

Multimorbidity dynamics in Catalonia 2010-2021: A population-based cohort study

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Bilbo

RESEARCH AIM

We aim at documenting & analyzing patterns of multimorbidity in Catalonia for different cohorts by sex and socioeconomic status

More specifically, we want to describe:

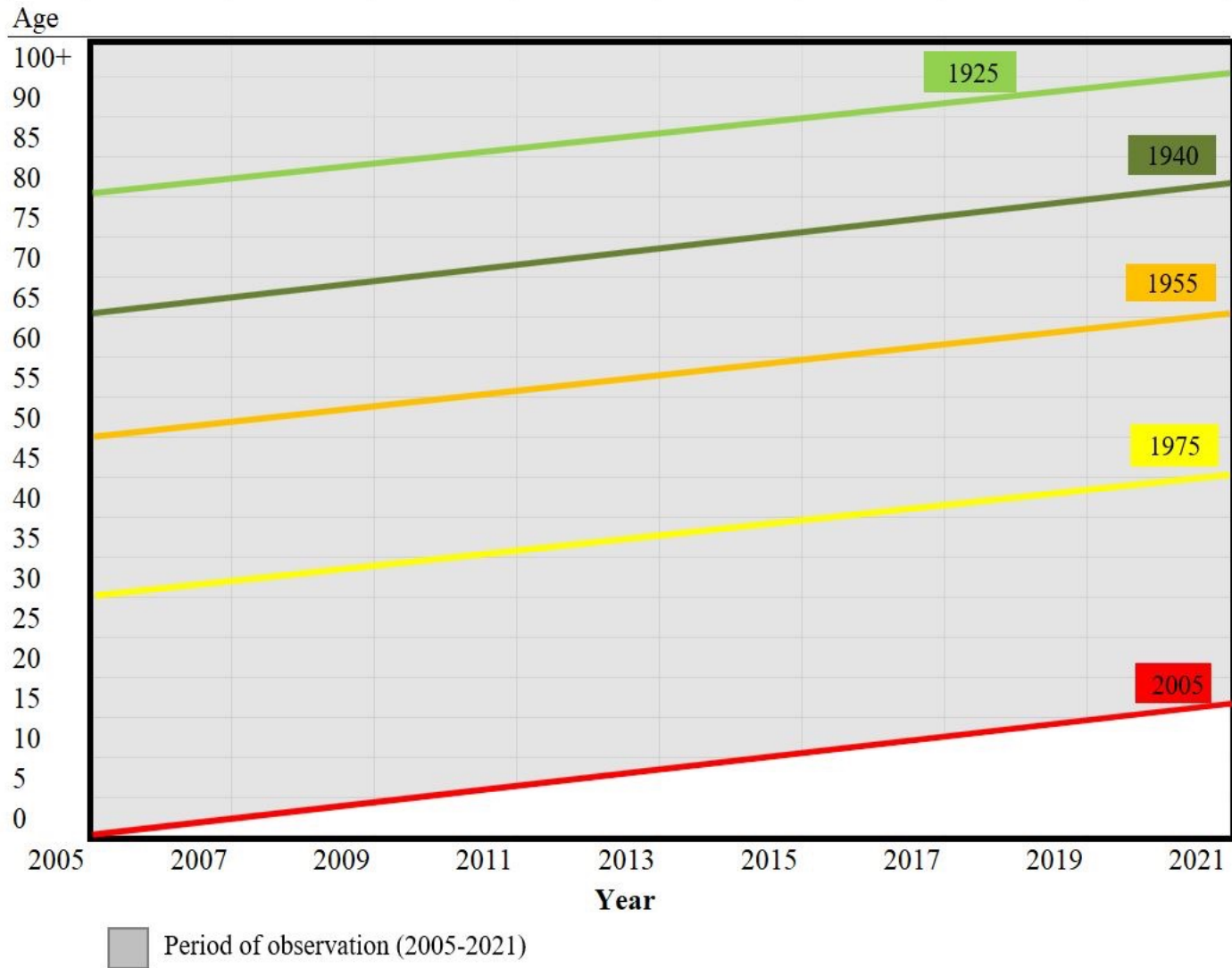
1. Trends in prevalence of multimorbidity
2. Trends in incidence of multimorbidity
3. Differences across SES groups
4. Differences between women and men

DATA: THE HEALIN COHORT

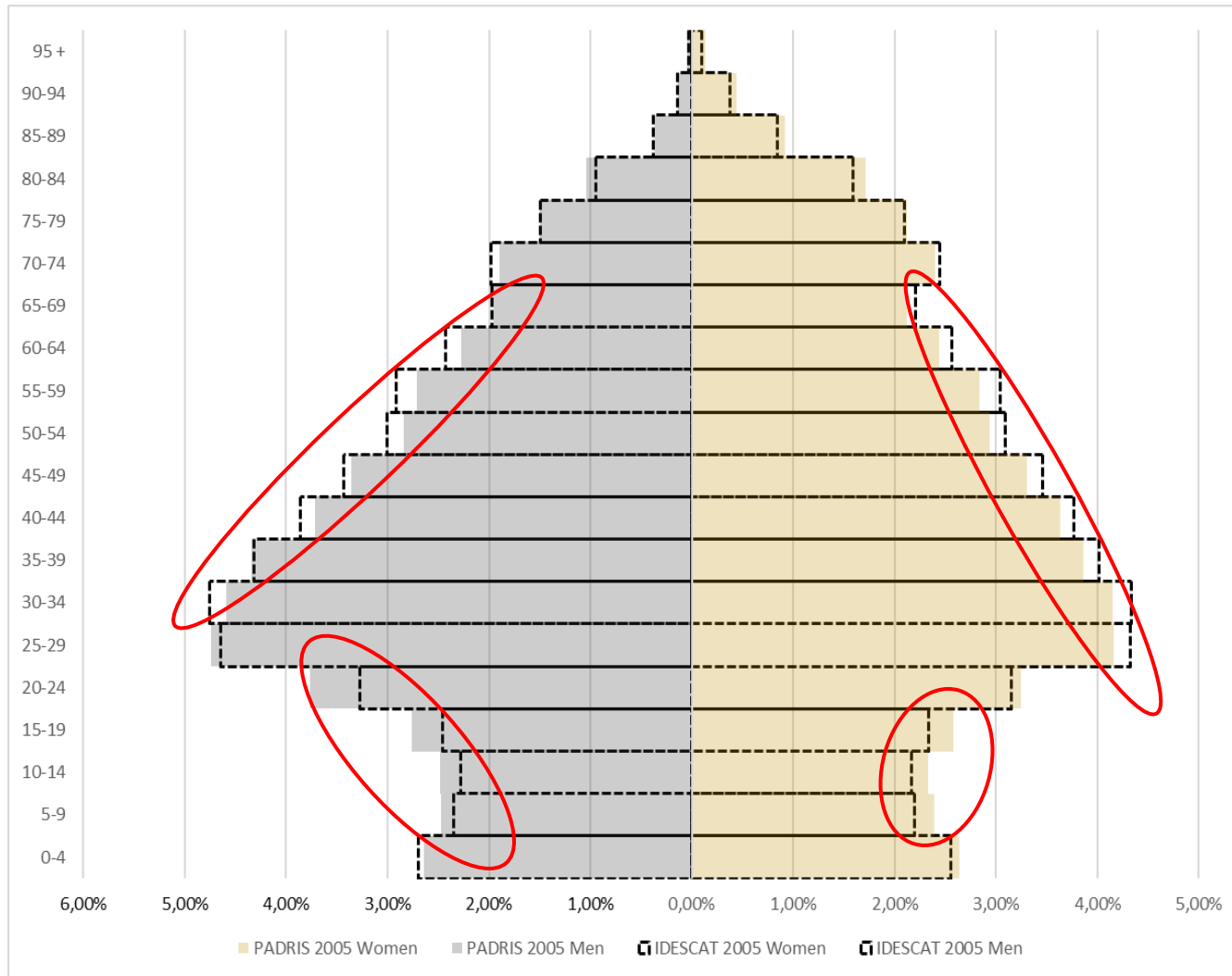
Health & Mortality Register data

- Population-based dataset following a sample of over 1.5 million people in Catalonia (22% of the total) from 2005 onwards
- Information from Primary Care (CAPs) and hospitalizations
- Representative of the whole Catalan population in 2005 according to age, sex & health regions

