Data description (abstract)

The second half of the nineteenth century was a period of major change in the dynamics of the British population. This was a time of transformation from a relatively 'high pressure' demographic regime characterised by medium to high birth and death rates towards a 'low pressure' regime of low birth and death rates, a transformation known as the 'demographic transition'. This transition was not uniform across England and Wales: certain places and social groups appear to have led the declines while others lagged behind. Exploring these geographical patterns can provide insights into the process of change and the influence of economic and geographical factors.

This dataset provides a range of demographic and socio-economic variables for Registration Sub-Districts (RSDs) in England and Wales, 1851-1911, calculated by the Atlas of Victorian Fertility project, ES/L015463/1. The measures have mainly been derived from the computerised individual level census enumerators' books (and household schedules for 1911) for England and Wales enhanced under the I-CeM project. See Schürer, K. and Higgs, E. (2014). *Integrated Census Microdata (I-CeM), 1851–1911*. [data collection]. Colchester, Essex: UK Data Archive [distributor]. SN: 7481, http://dx.doi.org/10.5255/UKDA-SN-7481-1. I-CeM does not currently include data for 1871, although the Atlas project has been able to access a version of the data for that year it does not contain information necessary to calculate many of the variables presented here. Users should therefore beware that 1871 does not contain data for many of the variables. In addition there are some RSDs for which data was missing in I-CeM, and others where data was partially missing. In the latter case measures have been calculated using the non-missing data.

Additional data, for some indicators, has been derived from the tables summarising numbers of births and death by year and areas, which were published by the Registrar General in his quarterly, annual and decennial reports of births, deaths and marriages.

Please note we do not provide any data for the Channel Islands, the Isle of Man, Scotland or Ireland.

Please note that due to boundary change, the number of RSDs changes in each year, and there is no guarantee that an RSD with the same identification number or name will cover the same geographical area in different years. There was a particularly large amount of change between the 1891 and 1901 census, when many urban RSDs were merged to form larger units. Boundary data which correspond with the RSDs for each year have been produced by Joe Day, and are available on request. Because RSD names are not unique, the RSD identifiers (CEN_1851, CEN_1861, etc) should be used to link to the GIS. It is also important to note that a particular value of RSD identifier in one year does not necessarily represent the same area in a different year.

More information on the data, including overviews of the geographical patterns and changes over time, can be found at populationspast.org, which provides an interactive mapping facility for these data.

Variable descriptions and calculation are given in the 'Variable descriptions' file. In addition, one data file is provided for each census year:

	1851	1861	1871	1881	1891	1901	1911
File name	1851_RSD_data	1861_RSD_data	1871_RSD_data	1881_RSD_data	1891_RSD_data	1901_RSD_data	1911_RSD_data
CEN_1**1 value	CEN_1851	CEN_1861	CEN_1871	CEN_1881	CEN_1891	CEN_1901	CEN_1911
Number of RSDs	2190	2194	2195	2175	2110	2064	2009
Number of RSDs with I-CeM data	2174	2188	2186	2175	2110	2059	2009
Number of variables	69	69	24	69	69	69	69

