

**The distribution of healthcare workforces relative to population ill health in England: Repeated cross-sectional analysis of Census data 2001-2021.**

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## SUPPLEMENTARY DATA

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**Table S1.** Census datasets used for current analysis

	<b>2001</b>	<b>2011</b>	<b>2021</b>
<b>Census response rate†</b>	98%	94%	97%
<b>Ill-health</b>	ST016 - Sex and age by general health and limiting long-term illness	LC3302EW - Long-term health problem or disability by general health by sex by age	RM069 - Disability by general health by age
<b>Employment and occupation</b>	ST116 - Employment activity and sex and professional qualifications by occupation	QS606EW - Occupation (Minor Groups)	TS064 - Occupation - minor groups
<b>Population data by age</b>	KS002 - Age structure	KS102EW - Age structure	TS007 - Age by single year
<b>Provision of informal care</b>	UV021 - Provision of unpaid care	QS301EW - Provision of unpaid care	TS039 - Provision of unpaid care
† England and Wales combined			

**Table S2.** Amalgamation of 152 upper-tier into 120 locations

Upper tier local authorities Code	Upper tier local authorities	Local authority grouped (to determine 'London')
E06000001	Hartlepool	Hartlepool
E06000002	Middlesbrough	Middlesbrough
E06000003	Redcar and Cleveland	Redcar and Cleveland
E06000004	Stockton-on-Tees	Stockton-on-Tees
E06000005	Darlington	Darlington
E06000006	Halton	Halton
E06000007	Warrington	Warrington
E06000008	Blackburn with Darwen	Blackburn with Darwen
E06000009	Blackpool	Blackpool
E06000010	Kingston upon Hull	Kingston upon Hull
E06000011	East Riding of Yorkshire	East Riding of Yorkshire
E06000012	North East Lincolnshire	North East Lincolnshire
E06000013	North Lincolnshire	North Lincolnshire
E06000014	York	York
E06000015	Derby	Derby
E06000016	Leicester	Leicester
E06000017	Rutland	Rutland
E06000018	Nottingham	Nottingham
E06000019	Herefordshire	Herefordshire
E06000020	Telford and Wrekin	Telford and Wrekin
E06000021	Stoke-on-Trent	Stoke-on-Trent
E06000022	Bath and North East Somerset	Bath and North East Somerset
E06000023	Bristol	Bristol
E06000024	North Somerset	North Somerset
E06000025	South Gloucestershire	South Gloucestershire
E06000026	Plymouth	Plymouth
E06000027	Torbay	Torbay
E06000030	Swindon	Swindon
E06000031	Peterborough	Peterborough
E06000032	Luton	Luton
E06000033	Southend-on-Sea	Southend-on-Sea
E06000034	Thurrock	Thurrock
E06000035	Medway	Medway
E06000036	Bracknell Forest	Bracknell Forest
E06000037	West Berkshire	West Berkshire
E06000038	Reading	Reading
E06000039	Slough	Slough
E06000040	Windsor and Maidenhead	Windsor and Maidenhead
E06000041	Wokingham	Wokingham
E06000042	Milton Keynes	Milton Keynes
E06000043	Brighton and Hove	Brighton and Hove
E06000044	Portsmouth	Portsmouth
E06000045	Southampton	Southampton
E06000046	Isle of Wight	Isle of Wight
E06000047	County Durham	County Durham

E06000049	Cheshire East	Cheshire East
E06000050	Cheshire West and Chester	Cheshire West and Chester
E06000051	Shropshire	Shropshire
E06000052	Cornwall	Cornwall
E06000053	Isles of Scilly	Isles of Scilly
E06000054	Wiltshire	Wiltshire
E06000055	Bedford	Bedford
E06000056	Central Bedfordshire	Central Bedfordshire
E06000057	Northumberland	Northumberland
E06000058	Bournemouth, Christchurch and Poole	Bournemouth, Christchurch and Poole
E06000059	Dorset	Dorset
E06000060	Buckinghamshire	Buckinghamshire
E06000061	North Northamptonshire	North Northamptonshire
E06000062	West Northamptonshire	West Northamptonshire
E08000001	Bolton	Bolton
E08000002	Bury	Bury
E08000003	Manchester	Manchester
E08000004	Oldham	Oldham
E08000005	Rochdale	Rochdale
E08000006	Salford	Salford
E08000007	Stockport	Stockport
E08000008	Tameside	Tameside
E08000009	Trafford	Trafford
E08000010	Wigan	Wigan
E08000011	Knowsley	Knowsley
E08000012	Liverpool	Liverpool
E08000013	St. Helens	St. Helens
E08000014	Sefton	Sefton
E08000015	Wirral	Wirral
E08000016	Barnsley	Barnsley
E08000017	Doncaster	Doncaster
E08000018	Rotherham	Rotherham
E08000019	Sheffield	Sheffield
E08000021	Newcastle upon Tyne	Newcastle upon Tyne
E08000022	North Tyneside	North Tyneside
E08000023	South Tyneside	South Tyneside
E08000024	Sunderland	Sunderland
E08000025	Birmingham	Birmingham
E08000026	Coventry	Coventry
E08000027	Dudley	Dudley
E08000028	Sandwell	Sandwell
E08000029	Solihull	Solihull
E08000030	Walsall	Walsall
E08000031	Wolverhampton	Wolverhampton
E08000032	Bradford	Bradford
E08000033	Calderdale	Calderdale
E08000034	Kirklees	Kirklees
E08000035	Leeds	Leeds