THE HEALIN COHORT ON A LEXIS DIAGRAM



DATA: THE HEALIN COHORT



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Health & Mortality Register data

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Setting:

- 2010-2021 (washout period 2005-2009)
- 48 groups of diseases from GP diagnostics
- Mortality (age at death & cause of death)
- Basic (2+) and complex (3+) multimorbidity

LIST OF DISEASES

Table A1. Original demographic and health variables available in the HEALIN cohort for each individual

Type of variable	Variables	ICD-10 Codes
Demographic variables	Date of birth, sex, nationality, health region, health sector, basic health areas, deaths	
Health measures	HIV/AIDS	B20-B24
	Malignant tumours	C00-C97
	Anemia	D50-D64
	Thyroid disorders	E00-E07
	Diabetes	E10-E14
	Obesity	E66
	Lipoprotein and other lipid metabolism disorders (high blood cholesterol)	E78
	Mental retardation	F70-F79
	Depression	F32-F33
	Anxiety	F40-F43
	Schizophrenia	F20-F21
	Dementia, Alzheimer's disease and brain degeneration	F00-F03, G30, G31
	Parkinson's disease	G20-G22
	Multiple Sclerosis	G35
	Epilepsy	G40-G41
	Migraines	G43
	Neuropathies	G50-G64, B02.2
	Blindness, glaucoma and macular degeneration	H54, H40, H35.3
	Hearing loss and vertigo	H90-H91, H81-H82
	Chronic rheumatic diseases of the heart	I05-I09
	Hypertensive diseases	I10-I15
	Ischemic heart diseases	I20-I25
	Atrial fibrillation	I48
	Heart failure	I50
	Peripheral arterial and venous vascular disease	I70.2, I72.4, I73, I74.2-I74.4, I80.2, I80.3, I83
	Cerebrovascular diseases	I60-I69
	Other diseases of the heart and circulatory system	I00-I02, I26-I47, I49, I51-I52, I70.1, I70.8, I70.9, I71-I72, I74.1, I74.5-I74.9, I77.0-I77.5, I77.9, I78-179, I801, I80.8, I81-182, I86-I99
	Chronic diseases of the lower respiratory tract	J40-J45, J47
	Pneumoconiosis and hypersensitivity pneumonitis	J60-J67.9, J92
	Pulmonary fibrosis	J84.1
	Chronic ulcer/gastritis	K22.1, K25-K28, K29.3-K2
	Inflammatory bowel disease	K50-K51
	Intestinal diverticular disease	K57
Chronic hepatitis B and C and cirrhosis	B18, K70, K73, K74, K76.0, K76.6, I85	
Decubitus and/or pressure ulcers	L89	
Inflammatory arthropathies: Rheumatoid arthritis, Psoriatic arthropathy, Gout and depositional arthropathy	M05-M14, L40.5	
Arthrosis and spondyloarthrosis	M15-M19, M45-M55	

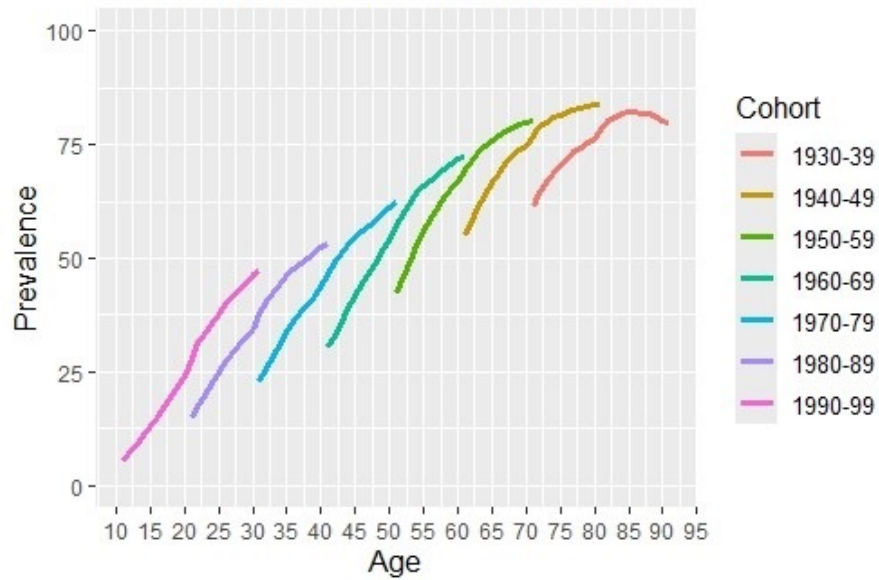
THE HEALIN COHORT: SES VARIABLES

- Income brackets
 - <18.000
 - 18.000-100.000
 - >100.000
- Educational attainment

