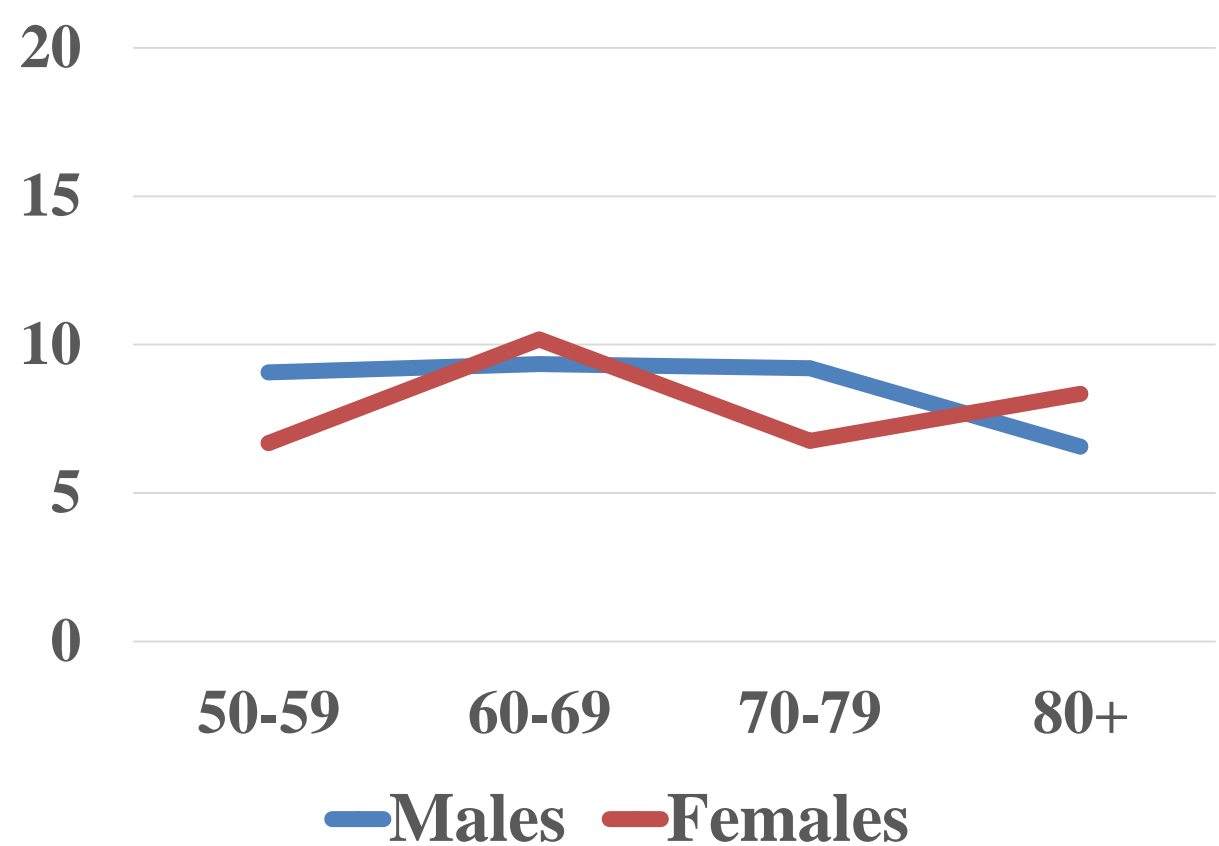


High HbA1c Prevalence (2006/08) and Onset (2006/08 - 2010/12)