E08000036	Wakefield	Wakefield
E08000037	Gateshead	Gateshead
E09000001	City of London	London
E09000002	Barking and Dagenham	London
E09000003	Barnet	London
E09000004	Bexley	London
E09000005	Brent	London
E09000006	Bromley	London
E09000007	Camden	London
E09000008	Croydon	London
E09000009	Ealing	London
E09000010	Enfield	London
E09000011	Greenwich	London
E09000012	Hackney	London
E09000013	Hammersmith and Fulham	London
E09000014	Haringey	London
E09000015	Harrow	London
E09000016	Havering	London
E09000017	Hillingdon	London
E09000018	Hounslow	London
E09000019	Islington	London
E09000020	Kensington and Chelsea	London
E09000021	Kingston upon Thames	London
E09000022	Lambeth	London
E09000023	Lewisham	London
E09000024	Merton	London
E09000025	Newham	London
E09000026	Redbridge	London
E09000027	Richmond upon Thames	London
E09000028	Southwark	London
E09000029	Sutton	London
E09000030	Tower Hamlets	London
E09000031	Waltham Forest	London
E09000032	Wandsworth	London
E09000033	Westminster	London
E10000003	Cambridgeshire	Cambridgeshire
E10000006	Cumbria	Cumbria
E10000007	Derbyshire	Derbyshire
E10000008	Devon	Devon
E10000011	East Sussex	East Sussex
E10000012	Essex	Essex
E10000013	Gloucestershire	Gloucestershire
E10000014	Hampshire	Hampshire
E10000015	Hertfordshire	Hertfordshire
E10000016	Kent	Kent
E10000017	Lancashire	Lancashire
E10000018	Leicestershire	Leicestershire
E10000019	Lincolnshire	Lincolnshire

E10000020	Norfolk	Norfolk
E10000023	North Yorkshire	North Yorkshire
E10000024	Nottinghamshire	Nottinghamshire
E10000025	Oxfordshire	Oxfordshire
E10000027	Somerset	Somerset
E10000028	Staffordshire	Staffordshire
E10000029	Suffolk	Suffolk
E10000030	Surrey	Surrey
E10000031	Warwickshire	Warwickshire
E10000032	West Sussex	West Sussex
E10000034	Worcestershire	Worcestershire

**Table S3.** Inclusion and grouping of health professions

	2001 Standard Occupational Classification 2000 (SOC2000)	2011 Standard Occupational Classification 2010 (SOC2010)	2021 (Standard Occupational Classification 2020 (SOC2020)
Health professionals	2211 Medical practitioners	2211 Medical practitioners	2211 Generalist medical practitioners 2212 Specialist medical practitioners
	2212 Psychologists	2212 Psychologists	2225 Clinical psychologists 2226 Other psychologists
	2213 Pharmacists/pharmacologists	2213 Pharmacists	2251 Pharmacists
	2214 Ophthalmic opticians	2214 Ophthalmic opticians	2252 Ophthalmic opticians
	2215 Dental practitioners	2215 Dental practitioners	2253 Dental practitioners
		2219 Health professionals n.e.c.	2259 Other health professionals n.e.c.
Health associates and therapy professionals	3214 Medical radiographers	2217 Medical radiographers	2254 Medical radiographers
	3215 Chiropodists	2218 Podiatrists	2256 Podiatrists
	3221 Physiotherapists	2221 Physiotherapists	2221 Physiotherapists
	3222 Occupational therapists	2222 Occupational therapists	2222 Occupational therapists
	3223 Speech and language therapists	2223 Speech and language therapists	2223 Speech and language therapists
	3229 Therapists n.e.c.	2229 Therapy professionals n.e.c.	2229 Therapy professionals n.e.c. 2224 Psychotherapists and cognitive behaviour therapists 3214 Complementary health associate professionals
	3213 Paramedics	3213 Paramedics	2255 Paramedics
	3216 Dispensing opticians	3216 Dispensing opticians	3211 Dispensing opticians
	3217 Pharmaceutical dispensers	3217 Pharmaceutical technicians	3212 Pharmaceutical technicians
	3218 Medical and dental technicians	3218 Medical and dental technicians	3213 Medical and dental technicians
		3219 Health associate professionals n.e.c.	3219 Health associate professionals n.e.c.
Nursing staff	3211 Nurses	2231 Nurses	2232 Registered community nurses 2233 Registered specialist nurses 2234 Registered nurse practitioners 2235 Registered mental health nurses 2236 Registered children's nurses 2237 Other registered nursing professionals
	3212 Midwives	2232 Midwives	2231 Midwifery nurses



**Table S4.** Demographic table of local authorities, 2021 Census and 2025 Indices of Multiple Deprivation.

(A darker colour represents a higher value.)