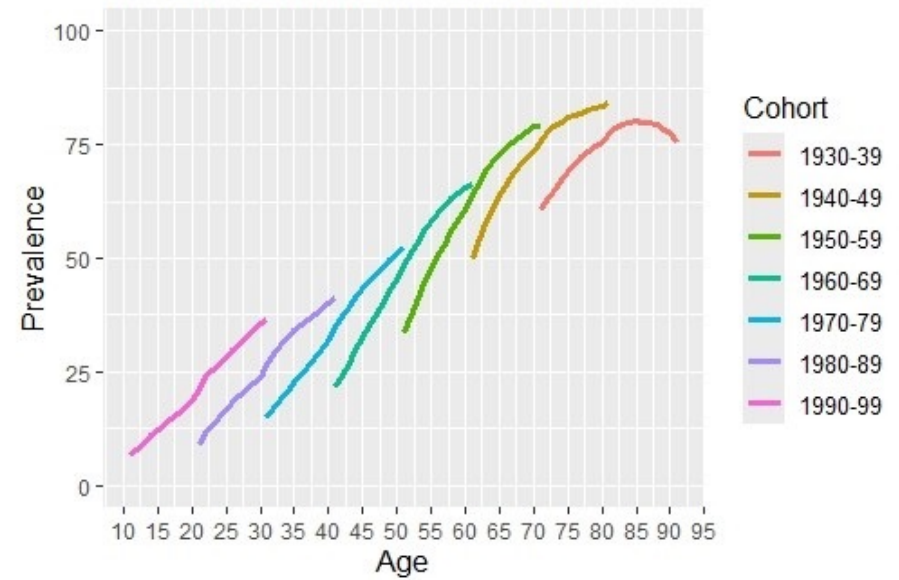


FINDINGS: PREVALENCE OF MULTIMORBIDITY

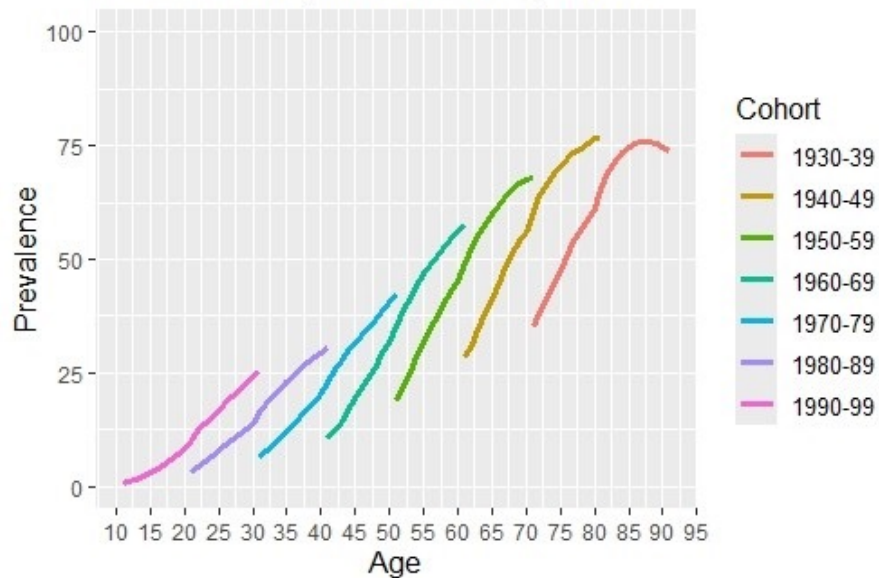
Prevalence basic multimorbidity-Women



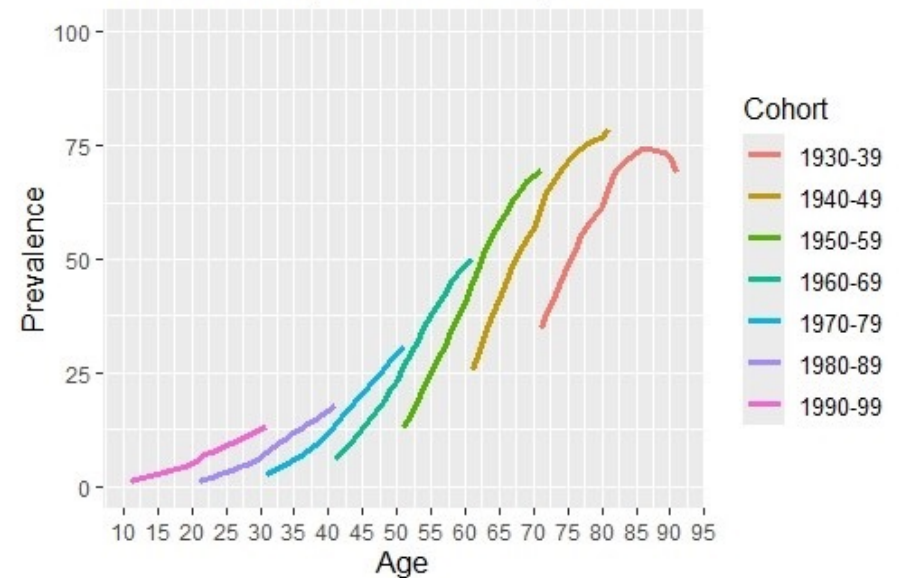
Prevalence basic multimorbidity-Men



Prevalence complex multimorbidity-Women

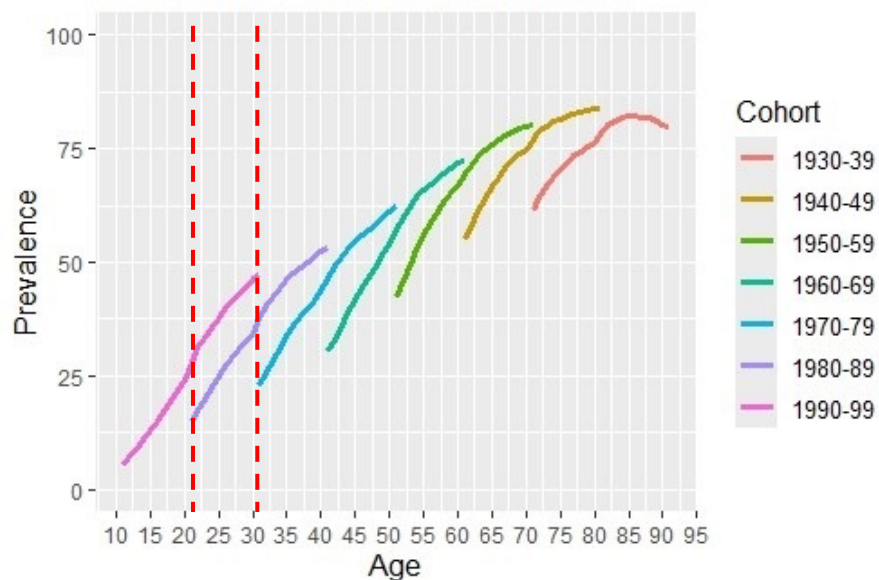


Prevalence complex multimorbidity-Men

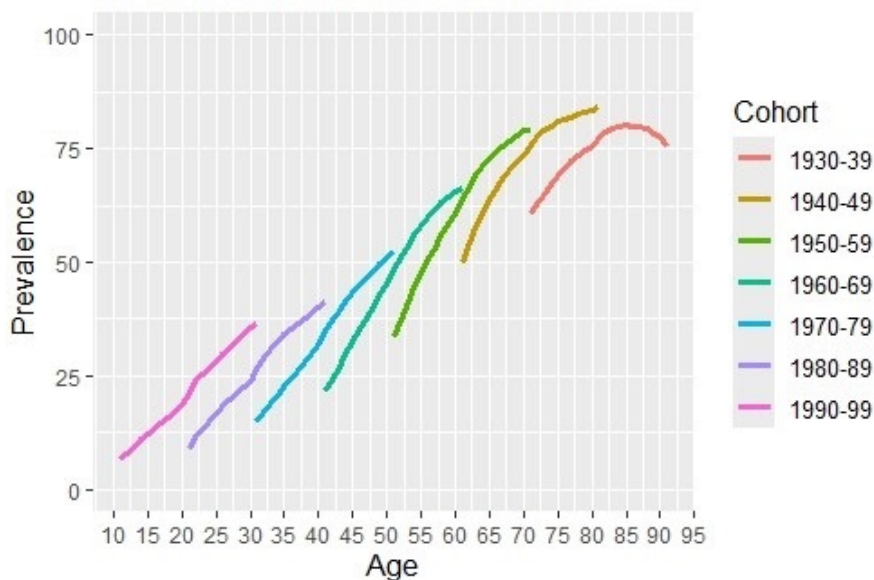


