

Appendix 4: Key study characteristics (n=41)

First Author (Year)	Country	Participants		SDoH Exposure(s)		Multimorbidity Outcome(s)		
		No.	Age range	SDoH Investigated	Method of data collection	Definition ^a	No. of conditions	Method of data collection
<i>Cross-sectional studies</i>								
Agborsangaya (2012) ⁶¹	Canada	4980	≥18	Household: income, composition	Self-report	Presence of 2 or more chronic conditions	16	Self-report
Agborsangaya (2013) ⁶²	Canada	4803	≥18	Household: income	Self-report	Concurrent occurrence of 2 or more chronic conditions in same individual	16	Self-report
Arbelle (2014) ⁶³	Israel	1972798	0-85+	Area-level: deprivation	Poverty index	2 or more of these morbidities in one patient	40	EHRs screened
Bahler (2015) ⁶⁴	Switzerland	229493	≥65	Area-level: deprivation	Polling data	2 or more chronic conditions in one person	22	EHRs screened
Barnett (2012) ²²	Scotland	1751841	0-85+	Area-level: deprivation	Carstairs index	2 or more morbidities in one patient	40	EHRs screened
Chung (2015) ⁶⁵	Hong Kong	25780	≥15	Household: income, tenure	Self-report	2 or more chronic health conditions	46	Self-report
Foguet-Boreu (2014) ³⁶	Spain	1749710	≥19	Area-level: Rurality	Assigned by researcher	Coexistence of 2 or more chronic diseases	146	EHRs screened
Hayek (2017) ⁶⁸	Israel	4325	≥21	Household: income	Self-report	2 or more physician-diagnosed conditions	10	Self-report
Johnson-Lawrence (2017) ⁶⁹	USA	115097	30-64	Household: income, tenure	Self-report	2 or more conditions	9	Self-report
Laires (2018) ⁴¹	Portugal	15196	25-79	Household: income	Unclear	2 or more of these chronic conditions	13	Self-report
Lebenbaum (2018) ⁶⁶	Canada	288300	≥18	Household: income, tenure Area-level: rurality	Self-report	At least 2 chronic conditions	10	Self-report
Li (2016) ⁴²	England	27806	16-85	Area-level: deprivation	IMD (2010)	At least 2 of the listed conditions	12 (+ 'other')	Self-report
McLean (2014) ⁴⁴	Scotland	1272685	≥25	Area-level: deprivation	Carstairs index	Coexistence of 2 or more chronic conditions	40	EHRs screened