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Hartlepool	21665	23.50%	52441	56.80%	18233	19.70%	1.70%	0.50%	0.70%	96.50%	0.60%	37.58	48.40%	51.60%
Middlesbrough	36759	25.50%	82987	57.70%	24178	16.80%	10.50%	2.70%	2.10%	82.40%	2.40%	40.04	49.30%	50.70%
Redcar and Cleveland	29805	21.80%	74979	54.90%	31747	23.30%	0.80%	0.20%	0.90%	97.70%	0.40%	30.34	48.40%	51.60%
Stockton-on-Tees	46800	23.80%	112610	57.30%	37184	18.90%	4.60%	1.10%	1.40%	92.00%	0.80%	25.83	49.10%	50.90%
Darlington	24237	22.50%	61524	57.10%	22040	20.40%	2.80%	0.70%	1.40%	94.40%	0.90%	25.71	48.90%	51.10%
County Durham	113841	21.80%	296889	56.90%	111338	21.30%	1.50%	0.30%	0.90%	96.80%	0.40%	28.81	48.90%	51.10%
Northumberland	64008	20.00%	175011	54.60%	81550	25.40%	1.10%	0.20%	0.80%	97.60%	0.30%	21.96	48.80%	51.20%
Newcastle upon Tyne	72114	24.00%	183496	61.10%	44515	14.80%	11.40%	3.30%	2.30%	80.00%	3.10%	28.83	49.40%	50.60%
North Tyneside	45452	21.80%	120618	57.70%	42897	20.50%	2.60%	0.60%	1.40%	94.90%	0.60%	20.93	48.50%	51.50%
South Tyneside	32403	21.90%	84535	57.20%	30836	20.90%	2.90%	0.50%	1.40%	94.40%	0.80%	31.06	48.50%	51.50%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Sunderland	59766	21.80%	158140	57.70%	56269	20.50%	3.00%	1.00%	0.90%	94.60%	0.50%	32.76	48.50%	51.50%
Gateshead	42430	21.60%	113948	58.10%	39773	20.30%	2.50%	1.10%	1.20%	93.50%	1.60%	28.13	49.00%	51.00%
Halton	30061	23.40%	74458	58.00%	23959	18.60%	1.10%	0.40%	1.40%	96.50%	0.60%	31.12	49.00%	51.00%
Warrington	46940	22.20%	123875	58.70%	40159	19.00%	3.30%	0.70%	1.60%	93.50%	0.90%	16.84	49.50%	50.50%
Blackburn with Darwen	43808	28.30%	88526	57.20%	22401	14.50%	35.70%	0.90%	1.70%	60.40%	1.40%	36.90	49.60%	50.40%
Blackpool	30519	21.60%	81326	57.70%	29191	20.70%	2.60%	0.50%	1.60%	94.70%	0.60%	43.47	49.40%	50.60%
Cheshire East	84606	21.20%	224939	56.40%	89227	22.40%	2.40%	0.60%	1.80%	94.40%	0.80%	14.17	49.00%	51.00%
Cheshire West and Chester	76547	21.40%	204856	57.40%	75747	21.20%	2.00%	0.60%	1.50%	95.30%	0.60%	17.74	48.80%	51.20%
Cumberland	55964	20.50%	154069	56.40%	63221	23.10%	1.00%	0.20%	0.80%	97.70%	0.40%	23.81	49.20%	50.80%
Westmorland and Furness	43281	19.10%	125005	55.20%	58305	25.70%	1.00%	0.30%	0.90%	97.60%	0.30%	17.84	49.30%	50.70%
Bolton	78028	26.40%	167213	56.50%	50722	17.10%	20.10%	3.80%	2.20%	71.90%	1.90%	31.41	49.30%	50.70%
Bury	47732	24.60%	110671	57.10%	35448	18.30%	10.60%	1.90%	2.60%	82.90%	1.90%	24.01	49.10%	50.90%
Manchester	149701	27.10%	350069	63.40%	52167	9.50%	20.90%	11.90%	5.30%	56.80%	5.10%	38.68	49.70%	50.30%
Oldham	67772	28.00%	135702	56.10%	38614	16.00%	24.60%	3.40%	2.50%	68.10%	1.40%	36.83	48.90%	51.10%
Rochdale	59299	26.50%	127607	57.00%	36867	16.50%	18.50%	3.50%	2.40%	74.00%	1.60%	34.33	49.00%	51.00%
Salford	65523	24.30%	168476	62.40%	35924	13.30%	5.50%	6.10%	3.10%	82.30%	2.90%	32.35	50.20%	49.80%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Stockport	67322	22.80%	168176	57.10%	59275	20.10%	7.30%	1.20%	2.60%	87.40%	1.60%	18.40	48.60%	51.40%
Tameside	55691	24.10%	134865	58.40%	40515	17.50%	9.20%	2.30%	2.10%	85.50%	0.80%	29.84	49.00%	51.00%
Trafford	59116	25.20%	134644	57.30%	41292	17.60%	12.60%	3.40%	3.80%	77.80%	2.50%	14.97	48.70%	51.30%
Wigan	74261	22.50%	191466	58.10%	63603	19.30%	1.80%	1.20%	1.30%	95.00%	0.70%	25.21	49.50%	50.50%
Knowsley	36776	23.80%	91501	59.20%	26242	17.00%	1.60%	0.80%	1.70%	95.30%	0.60%	36.16	47.80%	52.20%
Liverpool	112188	23.10%	299578	61.60%	74322	15.30%	5.70%	3.50%	3.50%	84.00%	3.30%	37.11	48.70%	51.30%
St. Helens	40018	21.80%	105588	57.60%	37641	20.50%	1.40%	0.40%	1.10%	96.50%	0.60%	28.95	49.10%	50.90%
Sefton	57905	20.70%	156565	56.10%	64763	23.20%	1.50%	0.50%	1.50%	95.80%	0.70%	25.15	48.40%	51.60%
Wirral	71362	22.30%	178445	55.70%	70392	22.00%	2.30%	0.40%	1.50%	95.20%	0.60%	27.47	48.40%	51.60%
Lancashire	281664	22.80%	697370	56.50%	256318	20.70%	8.10%	0.60%	1.60%	88.90%	0.70%	23.56	49.10%	50.90%
Kingston upon Hull, City of	65517	24.50%	160673	60.20%	40824	15.30%	2.80%	1.90%	1.70%	91.80%	1.80%	37.21	49.90%	50.10%
East Riding of Yorkshire	67236	19.60%	184486	53.90%	90495	26.40%	1.10%	0.30%	0.90%	97.40%	0.40%	15.76	49.00%	51.00%
North East Lincolnshire	35947	22.90%	88183	56.20%	32836	20.90%	1.60%	0.50%	1.00%	96.20%	0.70%	30.21	48.90%	51.10%
North Lincolnshire	37109	21.90%	95293	56.20%	37278	22.00%	3.30%	0.50%	1.10%	94.30%	0.80%	23.47	49.30%	50.70%