FINDINGS: PREVALENCE OF MULTIMORBIDITY

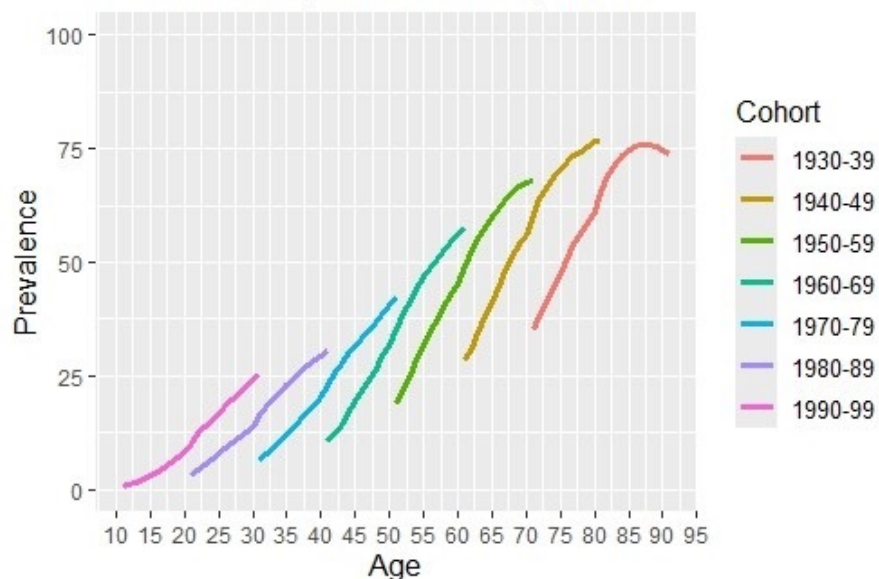
Prevalence basic multimorbidity-Women



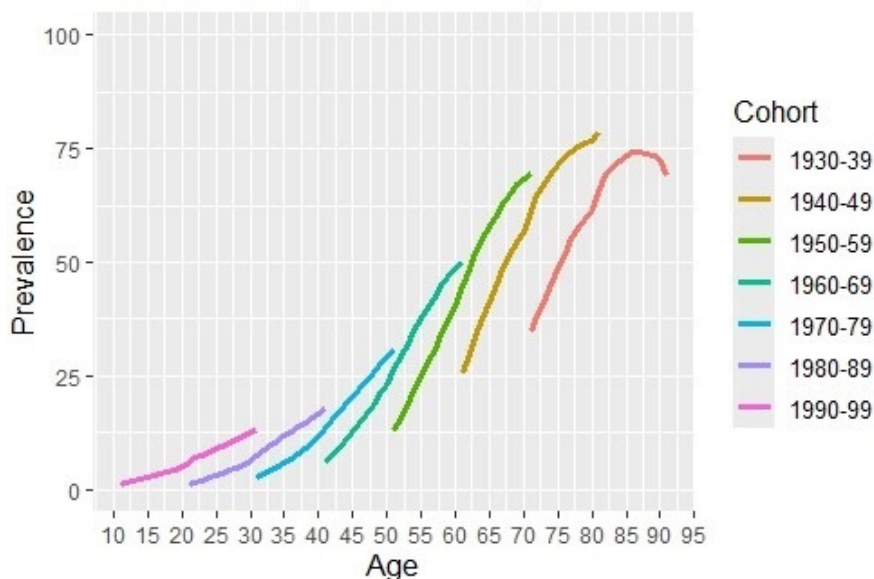
Prevalence basic multimorbidity-Men



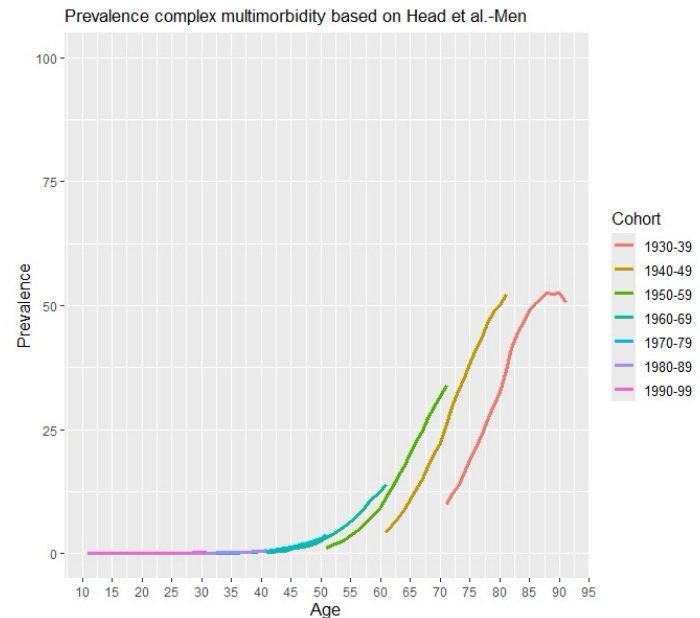
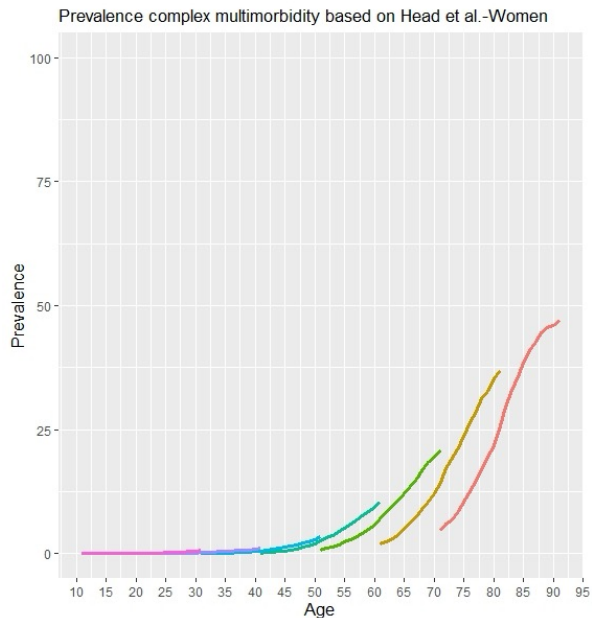
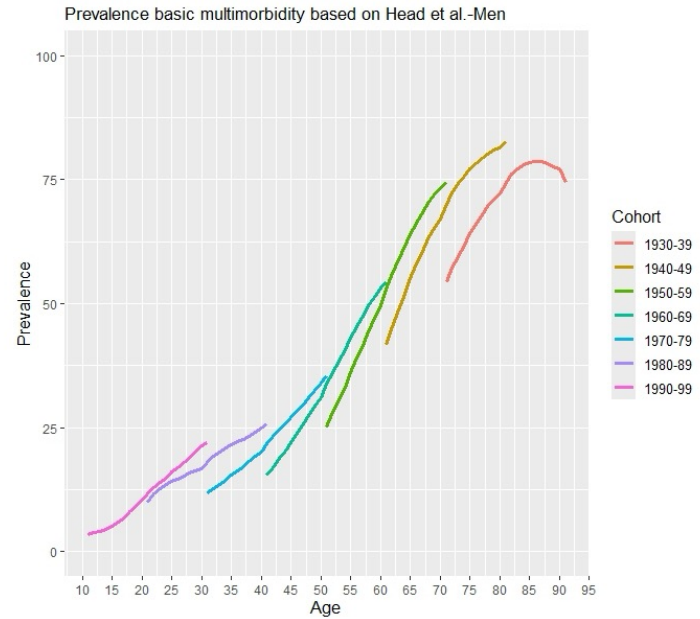
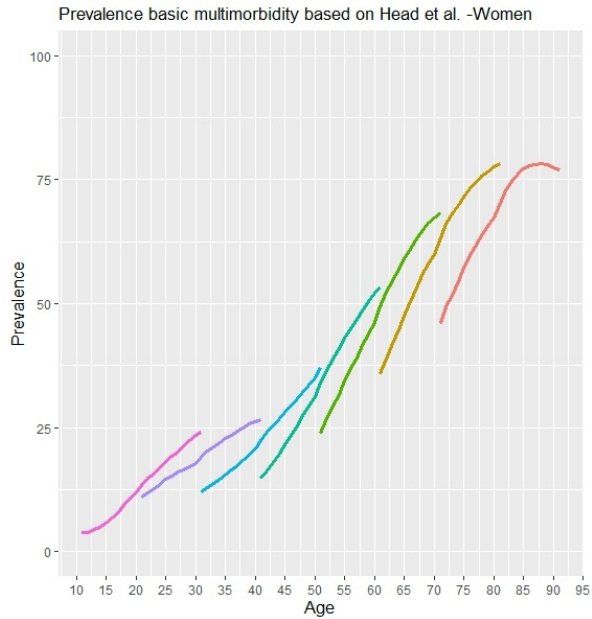
Prevalence complex multimorbidity-Women