Variable identifier	Name	Definition	Calculation & notes
CEN_1**1	RSD number	NB This is the only variable whose name differs for the different file	
REGCNTY	Registration County	as defined in published census volume	
REGDIST	Registration District	as defined in published census volume	
SUBDIST	Registration Sub-District	as defined in published census volume	
POP_DENS	Population Density	number of people per acre	Population density has been calculated using the number of people enumerated in each RSD on census night as published in the census report for each census year, and the area of the RSD derived from the GIS of RSD boundaries.
TYPE	Type of place	Each geographic unit (Registration Sub-District) has been assigned to one of eight types of place based on its occupational structure and population density. The types of place are: AGRICULTURE, SEMI-RURAL, SEMI-PROFESSIONAL, PROFESSIONAL, TEXTILE, MINING, TRANSPORT, and OTHER URBAN.	For each RSD, all economically active men and women (excluding general labourers) aged between 15 and 64 were identified. The percentage of these who worked in each of the following occupational orders was calculated: mining, metal work/manufacture, textiles, agriculture, pottery, professions, services, and transport. These percentages were then used to allocate each place as follows: If >= 25% work in textiles then the place was designated TEXTILE; Otherwise if >=30% worked in mining or metals then the place was designated MINING; Otherwise if >=7.5% worked in the professions AND >=30% worked in services then the place was designated PROFESSIONAL; Otherwise if >=5% worked in agriculture AND population density <1 person per acre then the place was designated AGRICULTURE; Otherwise if >=5% worked in agriculture then the place was designated SEMI-RURAL; Otherwise if >=15% worked in transport then the place was designated TRANSPORT; Otherwise if >=7.5% worked in the professions then the place was designated SEMI-PROFESSIONAL; Otherwise the place was designated OTHER URBAN. This exercise was carried out separately for each year, allowing places to change character as economic development took place. NB: for 1871 occupational structure was not available, so type of place was assigned using 1861 and 1881 for the same areas, and this may account for some discontinuities in the series.
POP	Population	Number of people in the RSD	As recorded in the published census volumes
ACRES	Acreage	Acreage of the RSD	Calculated from the RSD GIS
TFR	Total Fertility Rate	An estimate of the average number of children a woman gives birth to between her 20th birthday and her 50th birthday.	There are no sources which record how many children women had over their lifetime in this historical period, so the TFR has been calculated by assuming that each woman successively experienced the age-specific-fertility-rates (ASFRs) of women in the five year age groups observed at a particular point in time. ASFRs and TFRs have been calculated using the Own Children Method

			with a database of the individual level census enumerators' books for each census year originally made available by the I-CeM project and further enhanced by the Atlas of Fertility project team.
ASFR_20-24	Age Specific Fertility Rate for women aged 20 to 24	An estimate of the number of children born per 1000 woman aged 20-24 per year.	Calculated from the census enumerators' books by identifying children and their mothers, working out how many children were born to women of each age in the five years leading up the census, and adjusting for various factors including child mortality and children living away from their mothers. ASFRs have been calculated using a database of the individual level census enumerators' books for each census year originally made available by the I-CeM project and further enhanced by the Atlas of Fertility project team.
ASFR_25-29	Age Specific Fertility Rate for women aged 25 to 29	An estimate of the number of children born per 1000 woman aged 25-29 per year.	
ASFR_30-34	Age Specific Fertility Rate for women aged 30 to 34	An estimate of the number of children born per 1000 woman aged 30-34 per year.	
ASFR_35-39	Age Specific Fertility Rate for women aged 35 to 39	An estimate of the number of children born per 1000 woman aged 35-39 per year.	
ASFR_40-44	Age Specific Fertility Rate for women aged 40 to 44	An estimate of the number of children born per 1000 woman aged 40-45 per year.	
ASFR_45-49	Age Specific Fertility Rate for women aged 45 to 49	An estimate of the number of children born per 1000 woman aged 45-49 per year.	
TMFR	Total Marital Fertility Rate	An estimate of the number of children a woman would give birth to if she married at age 20 and remained married (without her husband dying) until her 50th birthday	There are no sources for England and Wales which record how many children women had over their lifetime in this historical period, so the TMFR has been calculated by assuming that each woman successively experienced the observed age-specific-marital-fertility-rates (ASMFRs) of women in each age group, from age 20 until her 50th birthday. ASMFRs and TMFRs have been calculated using a database of the individual level census enumerators' books for each census year originally made available by the I-CeM project and further enhanced by the Atlas of Fertility project team.
TMFR_25	Total Marital Fertility Rate from age 25	An estimate of the number of children a woman would give birth to if she married at age 25 and remained married (without her husband dying) until her 50th birthday	There are no sources for England and Wales which record how many children women had over their lifetime in this historical period, so the TMFR25 has been calculated by assuming that each woman successively experienced the observed age-specific-marital-fertility-rates (ASMFRs) of women in each age group, from age 25 until her 50th birthday. ASMFRs and TMFRs have been calculated using a database of the individual level census enumerators' books for each census year originally made available by the I-CeM project and further enhanced by the Atlas of Fertility project team.