York	44054	21.70%	120034	59.20%	38733	19.10%	3.80%	0.70%	1.80%	92.80%	1.00%	11.81	48.10%	51.90%
North Yorkshire	124575	20.20%	337088	54.80%	153828	25.00%	1.40%	0.40%	1.10%	96.70%	0.50%	15.80	49.00%	51.00%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Barnsley	54435	22.30%	142541	58.30%	47596	19.50%	0.90%	0.70%	0.90%	96.90%	0.50%	30.06	49.20%	50.80%
Doncaster	69819	22.70%	178435	57.90%	59852	19.40%	2.90%	1.20%	1.50%	93.10%	1.20%	30.52	49.60%	50.40%
Rotherham	61637	23.20%	151942	57.20%	52227	19.60%	5.30%	1.10%	1.40%	91.00%	1.10%	29.84	49.00%	51.00%
Sheffield	131701	23.70%	330003	59.30%	94819	17.00%	9.60%	4.60%	3.50%	79.10%	3.20%	27.57	49.30%	50.70%
Bradford	154780	28.30%	308629	56.50%	83001	15.20%	32.10%	2.00%	2.70%	61.10%	2.00%	36.71	48.90%	51.10%
Calderdale	49035	23.70%	118286	57.20%	39310	19.00%	10.50%	0.70%	1.90%	86.10%	0.80%	27.58	48.70%	51.30%
Kirklees	108269	25.00%	248134	57.30%	76813	17.70%	19.40%	2.30%	3.10%	73.60%	1.50%	25.81	49.00%	51.00%
Leeds	196394	24.20%	488793	60.20%	126766	15.60%	9.70%	5.60%	3.40%	79.00%	2.30%	24.12	48.80%	51.20%
Wakefield	79764	22.60%	206994	58.60%	66606	18.80%	3.60%	1.30%	1.40%	93.00%	0.70%	27.25	49.20%	50.80%
Derby	65448	25.00%	153131	58.60%	42785	16.40%	15.60%	4.00%	3.70%	73.80%	2.90%	28.16	49.60%	50.40%
Leicester	101064	27.40%	224006	60.80%	43499	11.80%	43.40%	7.80%	3.80%	40.90%	4.10%	34.45	49.40%	50.60%
Rutland	8915	21.70%	21749	53.00%	10384	25.30%	1.50%	1.30%	1.80%	94.80%	0.50%	9.85	51.30%	48.70%
Nottingham	87568	27.10%	198097	61.20%	37965	11.70%	14.90%	10.00%	5.90%	65.90%	3.30%	33.75	49.10%	50.90%
North Northamptonshire	85662	23.80%	208504	58.00%	65357	18.20%	3.50%	3.10%	2.30%	90.30%	0.80%	18.47	49.30%	50.70%
West Northamptonshire	101056	23.70%	251995	59.20%	72676	17.10%	5.30%	4.90%	2.80%	85.90%	1.10%	16.65	49.50%	50.50%
Derbyshire	165234	20.80%	453715	57.10%	175687	22.10%	1.50%	0.50%	1.40%	96.30%	0.30%	19.39	49.10%	50.90%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Leicestershire	159226	22.40%	405062	56.90%	148079	20.80%	8.20%	1.10%	2.20%	87.50%	1.00%	12.81	49.40%	50.60%
Lincolnshire	161342	21.00%	426869	55.60%	180154	23.40%	1.60%	0.60%	1.30%	96.00%	0.60%	22.24	49.00%	51.00%
Nottinghamshire	178601	21.70%	471033	57.10%	175188	21.20%	3.00%	1.20%	2.10%	93.00%	0.70%	18.60	49.10%	50.90%
Herefordshire, County of	37095	19.80%	101470	54.30%	48472	25.90%	1.20%	0.30%	1.10%	96.90%	0.50%	18.76	49.10%	50.90%
Telford and Wrekin	45469	24.50%	107358	57.90%	32717	17.60%	5.40%	2.90%	2.60%	88.20%	0.90%	24.42	49.20%	50.80%
Stoke-on-Trent	64560	25.00%	149546	57.90%	44264	17.10%	9.90%	2.70%	2.30%	83.50%	1.70%	33.61	49.70%	50.30%
Shropshire	64834	20.00%	176684	54.60%	82088	25.40%	1.30%	0.30%	1.20%	96.70%	0.40%	17.60	49.30%	50.70%
Birmingham	325789	28.50%	668640	58.40%	150489	13.10%	31.00%	11.00%	4.80%	48.60%	4.50%	38.12	48.90%	51.10%
Coventry	89921	26.00%	205090	59.40%	50313	14.60%	18.50%	8.90%	3.40%	65.50%	3.70%	27.53	49.90%	50.10%
Dudley	75030	23.20%	182400	56.40%	66058	20.40%	8.40%	2.50%	2.80%	84.90%	1.40%	23.17	49.20%	50.80%
Sandwell	93100	27.20%	199029	58.20%	49705	14.50%	25.80%	8.70%	4.30%	57.20%	4.00%	33.77	49.20%	50.80%
Solihull	50875	23.50%	119765	55.40%	45599	21.10%	11.00%	1.80%	3.50%	82.20%	1.50%	17.04	48.50%	51.50%
Walsall	74602	26.30%	160060	56.30%	49462	17.40%	18.70%	4.60%	3.30%	71.40%	2.10%	31.73	48.80%	51.20%
Wolverhampton	67404	25.60%	153040	58.00%	43282	16.40%	21.20%	9.30%	5.30%	60.60%	3.60%	32.55	49.10%	50.90%
Staffordshire	185825	21.20%	496144	56.60%	194137	22.20%	3.30%	0.80%	1.70%	93.60%	0.50%	16.51	49.50%	50.50%
Warwickshire	131626	22.10%	342532	57.40%	122615	20.50%	6.30%	1.30%	2.30%	89.10%	1.00%	15.59	49.30%	50.70%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Worcestershire	129466	21.40%	336176	55.70%	138034	22.90%	3.10%	0.70%	1.90%	93.80%	0.60%	17.31	49.00%	51.00%
Peterborough	57936	26.90%	127148	59.00%	30589	14.20%	14.30%	4.10%	3.50%	75.40%	2.70%	27.80	49.40%	50.60%
Luton	64507	28.60%	134389	59.70%	26366	11.70%	37.00%	10.10%	4.30%	45.20%	3.50%	29.55	50.10%	49.90%
Southend-on-Sea	41477	23.00%	104648	57.90%	34561	19.10%	5.50%	2.90%	3.10%	87.50%	1.10%	24.03	48.70%	51.30%
Thurrock	47785	27.20%	104362	59.30%	23854	13.60%	6.90%	11.90%	3.00%	76.70%	1.50%	21.03	49.00%	51.00%
Bedford	45197	24.40%	109006	58.80%	31024	16.70%	12.60%	5.30%	4.60%	75.70%	1.80%	19.75	49.20%	50.80%
Central Bedfordshire	68962	23.40%	172343	58.60%	52947	18.00%	3.50%	2.40%	3.00%	90.20%	0.80%	13.10	49.30%	50.70%