Prevalence complex multimorbidity-Men



PREVALENCE WITH ALTERNATIVE DEFINITIONS



THE MOST PREVALENT CONDITIONS

Rank	1930-39 Cohort	1940-49 Cohort	1950-59 Cohort	1960-69 Cohort	1970-79 Cohort	1980-89 Cohort	1990-99 Cohort
1	Dorsalgia (Back Pain) (4.9%)	Dorsalgia (Back Pain) (6.1%)	Dorsalgia (Back Pain) (7.8%)	Dorsalgia (Back Pain) (10.3%)	Dorsalgia (Back Pain) (15.1%)	Dorsalgia (Back Pain) (17.5%)	Dorsalgia (Back Pain) (13.9%)
2	Essential (Primary) Hypertension (4.3%)	Essential (Primary) Hypertension (5.0%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (6.1%)	Other Anxiety Disorders (5.7%)	Other Anxiety Disorders (8.4%)	Other Anxiety Disorders (10.3%)	Other Anxiety Disorders (9.8%)
3	Disorders of Lipoprotein Metabolism and Other Lipidemias (3.4%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (4.8%)	Essential (Primary) Hypertension (5.2%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (5.7%)	Other and Unspecified Soft Tissue Disorders, Not Elsewhere Classified (5.2%)	Nicotine Dependence (6.8%)	Other and Unspecified Soft Tissue Disorders, Not Elsewhere Classified (7.6%)
4	Chronic Kidney Disease (CKD) (3.1%)	Overweight and Obesity (3.9%)	Overweight and Obesity (4.5%)	Other and Unspecified Soft Tissue Disorders, Not Elsewhere Classified (4.8%)	Nicotine Dependence (4.9%)	Other and Unspecified Soft Tissue Disorders, Not Elsewhere Classified (5.6%)	Overweight and Obesity (5.6%)
5	Overweight and Obesity (2.7%)	Other and Unspecified Soft Tissue Disorders, Not Elsewhere Classified (3.3%)	Other and Unspecified Soft Tissue Disorders, Not Elsewhere Classified (3.9%)	Overweight and Obesity (4.7%)	Overweight and Obesity (4.5%)	Overweight and Obesity (3.8%)	Nicotine Dependence (4.7%)
6	Other and Unspecified Soft Tissue Disorders, Not Elsewhere Classified (2.5%)	Other Anxiety Disorders (2.5%)	Other Anxiety Disorders (3.7%)	Essential (Primary) Hypertension (4.3%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (3.8%)	Hypertensive Heart and Chronic Kidney Disease (3.6%)	Hypertensive Heart and Chronic Kidney Disease (4.5%)
7	Atrial Fibrillation and Flutter (2.2%)	Shoulder Lesions (2.4%)	Shoulder Lesions (2.8%)	Nicotine Dependence (3.8%)	Other Enthesopathies (Disorders of Ligament or Tendon Attachments) (3.4%)	Other Disorders of Muscle (3.6%)	Other Disorders of Muscle (4.0%)
8	Unspecified Diabetes Mellitus (2.1%)	Unspecified Diabetes Mellitus (2.4%)	Other Enthesopathies (Disorders of Ligament or Tendon Attachments) (2.4%)	Other Enthesopathies (Disorders of Ligament or Tendon Attachments) (3.5%)	Other Disorders of Muscle (2.8%)	Other Enthesopathies (Disorders of Ligament or Tendon Attachments) (2.8%)	Asthma (3.3%)
9	Osteoarthritis of Knee (2.1%)	Enlarged Prostate (Benign Prostatic Hyperplasia) (2.2%)	Nicotine Dependence (2.4%)	Shoulder Lesions (2.8%)	Essential (Primary) Hypertension (2.3%)	Migraine (2.3%)	Other Enthesopathies (Disorders of Ligament or Tendon Attachments) (3.3%)
10	Other Heart Disorders in Diseases Classified Elsewhere (2.0%)	Osteoarthritis of Knee (2.1%)	Unspecified Diabetes Mellitus (2.3%)	Major Depressive Disorder, Single Episode (2.1%)	Major Depressive Disorder, Single Episode (2.3%)	Disorders of Lipoprotein Metabolism and Other Lipidemias	Migraine (2.8%)

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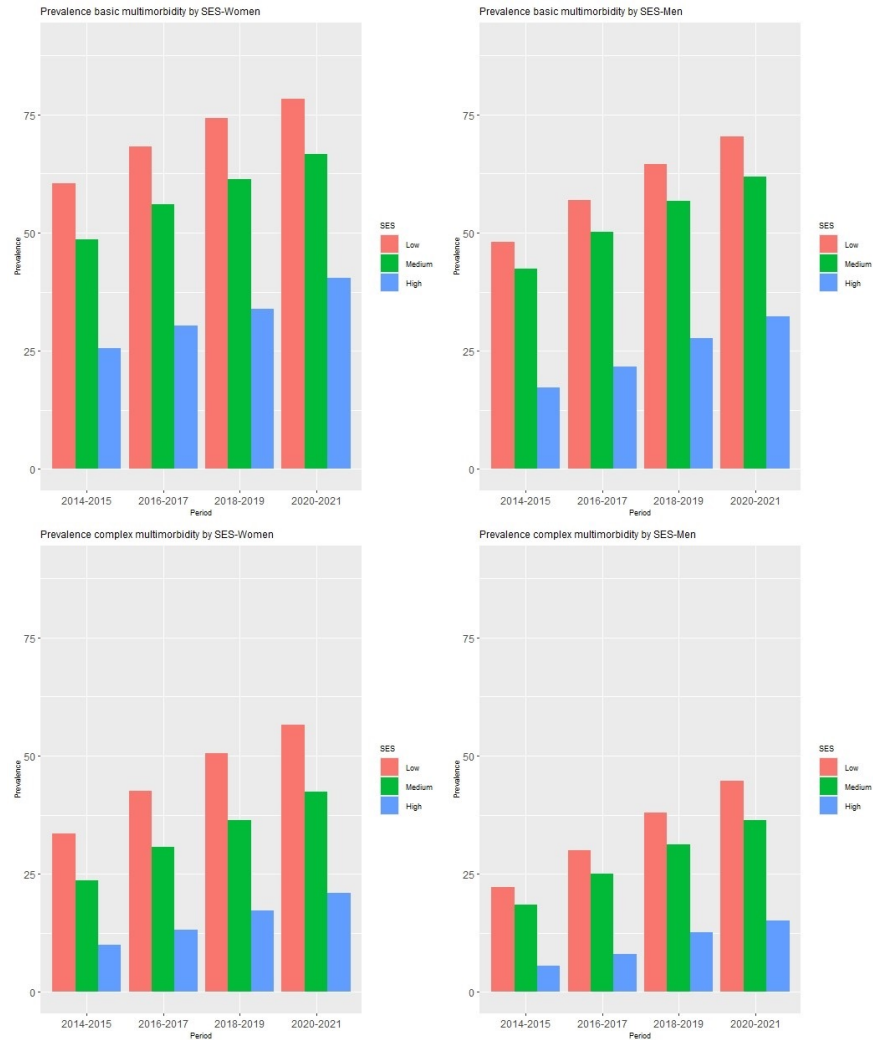
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SES DIFFERENCES IN M-M PREVALENCE

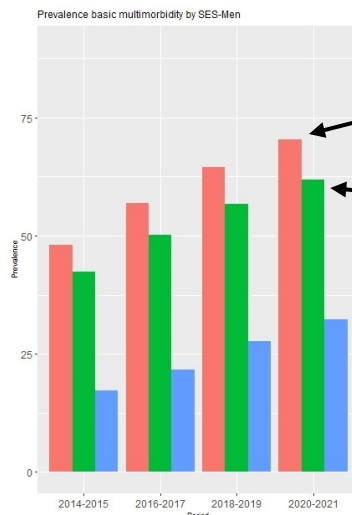
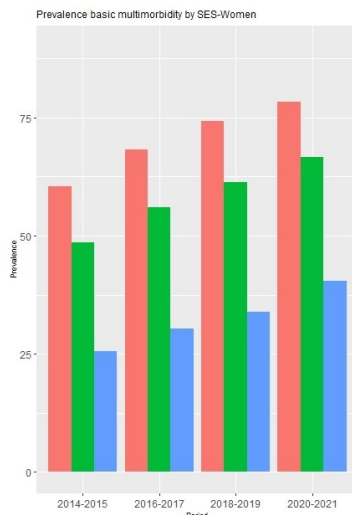