Prevalence

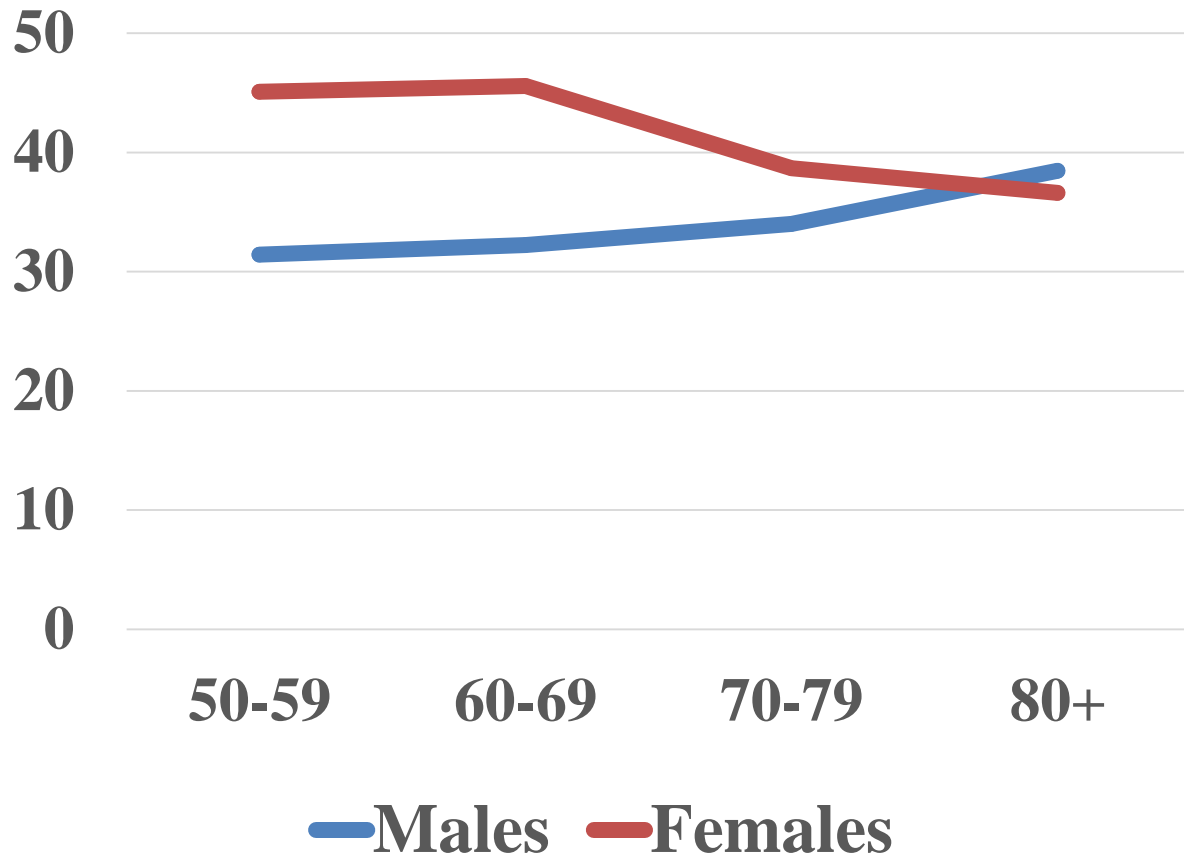


Onset

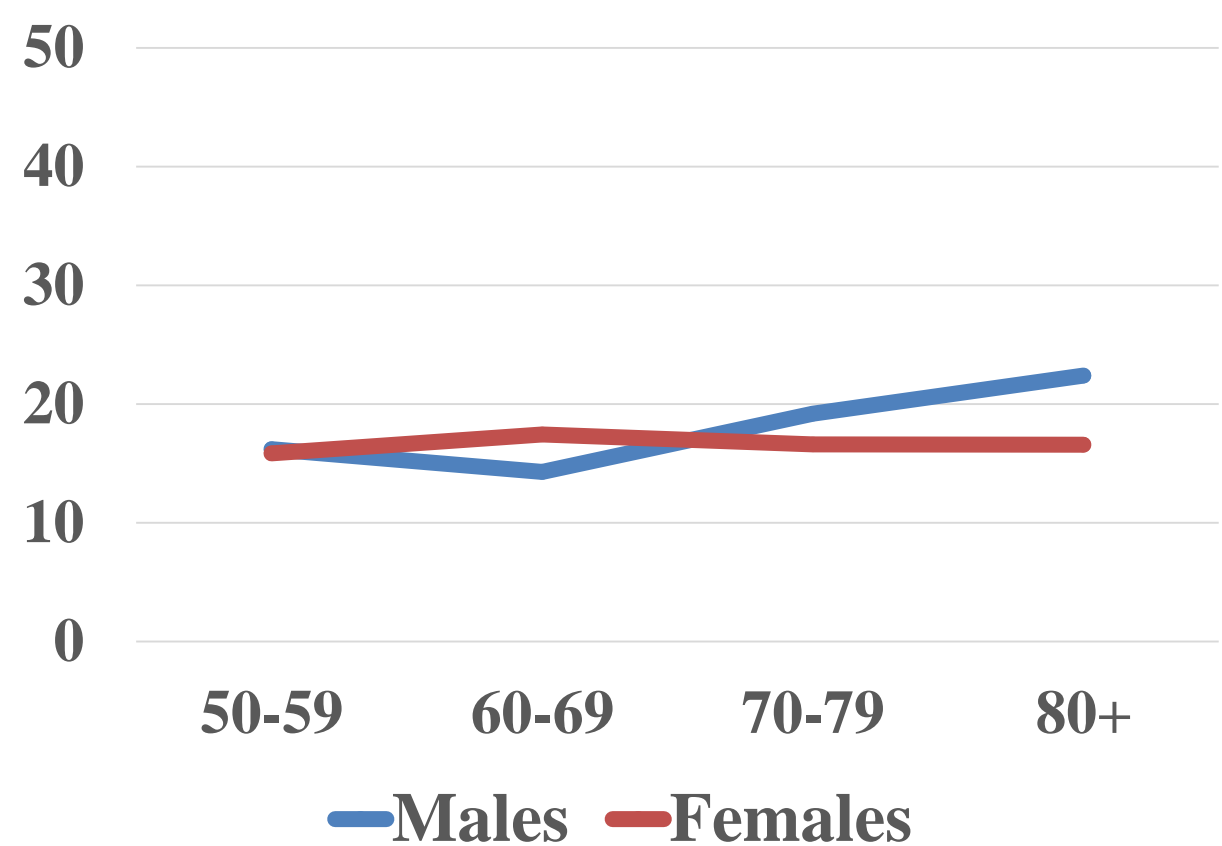


High CRP Prevalence (2006/08) and Onset (2006/08-2010/12)