Cambridgeshire	150535	22.20%	401741	59.20%	126576	18.60%	5.80%	1.40%	2.90%	88.60%	1.30%	13.33	49.40%	50.60%
Essex	342051	22.70%	851491	56.60%	309979	20.60%	3.70%	2.50%	2.40%	90.40%	1.00%	17.70	48.70%	51.30%
Hertfordshire	291502	24.30%	703028	58.60%	204268	17.00%	8.60%	3.70%	3.80%	81.80%	2.10%	13.01	48.80%	51.20%
Norfolk	186814	20.40%	505544	55.20%	223762	24.40%	2.10%	0.90%	1.60%	94.70%	0.70%	21.18	49.00%	51.00%
Suffolk	161110	21.20%	420383	55.30%	179198	23.60%	2.30%	1.30%	2.30%	93.10%	0.90%	18.85	49.30%	50.70%
City of London	762	8.90%	6614	77.00%	1209	14.10%	16.80%	2.70%	5.50%	69.40%	5.60%	10.21	55.00%	45.00%
Barking and Dagenham	68936	31.50%	130901	59.80%	19032	8.70%	25.90%	21.40%	4.30%	44.90%	3.60%	30.27	48.70%	51.30%
Barnet	96626	24.80%	236611	60.80%	56104	14.40%	19.30%	7.90%	5.40%	57.70%	9.80%	19.50	48.40%	51.60%
Bexley	61778	25.10%	143802	58.30%	40892	16.60%	9.90%	12.20%	3.50%	71.90%	2.50%	15.30	48.10%	51.90%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Brent	81296	23.90%	218965	64.40%	39555	11.60%	32.80%	17.50%	5.10%	34.60%	10.00%	30.05	49.10%	50.90%
Bromley	78257	23.70%	193493	58.60%	58244	17.70%	8.30%	7.60%	5.40%	76.50%	2.30%	12.67	48.00%	52.00%
Camden	44035	21.00%	141272	67.20%	24826	11.80%	18.10%	9.00%	6.60%	59.50%	6.80%	23.70	47.30%	52.70%
Croydon	97933	25.10%	239713	61.40%	53073	13.60%	17.50%	22.60%	7.60%	48.40%	3.90%	22.56	48.00%	52.00%
Ealing	89209	24.30%	233443	63.60%	44462	12.10%	30.30%	10.80%	5.20%	43.20%	10.60%	25.95	49.30%	50.70%
Enfield	89454	27.10%	195517	59.30%	45013	13.60%	11.50%	18.30%	5.90%	52.10%	12.10%	29.89	47.70%	52.30%
Greenwich	71910	24.90%	186933	64.70%	30225	10.50%	13.20%	21.00%	6.00%	55.70%	4.20%	23.54	48.60%	51.40%
Hackney	60837	23.50%	177807	68.60%	20505	7.90%	10.40%	21.10%	6.70%	53.10%	8.70%	31.80	47.80%	52.20%
Hammersmith and Fulham	35111	19.20%	129060	70.50%	18986	10.40%	10.50%	12.30%	6.70%	63.20%	7.30%	21.20	46.90%	53.10%
Haringey	59817	22.60%	176708	66.90%	27712	10.50%	8.70%	17.60%	7.00%	57.00%	9.70%	30.86	48.20%	51.80%
Harrow	63355	24.30%	157669	60.40%	40179	15.40%	45.20%	7.30%	3.80%	36.50%	7.20%	17.53	49.30%	50.70%
Havering	63685	24.30%	152256	58.10%	46111	17.60%	10.70%	8.20%	3.70%	75.30%	2.00%	16.76	48.20%	51.80%
Hillingdon	78901	25.80%	185835	60.70%	41173	13.50%	33.30%	7.80%	4.40%	48.20%	6.30%	20.65	49.40%	50.60%
Hounslow	72160	25.00%	182072	63.20%	33949	11.80%	36.70%	7.20%	4.70%	44.10%	7.30%	24.86	49.70%	50.30%
Islington	41778	19.30%	154490	71.30%	20321	9.40%	9.90%	13.30%	7.50%	62.20%	7.10%	26.65	47.70%	52.30%
Kensington and Chelsea	25726	17.90%	97049	67.70%	20600	14.40%	11.90%	7.90%	6.60%	63.70%	9.90%	20.34	46.80%	53.20%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Kingston upon Thames	40107	23.90%	103633	61.70%	24324	14.50%	17.80%	2.80%	5.40%	68.30%	5.70%	11.06	48.20%	51.80%
Lambeth	60624	19.10%	229770	72.30%	27260	8.60%	7.30%	24.00%	8.10%	55.00%	5.70%	23.04	48.50%	51.50%
Lewisham	70550	23.50%	201360	67.00%	28644	9.50%	9.00%	26.80%	8.10%	51.50%	4.70%	25.47	47.50%	52.50%
Merton	50678	23.60%	137437	63.90%	27071	12.60%	18.60%	10.60%	5.90%	60.20%	4.60%	14.38	48.60%	51.40%
Newham	92629	26.40%	233241	66.40%	25166	7.20%	42.20%	17.50%	4.70%	30.80%	4.90%	31.58	49.90%	50.10%
Redbridge	83668	27.00%	188660	60.80%	37932	12.20%	47.30%	8.40%	4.10%	34.80%	5.40%	19.85	49.40%	50.60%
Richmond upon Thames	47293	24.20%	116538	59.70%	31448	16.10%	8.90%	1.90%	5.50%	80.50%	3.30%	9.53	48.10%	51.90%
Southwark	64676	21.00%	217277	70.60%	25682	8.30%	9.90%	25.10%	7.20%	51.40%	6.30%	23.33	48.40%	51.60%
Sutton	52756	25.20%	125139	59.70%	31741	15.10%	17.50%	5.90%	4.80%	68.30%	3.40%	13.85	48.40%	51.60%
Tower Hamlets	72508	23.40%	220325	71.00%	17472	5.60%	44.40%	7.30%	5.00%	39.40%	3.90%	30.55	50.20%	49.80%
Waltham Forest	68181	24.50%	181847	65.30%	28396	10.20%	19.90%	15.00%	6.50%	52.80%	5.80%	23.45	49.00%	51.00%
Wandsworth	64371	19.70%	231801	70.80%	31334	9.60%	11.70%	10.10%	6.30%	67.80%	4.10%	15.16	47.40%	52.60%
Westminster	35665	17.50%	143792	70.40%	24781	12.10%	16.80%	8.10%	6.50%	55.20%	13.50%	23.93	48.40%	51.60%
Medway	69891	25.00%	163828	58.60%	46054	16.50%	5.90%	5.60%	2.80%	84.30%	1.40%	24.35	49.00%	51.00%
Bracknell Forest	30130	24.20%	75602	60.70%	18875	15.10%	7.10%	2.40%	3.10%	86.10%	1.30%	10.08	49.30%	50.70%
West Berkshire	37796	23.40%	92140	57.10%	31512	19.50%	3.70%	1.30%	2.40%	91.90%	0.70%	11.05	49.40%	50.60%



Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Reading	41957	24.10%	111289	63.90%	20978	12.00%	17.70%	7.20%	5.10%	67.10%	2.90%	18.56	49.80%	50.20%
Slough	47204	29.80%	95976	60.60%	15320	9.70%	46.70%	7.60%	4.00%	36.00%	5.70%	22.97	49.50%	50.50%
Windsor and Maidenhead	36713	23.90%	88463	57.60%	28321	18.50%	13.10%	1.50%	3.40%	79.80%	2.10%	8.88	49.10%	50.90%
Wokingham	44602	25.10%	102353	57.70%	30547	17.20%	12.90%	2.40%	3.10%	79.90%	1.60%	6.10	49.10%	50.90%
Milton Keynes	74966	26.10%	172510	60.10%	39586	13.80%	12.40%	9.70%	4.10%	71.80%	2.00%	18.50	49.30%	50.70%
Brighton and Hove	56744	20.50%	181384	65.50%	38976	14.10%	4.80%	2.00%	4.80%	85.40%	3.10%	20.27	48.90%	51.10%
Portsmouth	49556	23.80%	127657	61.40%	30790	14.80%	6.90%	3.40%	2.60%	85.20%	1.80%	26.38	49.60%	50.40%
Southampton	58836	23.60%	155836	62.60%	34250	13.80%	10.60%	3.00%	3.30%	80.70%	2.30%	25.61	50.20%	49.80%
Isle of Wight	25854	18.40%	73586	52.40%	41019	29.20%	1.20%	0.30%	1.20%	97.00%	0.30%	24.60	48.50%	51.50%
Buckinghamshire	133657	24.20%	315710	57.10%	103712	18.80%	12.40%	2.60%	3.50%	79.90%	1.60%	11.92	48.90%	51.10%
East Sussex	111889	20.50%	291479	53.40%	142478	26.10%	2.10%	0.80%	2.30%	93.90%	0.90%	21.23	48.00%	52.00%
Hampshire	307737	22.00%	789028	56.30%	304134	21.70%	3.80%	1.00%	1.90%	92.60%	0.80%	12.78	48.90%	51.10%
Kent	369065	23.40%	887676	56.30%	319326	20.30%	4.40%	2.60%	2.30%	89.40%	1.20%	20.70	48.80%	51.20%
Oxfordshire	166996	23.00%	428500	59.10%	129794	17.90%	6.40%	2.10%	3.10%	86.90%	1.60%	11.18	49.40%	50.60%
Surrey	286021	23.80%	689896	57.30%	227190	18.90%	7.70%	1.70%	3.40%	85.50%	1.70%	10.13	48.80%	51.20%
West Sussex	190979	21.60%	490307	55.50%	201390	22.80%	4.30%	1.30%	2.40%	91.00%	1.00%	14.80	48.60%	51.40%