SES DIFFERENCES IN M-M PREVALENCE

Women

Men

Basic MM

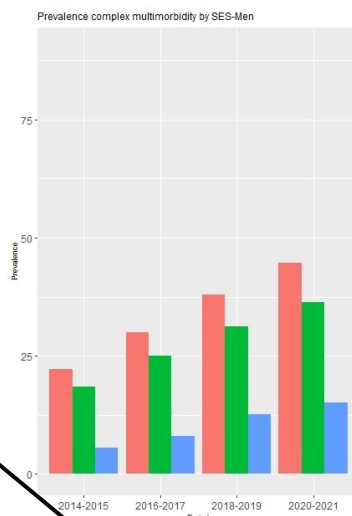
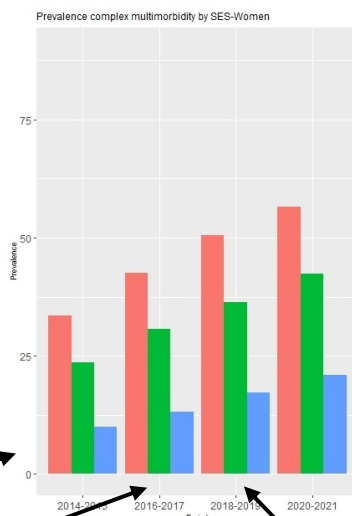


Low-income

Middle-income

High-income

Complex MM



2014-15

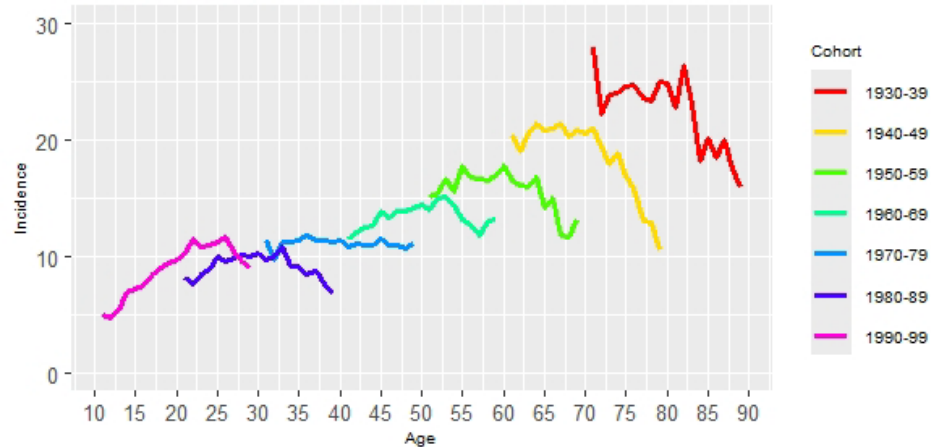
2016-17

2018-19

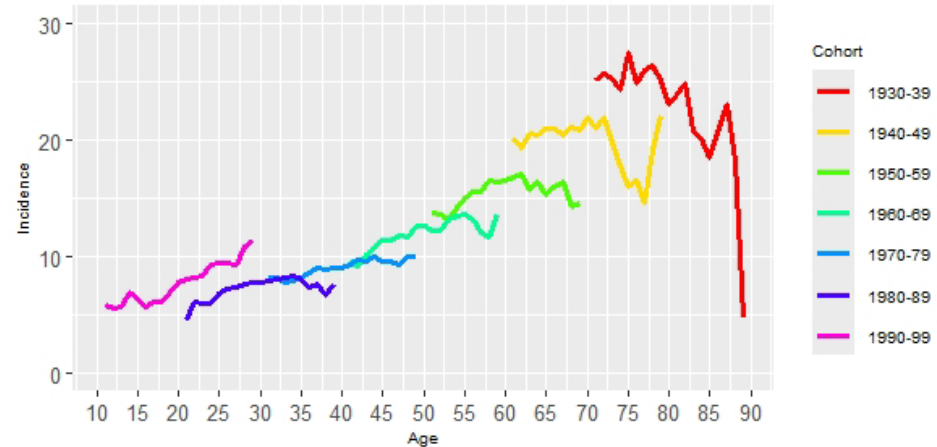
2020-21

FINDINGS: INCIDENCE OF MULTIMORBIDITY

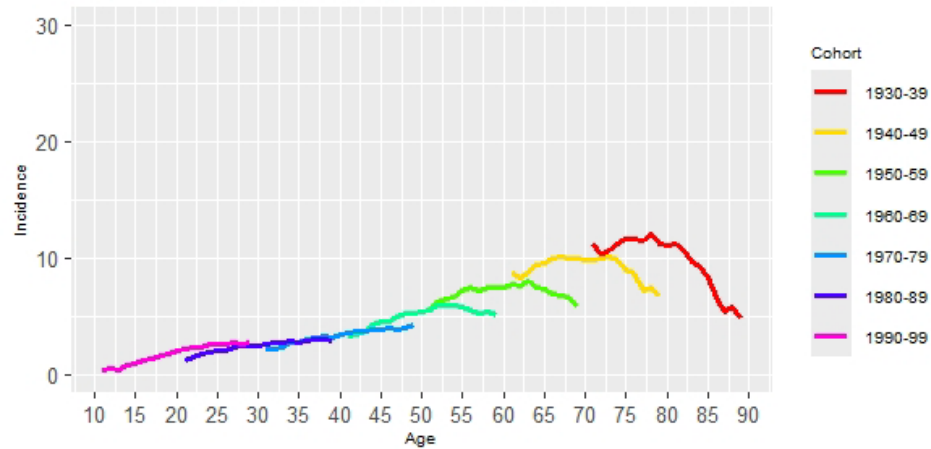
Incidence basic multimorbidity by cohort-Women



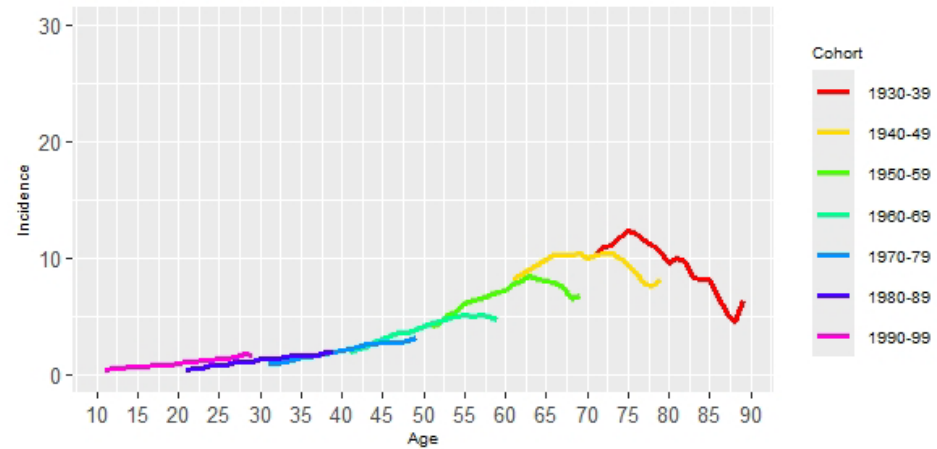
Incidence basic multimorbidity by cohort-Men



Incidence complex multimorbidity by cohort-Women



Incidence complex multimorbidity by cohort-Men

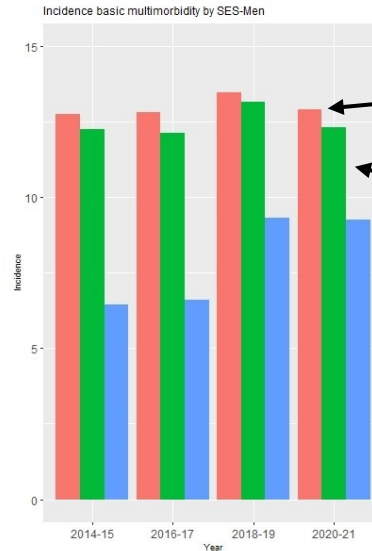
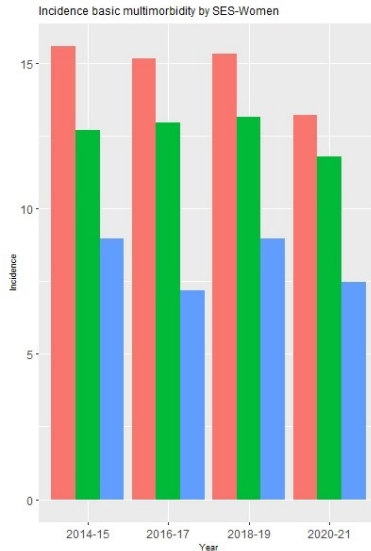