Prevalence

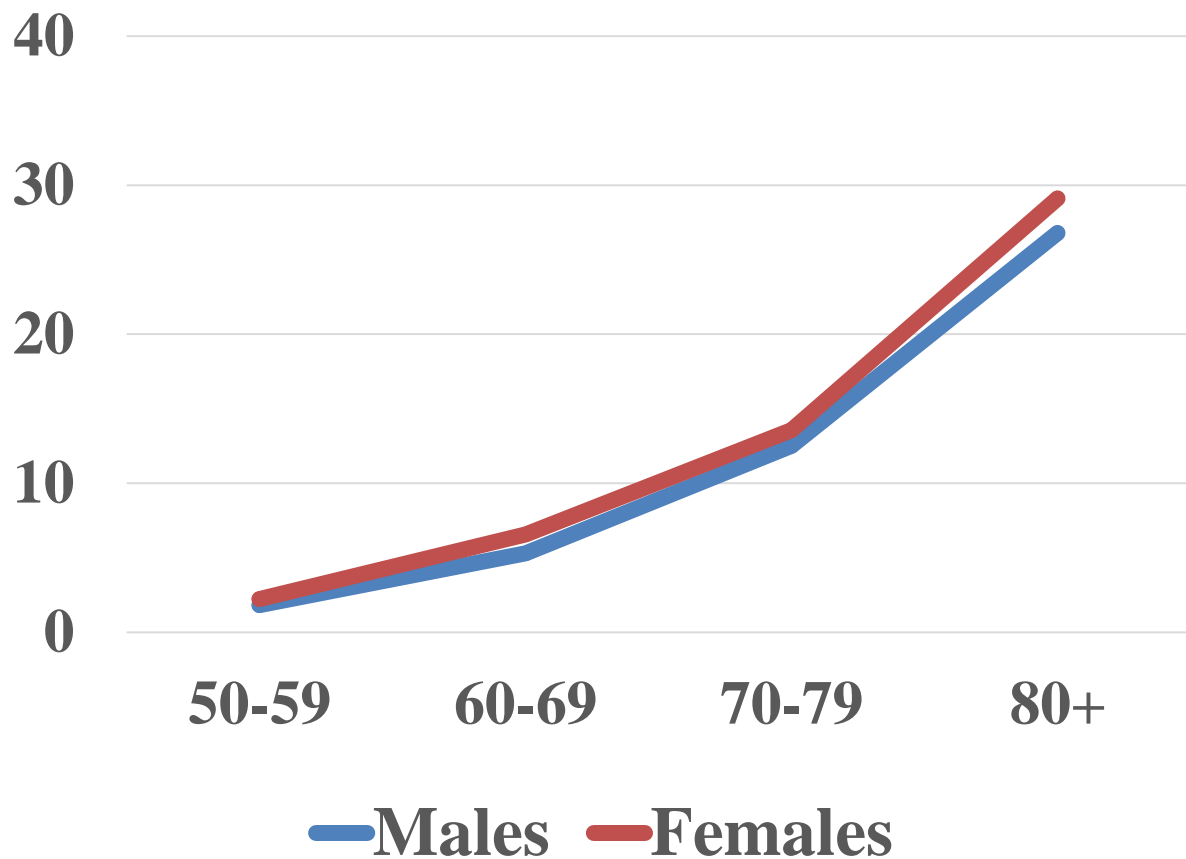


Onset

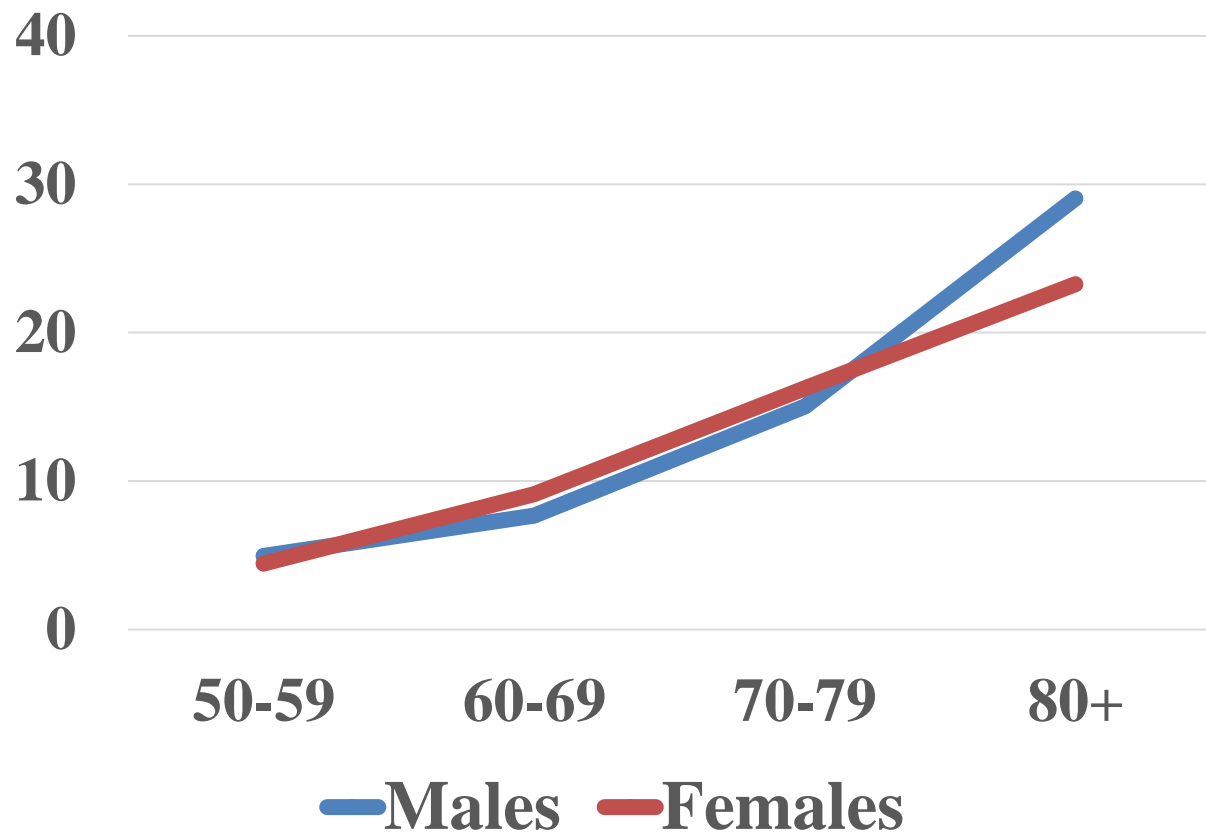


High Cystatin C Prevalence (2006/08) and Onset (2006/08 - 2010/12)

Prevalence



Onset



Sum –

Use NHANES equivalent values.

Even combining the original values across the sample at one wave is not always possible.

NHANES equivalent allows comparisons across studies with similar measurement and use of conventional risk levels.

The HRS future ???

New assays???

New challenges with new methods???

The Health and Retirement Study is supported by NIA U01 AG009740