Local authority	Population aged 0-19		Population aged 20-64		Population aged 65 and above		Ethnicity proportion					Indices of Multiple Deprivation, 2025	Sex proportion	
	Number	Percentage of total population	Number	Percentage of total population	Number	Percentage of total population	Asian, Asian British or Asian Welsh	Black, Black British, Black Welsh, Caribbean or African	Mixed or Multiple ethnic groups	White	Other ethnic group	IMD Average Score	Male	Female
Bath and North East Somerset	44484	23.00%	111403	57.60%	37522	19.40%	3.30%	1.00%	2.70%	92.20%	0.80%	12.28	48.80%	51.20%
Bristol, City of	107898	22.80%	303806	64.30%	60760	12.90%	6.60%	5.90%	4.50%	81.10%	1.90%	22.50	49.60%	50.40%
North Somerset	46573	21.50%	118286	54.60%	51875	23.90%	1.50%	0.50%	1.70%	95.70%	0.60%	15.46	48.60%	51.40%
South Gloucestershire	66173	22.80%	170057	58.60%	54194	18.70%	3.80%	1.60%	2.50%	91.20%	0.90%	11.61	49.50%	50.50%
Plymouth	59283	22.40%	156442	59.10%	48970	18.50%	2.20%	1.10%	1.80%	94.00%	1.00%	24.09	49.10%	50.90%
Torbay	27596	19.80%	74541	53.50%	37187	26.70%	1.60%	0.30%	1.50%	96.10%	0.40%	26.92	48.70%	51.30%
Swindon	55829	23.90%	140513	60.20%	37069	15.90%	11.60%	2.60%	2.80%	81.50%	1.50%	17.55	49.70%	50.30%
Cornwall	116262	20.40%	309904	54.30%	144142	25.30%	0.70%	0.20%	1.20%	96.80%	1.10%	22.32	48.50%	51.50%
Isles of Scilly	351	17.10%	1122	54.60%	582	28.30%	0.30%	0.20%	1.10%	97.50%	0.90%	12.65	48.90%	51.10%
Wiltshire	112821	22.10%	285985	56.00%	111527	21.90%	2.10%	1.10%	1.70%	94.30%	0.70%	13.61	49.30%	50.70%
Bournemouth, Christchurch and Poole	83689	20.90%	230083	57.50%	86426	21.60%	3.40%	1.10%	2.80%	91.30%	1.50%	17.51	48.80%	51.20%
Dorset	72662	19.10%	194641	51.30%	112276	29.60%	1.10%	0.30%	1.20%	97.10%	0.40%	16.27	48.60%	51.40%
Somerset	120030	21.00%	309621	54.20%	141897	24.80%	1.50%	0.40%	1.20%	96.40%	0.40%	19.14	48.90%	51.10%
Devon	164671	20.30%	437571	53.90%	209398	25.80%	1.50%	0.30%	1.40%	96.40%	0.50%	17.72	48.50%	51.50%
Gloucestershire	140468	21.80%	364793	56.60%	139815	21.70%	2.90%	1.20%	2.20%	93.10%	0.70%	15.15	48.90%	51.10%