INCIDENCE OF M-M: SES DIFFERENCES

Women

Men

Basic MM

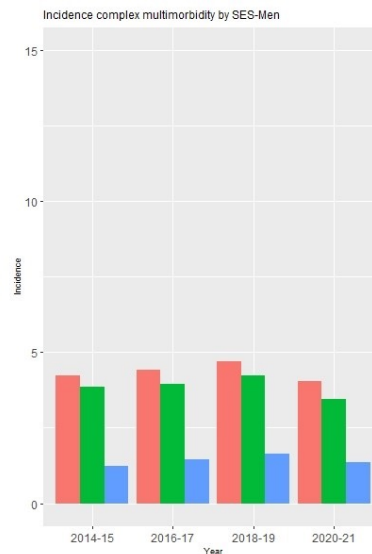
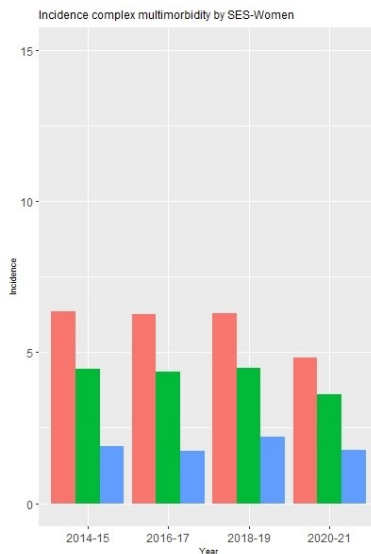


Low-income

Middle-income

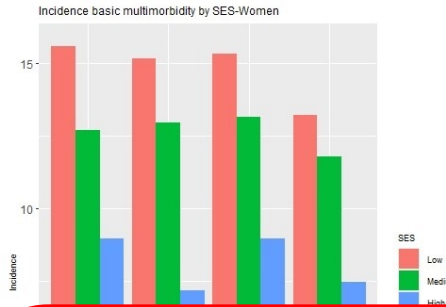
High-income

Complex MM

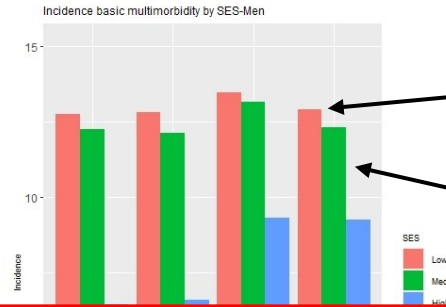


INCIDENCE OF M-M: SES DIFFERENCES

Women



Men



Low-income

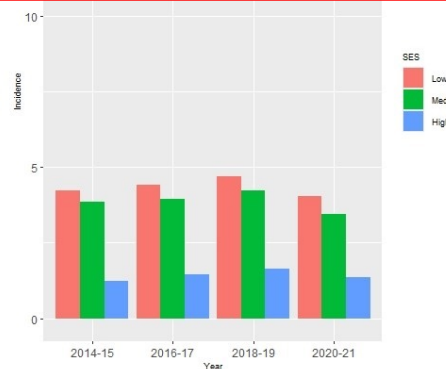
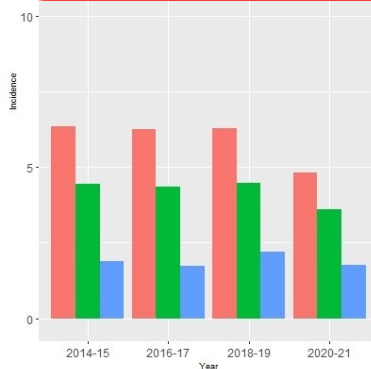
Middle-income

Basic MM

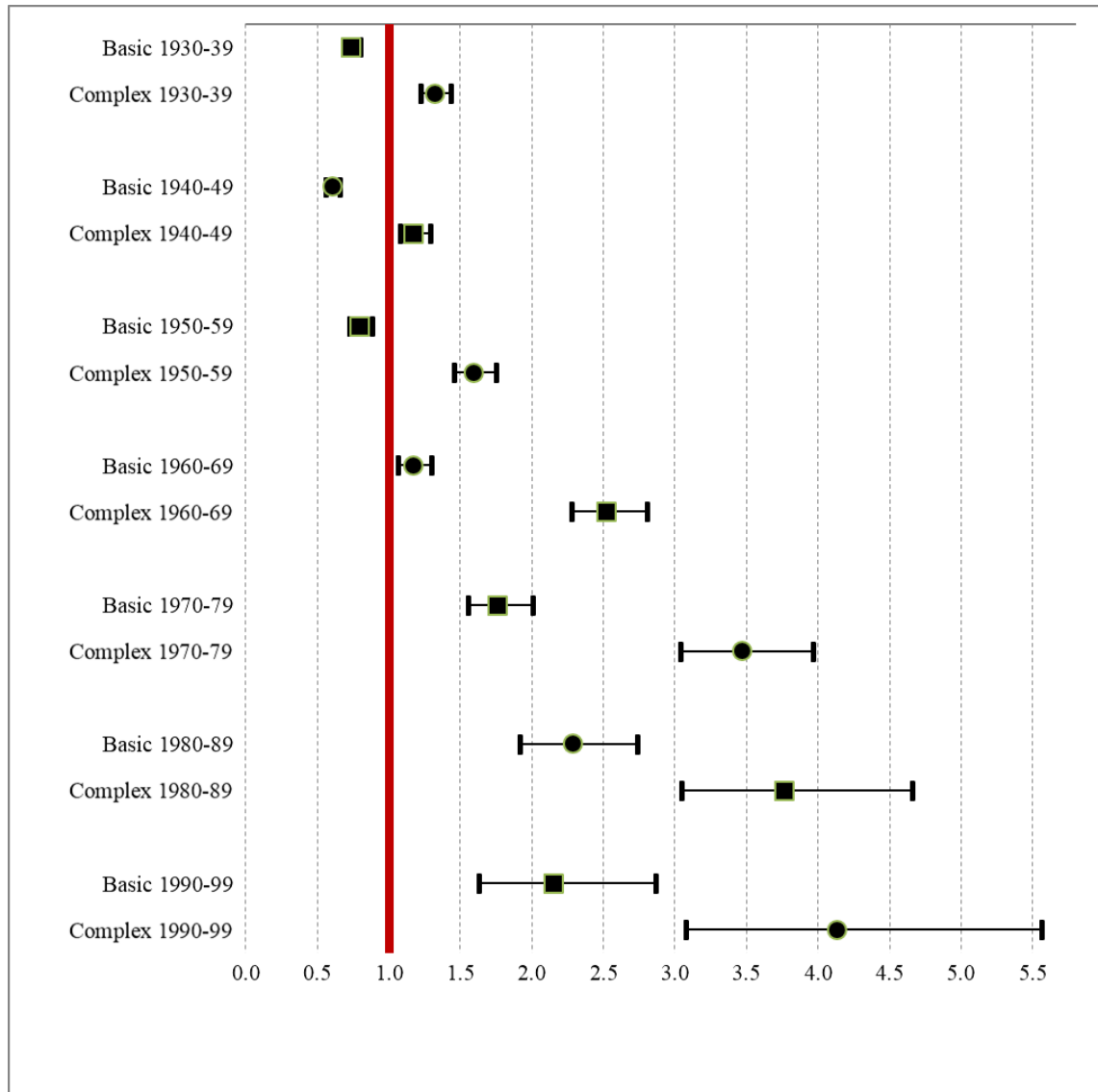
Clear SES gradient: Lower SES individuals experiencing higher prevalence and incidence of multimorbidity

High-income

Complex MM



MORTALITY RISKS



Logistic regression coefficients for the relative risk of dying for individuals experiencing basic and complex multimorbidity