ASMFR_20-24	Age Specific Marital Fertility Rate for women aged 20 to 24	An estimate of the number of children born per 1000 married woman aged 20-24 per year.	Calculated from the census enumerators' books by identifying children and their mothers, working out how many children were born to married women of each age in the five years leading up the census, and adjusting for various factors including child mortality and children living away from their mothers. ASMFRs have been calculated using a database of the individual level census enumerators' books for each census year originally made available by the I-CeM project and further enhanced by the Atlas of Fertility project team.
ASMFR_25-29	Age Specific Marital Fertility Rate for women aged 25 to 29	An estimate of the number of children born per 1000 married woman aged 25-29 per year.	
ASMFR_30-34	Age Specific Marital Fertility Rate for women aged 30 to 34	An estimate of the number of children born per 1000 married woman aged 30-34 per year.	
ASMFR_35-39	Age Specific Marital Fertility Rate for women aged 35 to 39	An estimate of the number of children born per 1000 married woman aged 35-39 per year.	
ASMFR_40-44	Age Specific Marital Fertility Rate for women aged 40 to 44	An estimate of the number of children born per 1000 married woman aged 40-44 per year.	
ASMFR_45-49	Age Specific Marital Fertility Rate for women aged 45 to 49	An estimate of the number of children born per 1000 married woman aged 45-49 per year.	
LEGIT_RATE	Legitimate birth rate	The number of legitimate births in a year per 1,000 married women aged 15-49	Calculated using the numbers of legitimate and illegitimate births for each RSD published in the Registrar General's Annual Reports. In most cases the number of births has been averaged over three years: the year before the census, the census year and the year after the census year, in order to minimise the effect of small numbers. However 1910 was the last year for which data on the number of births by legitimacy was published for RSDs, so for our 1911 figures only births for 1910 were used. In some cases where boundary changes occurred in the three years around a census, the average was calculated using only births from the year where the birth and census data referred to the same RSD. For rates, the numbers of women by marital status in each RSD were calculated using the individual level census data, inflating the figure by the ratio of the female population in the I-CeM database to the female population for the same RSD published in the census reports. This was done to minimise the impact of data missing from the I-CeM dataset.
ILLEG_RATE	Illegitimate birth rate	The number of illegitimate births in a year per 1,000 single, divorced, widowed and 'marital status unknown' women aged 15-49	
ILLEG_RATIO	Illegitimacy ratio	The number of illegitimate births as a percentage of all births	

F_SMAM	Singulate mean age at marriage for women	An indicator of the average age at which women married	SMAMs measure the average number of person-years lived in a single (never-married) state among those who marry before age 50. They are calculated from the proportions of men or women single at each age.
M_SMAM	Singulate mean age at marriage for men	An indicator of the average age at which men married	Although they are not direct measures of the age at which the men or women in the population actually got married, they will be close to that if marriage patterns were not subject to rapid change, and in the absence of migratory movements which may swell or deplete the ranks of unmarried people with individuals who were unlikely to contribute to the marriage market.
F_CEL_4554	Female celibacy	The number of women aged 45-54 who were single (never married), expressed as a percentage of all women aged 45-54	The measure is calculated using the marital status and age information in the individual level census returns. Because few people married for the first time after the age of 50, this is taken to represent the percentage of the population who never marry.
M_CEL_4554	Male celibacy	The number of men aged 45-54 who were single (never married), expressed as a percentage of all men aged 45-55	
IMR	Infant Mortality Rate	The number of children who died before their first birthday out of each 1,000 children born, for the five years leading up to the census date.	To calculate the IMR we divided all deaths to infants (i.e. children under a year old) in the five years leading up to each census (e.g. April 1876 to March 1881 for the five years leading up to the 1881 census), by the number of children born in the same period, and multiplied by 1,000. Some of the deaths to infants dying in the early part of the period (e.g. in April 1876) will have been to infants born before the start of the period (e.g. in February 1876), but this is compensated for by the deaths of children born towards the end of the period e.g. in March 1881) who died after the census (e.g. in May 1881). This is the usual method for calculating the infant mortality rate. The data on infant births and deaths for each RSD were transcribed from the Registrar General's Quarterly Returns of Births, Deaths and Marriages. These data were not produced before 1869, so we have had to assume that infant mortality did not change between 1851 and 1869.
ECMR	Early Child Mortality Rate	The number of children who die between their first and fifth birthdays, out of every 1,000 children in that age group, for the five years leading up to the census date	ECMRs for the five years leading up to each census were calculated using a statistical model which relates ECMR to infant mortality, industrial structure, and other variables capturing the disease environment and socio-economic conditions (see DOI: 10.4054/DemRes.2017.37.58 for details of this process).
DOC	Doctors	The number of doctors per 10,000 people	This measure has been based on the occupations individual people recorded on the census forms. Doctors include all those reporting themselves to be a doctor, physician, surgeon, registered practitioner, etc. The number of doctors in each area has been divided by the population in that area and multiplied by 10,000 to get a rate per 10,000 people.
LP_FAM	Lone parent households	The number of households containing a lone-parent family (at least one child under the age	Lone parent families are defined as one parent (married, widowed or single) living with at least one unmarried child aged under 15. Because the census