**Table S5.** Checklist for Reporting Of Survey Studies (CROSS)

Section/topic	Item	Item description	Reported on page #
<b>Title and abstract</b>			
Title and abstract	1a	State the word “survey” along with a commonly used term in title or abstract to introduce the study’s design.	2
	1b	Provide an informative summary in the abstract, covering background, objectives, methods, findings/results, interpretation/discussion, and conclusions.	2
<b>Introduction</b>			
Background	2	Provide a background about the rationale of study, what has been previously done, and why this survey is needed.	3-4
Purpose/aim	3	Identify specific purposes, aims, goals, or objectives of the study.	4-5
<b>Methods</b>			
Study design	4	Specify the study design in the methods section with a commonly used term (e.g., cross-sectional or longitudinal).	5
Data collection methods	5a	Describe the questionnaire (e.g., number of sections, number of questions, number and names of instruments used).	Length and broad content given on p6
	5b	Describe all questionnaire instruments that were used in the survey to measure particular concepts. Report target population, reported validity and reliability information, scoring/classification procedure, and reference links (if any).	6
	5c	Provide information on pretesting of the questionnaire, if performed (in the article or in an online supplement). Report the method of pretesting, number of times questionnaire was pre-tested, number and demographics of participants used for pretesting, and the level of similarity of demographics between pre-testing participants and sample population.	6
	5d	Questionnaire if possible, should be fully provided (in the article, or as appendices or as an online supplement).	Link provided
	6a	Describe the study population (i.e., background, locations, eligibility criteria for participant inclusion in survey, exclusion criteria).	6
	6b	Describe the sampling techniques used (e.g., single stage or multistage sampling, simple random sampling, stratified sampling, cluster sampling, convenience sampling). Specify the locations of sample participants whenever clustered sampling was applied.	6
Sample characteristics			NA
	6c	Provide information on sample size, along with details of sample size calculation.	Census sample – all available data used
	6d	Describe how representative the sample is of the study population (or target population if possible), particularly for population-based surveys.	

Survey administration	7a	Provide information on modes of questionnaire administration, including the type and number of contacts, the location where the survey was conducted (e.g., outpatient room or by use of online tools, such as SurveyMonkey).	6
	7b	Provide information of survey's time frame, such as periods of recruitment, exposure, and follow-up days.	6
	7c	Provide information on the entry process: →For non-web-based surveys, provide approaches to minimize human error in data entry. →For web-based surveys, provide approaches to prevent "multiple participation" of participants.	6
Study preparation	8	Describe any preparation process before conducting the survey (e.g., interviewers' training process, advertising the survey).	6
Ethical considerations	9a	Provide information on ethical approval for the survey if obtained, including informed consent, institutional review board [IRB] approval, Helsinki declaration, and good clinical practice [GCP] declaration (as appropriate).	Na – statement given on p13
	9b	Provide information about survey anonymity and confidentiality and describe what mechanisms were used to protect unauthorized access.	
Statistical analysis	10a	Describe statistical methods and analytical approach. Report the statistical software that was used for data analysis.	7
	10b	Report any modification of variables used in the analysis, along with reference (if available).	6-7
	10c	Report details about how missing data was handled. Include rate of missing items, missing data mechanism (i.e., missing completely at random [MCAR], missing at random [MAR] or missing not at random [MNAR]) and methods used to deal with missing data (e.g., multiple imputation).	na
	10d	State how non-response error was addressed.	na
	10e	For longitudinal surveys, state how loss to follow-up was addressed.	na
	10f	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for non-representativeness of the sample.	na
	10g	Describe any sensitivity analysis conducted.	na
<b>Results</b>			
Respondent characteristics	11a	Report numbers of individuals at each stage of the study. Consider using a flow diagram, if possible.	na
	11b	Provide reasons for non-participation at each stage, if possible.	na
	11c	Report response rate, present the definition of response rate or the formula used to calculate response rate.	6
	11d	Provide information to define how unique visitors are determined. Report number of unique visitors along with relevant proportions (e.g., view proportion, participation proportion, completion proportion).	Not available

Descriptive results	12	Provide characteristics of study participants, as well as information on potential confounders and assessed outcomes.	Supplementary data
	13a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates along with 95% confidence intervals and p-values.	
Main findings	13b	For multivariable analysis, provide information on the model building process, model fit statistics, and model assumptions (as appropriate).	Subgroup analysis p10; Table 2
	13c	Provide details about any sensitivity analysis performed. If there are considerable amount of missing data, report sensitivity analyses comparing the results of complete cases with that of the imputed dataset (if possible).	na
<b>Discussion</b>			
Limitations	14	Discuss the limitations of the study, considering sources of potential biases and imprecisions, such as non-representativeness of sample, study design, important uncontrolled confounders.	12-13
Interpretations	15	Give a cautious overall interpretation of results, based on potential biases and imprecisions and suggest areas for future research.	12-14
Generalizability	16	Discuss the external validity of the results.	14
<b>Other sections</b>			
Role of funding source	17	State whether any funding organization has had any roles in the survey's design, implementation, and analysis.	15
Conflict of interest	18	Declare any potential conflict of interest.	15
Acknowledgements	19	Provide names of organizations/persons that are acknowledged along with their contribution to the research.	15