SUMMARY/CONCLUSION

- Increases in multimorbidity in Catalonia since 2010 (in line with other studies in the US, UK, Canada, Scotland, the Netherlands, Sweden,...)
- Each generation ages with worse multimorbidity outcomes than the previous generation did some years ago
- Women experiencing more multimorbidity than men
- Multi-morbidity increases the risk of mortality
- Clear socio-economic gradient
 - Low-income individuals experiencing worse MM outcomes
 - ⇒ Policies can delay or prevent the onset of MM

DISCUSSION

- Why?
 - Worsening of health conditions? Health-seeking behavior? Improvements in detection technologies? Screening campaigns?
- Mental health, increasingly prominent among younger generations
- Increasing complexity of multimorbid profiles as individuals age
 - Implications for public health planning

Thanks for
your attention

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THE MOST PREVALENT CONDITIONS: WOMEN

Rank	1930-39 Cohort	1940-49 Cohort	1950-59 Cohort	1960-69 Cohort	1970-79 Cohort	1980-89 Cohort	1990-99 Cohort
1	Dorsalgia (Back Pain) (5.2%)	Dorsalgia (Back Pain) (6.7%)	Dorsalgia (Back Pain) (8.3%)	Dorsalgia (Back Pain) (10.4%)	Dorsalgia (Back Pain) (15.5%)	Dorsalgia (Back Pain) (17.9%)	Dorsalgia (Back Pain) (14%)
2	Essential (Primary) Hypertension (4.2%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (5%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (6.3%)	Other Anxiety Disorders (6.6%)	Other Anxiety Disorders (9.2%)	Other Anxiety Disorders (11.1%)	Other Anxiety Disorders (10.9%)
3	Disorders of Lipoprotein Metabolism and Other Lipidemias (3.6%)	Essential (Primary) Hypertension (4.7%)	Other Anxiety Disorders (4.7%)	Other and Unspecified Soft Tissue Disorders (5.3%)	Other and Unspecified Soft Tissue Disorders (5.1%)	Nicotine Dependence (5.5%)	Other and Unspecified Soft Tissue Disorders (6.9%)
4	Chronic Kidney Disease (3.1%)	Overweight and Obesity (4%)	Other and Unspecified Soft Tissue Disorders (4.5%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (4.8%)	Overweight and Obesity (4.1%)	Other and Unspecified Soft Tissue Disorders (5%)	Overweight and Obesity (5.2%)
5	Overweight and Obesity (2.9%)	Other and Unspecified Soft Tissue Disorders (3.8%)	Essential (Primary) Hypertension (4.4%)	Overweight and Obesity (4.2%)	Nicotine Dependence (3.8%)	Overweight and Obesity (3.9%)	Hypertensive Heart and Chronic Kidney Disease (5%)
6	Other and Unspecified Soft Tissue Disorders (2.7%)	Other Anxiety Disorders (3.2%)	Overweight and Obesity (4.3%)	Other Enthesopathies (3.7%)	Iron Deficiency Anemia (3.5%)	Hypertensive Heart and Chronic Kidney Disease (3.7%)	Nicotine Dependence (4.1%)
7	Osteoarthritis of Knee (2.5%)	Shoulder Lesions (2.9%)	Shoulder Lesions (3.1%)	Essential (Primary) Hypertension (3.2%)	Other Enthesopathies (3.3%)	Other Disorders of Muscle (3.4%)	Other Disorders of Muscle (3.9%)
8	Other Anxiety Disorders (2.4%)	Osteoarthritis of Knee (2.6%)	Other Enthesopathies (2.7%)	Nicotine Dependence (3.1%)	Other Disorders of Muscle (2.9%)	Iron Deficiency Anemia (3.1%)	Migraine (3.5%)
9	Other and Unspecified Osteoarthritis (2.3%)	Other and Unspecified Osteoarthritis (2.4%)	Major Depressive Disorder (2.2%)	Shoulder Lesions (3%)	Major Depressive Disorder (2.6%)	Migraine (3%)	Iron Deficiency Anemia (3.5%)
10	Shoulder Lesions (2.1%)	Unspecified Diabetes Mellitus (2%)	Other and Unspecified Osteoarthritis (2%)	Iron Deficiency Anemia (2.6%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (2.4%)	Other Enthesopathies (2.5%)	Other Enthesopathies (3%)

THE MOST PREVALENT CONDITIONS: MEN

Rank	1930-39 Cohort	1940-49 Cohort	1950-59 Cohort	1960-69 Cohort	1970-79 Cohort	1980-89 Cohort	1990-99 Cohort
1	Dorsalgia (Back Pain) (4.4%)	Dorsalgia (Back Pain) (5.5%)	Dorsalgia (Back Pain) (7.2%)	Dorsalgia (Back Pain) (10.3%)	Dorsalgia (Back Pain) (14.7%)	Dorsalgia (Back Pain) (17%)	Dorsalgia (Back Pain) (13.8%)
2	Essential (Primary) Hypertension (4.3%)	Essential (Primary) Hypertension (5.4%)	Essential (Primary) Hypertension (6.1%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (6.8%)	Other Anxiety Disorders (7.3%)	Other Anxiety Disorders (9.3%)	Other and Unspecified Soft Tissue Disorders (8.6%)
3	Enlarged Prostate (Benign Prostatic Hyperplasia) (4.1%)	Enlarged Prostate (Benign Prostatic Hyperplasia) (4.6%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (6%)	Essential (Primary) Hypertension (5.6%)	Nicotine Dependence (6.3%)	Nicotine Dependence (8.4%)	Other Anxiety Disorders (8.4%)
4	Disorders of Lipoprotein Metabolism and Other Lipidemias (3.1%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (4.6%)	Overweight and Obesity (4.8%)	Overweight and Obesity (5.3%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (5.6%)	Other and Unspecified Soft Tissue Disorders (6.2%)	Overweight and Obesity (6.1%)
5	Chronic Kidney Disease (3.1%)	Overweight and Obesity (3.8%)	Enlarged Prostate (Benign Prostatic Hyperplasia) (3.7%)	Nicotine Dependence (4.8%)	Other and Unspecified Soft Tissue Disorders (5.3%)	Other Disorders of Muscle (3.8%)	Nicotine Dependence (5.5%)
6	Atrial Fibrillation and Flutter (2.5%)	Unspecified Diabetes Mellitus (3%)	Other and Unspecified Soft Tissue Disorders (3.2%)	Other Anxiety Disorders (4.6%)	Overweight and Obesity (5%)	Overweight and Obesity (3.7%)	Other Disorders of Muscle (4.1%)
7	Overweight and Obesity (2.4%)	Other and Unspecified Soft Tissue Disorders (2.7%)	Nicotine Dependence (3.2%)	Other and Unspecified Soft Tissue Disorders (4.2%)	Other Enthesopathies (3.5%)	Hypertensive Heart and Chronic Kidney Disease (3.5%)	Asthma (4%)
8	Unspecified Diabetes Mellitus (2.4%)	Nicotine Dependence (2%)	Unspecified Diabetes Mellitus (3.2%)	Other Enthesopathies (3.2%)	Essential (Primary) Hypertension (3.1%)	Other Enthesopathies (3.2%)	Hypertensive Heart and Chronic Kidney Disease (3.9%)
9	Other and Unspecified Soft Tissue Disorders (2.2%)	Shoulder Lesions (2%)	Other Anxiety Disorders (2.7%)	Shoulder Lesions (2.4%)	Other Disorders of Muscle (2.7%)	Disorders of Lipoprotein Metabolism and Other Lipidemias (2.9%)	Other Enthesopathies (3.6%)
10	Other Heart Disorders in Diseases Classified (2.1%)	Chronic Kidney Disease (1.9%)	Shoulder Lesions (2.4%)	Unspecified Diabetes Mellitus (2.3%)	Shoulder Lesions (2.3%)	Asthma (2%)	Other and Unspecified Arthropathy (Joint Disorders) (2.4%)