Moin (2018) ⁴⁶	Canada	12516587	≥50	Area-level: deprivation	ON-Marg Index	Co-occurrence of 2+ (and 3+) chronic conditions	18	EHRs screened
Neilsen (2017) ⁴⁸	Multiple	63842	≥50	Household: income	Self-report	Coexistence of 2 or more chronic conditions	12	Self-report
Orueta (2013) ⁵⁰	Spain	452698	≥65	Area-level: deprivation	Deprivation index	Co-occurrence of 2 or more (or 3 or more) health problems	47	EHRs screened
Orueta (2013) ⁴⁹	Spain	2262286	0-75	Area-level: socioeconomic inequality	Deprivation index	Number of chronic conditions	52	EHRs screened
Orueta (2014) ⁵¹	Spain	2262698	0-85	Area-level: deprivation	Deprivation index	Coexistence of 2 or more conditions in the same patient	52	EHRs screened
Prazeres (2015) ⁵²	Portugal	1993	≥18	Household: income, composition Area-level: rurality	Self-report	Presence of ≥2 or ≥3 chronic health problems	147 _a	Self-report + EHRs screened
Roberts (2015) ⁵³	Canada	105416	≥20	Household: income, education level Area-level: rurality	Self-report (unclear for rurality)	2 or more, and 3 or more, chronic diseases	9	Self-report
Ryan (2018) ⁵⁴	Canada	13581191	0-105	Area-level: deprivation	ON-Marg Index	Presence of 3 or more chronic conditions	17	EHRs screened
Sinnott (2015) ⁵⁶	Ireland	2047	50-69	Household: dysfunction in childhood (e.g. divorce)	Self-report	2 or more chronic diseases	20	Self-report
Stanley (2018) ⁵⁷	New Zealand	3489747	≥18	Area-level: deprivation	NZDep index (2013)	At least 2 conditions from 2 different condition lists	61 and 30	EHRs screened
Stokes (2018) ⁶⁷	New Zealand	232	≥35	Area-level: deprivation	NZDep index (year unclear)	Presence of 2 or more morbidities in one patient	31	EHRs screened
Verest (2019) ⁵⁹	Netherlands	22362	18-70	Household: income	Self-report	2 or more chronic diseases	21	Self-report
Violan (2014) ³⁵	Spain	1356761	≥19	Area-level: deprivation	Deprivation index	Coexistence of 2 or more chronic conditions	146 _a	EHRs screened
<i>Longitudinal Studies</i>								
Cantarero-Prieto (2018) ⁷⁰	Multiple	31536	≥50	Household: composition Area-level: rurality	Interviewed (no further details)	3 or more chronic diseases	14	Self-report
Cassell (2018) ⁴	England	403985	≥18	Area-level: deprivation	IMD (year unclear)	2 or more currently active long-term conditions	36	EHRs screened
Charlton (2013) ³⁴	England	282887	≥30	Area-level: deprivation	IMD (2010)	Dual (2 conditions) and triple (3) morbidity	5	EHRs screened

Henchoz (2019) ³⁷	Switzerland	4055	65-70	Household: childhood financial hardship, composition	Self-report	Co-occurrence of 2 or more medical conditions	13	Self-report
Humphreys (2018) ³⁸	England	1979	64-68	Household: paternal social class at birth (based on occupation)	Self-report	Total number of multi-morbid conditions	10	Self-report
Johnston (2019) ⁷²	Scotland	6561	N/A	Household: paternal social class at birth (based on occupation)	Self-report	2 or more self-reported conditions	N/A	Self-report
Katikireddi (2017) ³⁹	Scotland	10083	18-75	Household: income Area-level: deprivation	Self-report and Carstairs index	2 or more of the relevant conditions	40	Self-report
Ki (2017) ⁴⁰	Korea	9971	≥30	Household: relative poverty (based on income)	Self-report	Number of chronic diseases	66	Self-report
Lujic (2017) ⁴³	Australia	90352	≥45	Household: income, language Area-level: rurality	Self-report	2 or more chronic conditions	8	Self-report and EHRs screened
Melis (2014) ⁴⁵	Sweden	390	≥75	Household: composition	Self-report	Co-occurrence of 2 or more chronic conditions	38	Physicians determination
Mounce (2018) ⁴⁷	England	5564	≥50	Household: composition	Self-report	2 or more conditions	15	Self-report
Salisbury (2011) ⁵⁵	England	99997	≥18	Area-level: deprivation	Townsend index	More than 1 chronic condition	17 (+114 _a)	EHRs screened
Schäfer (2012) ⁶⁰	Germany	3189	65-84	Household: income, tenure, composition	Self-report	Number of chronic conditions	29	EHRs screened
Tomasdottir (2016) ⁵⁸	Norway	20365	20-59	Area-level: distrust in neighbours	Self-report	2 or more coinciding chronic diseases within the same individual	17	Self-report
Tucker-Seeley (2011) ⁷¹	USA	7305	50-75+	Household: childhood financial hardship	Self-report	Count of chronic conditions	6	Self-report

Note: SDoH = social determinants of health; EHRs = electronic health records; IMD = Index of Multiple Deprivation; ON-Marg = Ontario marginalisation index; NZDep = New Zealand's deprivation index
^aDefinition(s) of multimorbidity are taken as direct quotes from each paper