		of 15 with only one parent present), expressed as a percentage of all households.	recorded each person where they happened to be on census night, rather than where they usually lived, it is impossible to tell if an absent husband or wife of a married parent was permanently or temporarily absent from the household. In the Victorian censuses, a household was not necessarily just a family: it may have included others living in the dwelling, such as boarders, servants, or more distant relatives. The census forms asked each individual to identify their relationship to the head of the household, and it is this variable which is used to identify family relationships. It is relatively easy to identify the spouse and children of the head of household, but more difficult to identify family groups which do not include the head. For example if a 'grandchild' was present in a household, it may not be obvious to which, if any, of the head's children that grandchild belonged. Thus this variable may undercount lone-parent families if a link between a parent and a child cannot be made, but overcount them when a parent-child link can be made but the link between parents is missed. The particularly low percentages of lone parent families in Oxfordshire and Berkshire in 1851 are likely to be connected to transcription issues making it difficult to make parent-child links. Other people (relatives or non-relatives) may also be present in a household with a lone-parent family.	
SINGLE_PER	Single person households	Households containing only one person, expressed as a percentage of all households.	The number of households containing only one person is divided by the total number of households and multiplied by 100	It might seem easy to define a household, but for the nineteenth century it is actually quite problematic. This is because families often rented out part of their homes under a variety of arrangements: from boarders who paid rent, ate with the family and may even have shared a bedroom with them, to lodgers who rented a separate floor or apartment. There was also potential confusion between boarders and relatives, as some relatives may have paid rent and qualified as both, but only one relationship could be
HOUSE_SERV	Households with servants	Households which had at least one live-in servant (excluding those specifically designated as farm servants), expressed as a percentage of all households.	This indicator has been calculated by classing each household where there was at least one person whose relationship to the head of household was given as 'servant' as a servant-keeping household. The number of servant-keeping households was then divided by the total number of households and multiplied by 100.	
BOARD	Households with boarders	Households containing at least one boarder, expressed as a percentage of all households.	Boarders were defined as people renting a room or bed in someone else's house, and taking meals with the householder's family. They can be identified by 'boarder' being written in the 'relationship to household head' column on the census form. A household has been classed as containing boarders if at least one person was identified as a boarder, and the number of households with boarders has been	

			divided by the total number of households and multiplied by 100.	recorded. Until the end of the nineteenth century, the
HH_KIN	Households with kin	Households containing people related to the head other than his/her immediate family, expressed as a percentage of all households.	The head's immediate family has been defined as either his wife (or her husband) and his or her unmarried children; or, if he or she is unmarried, his or her parents (and siblings too, but only if at least one parent is present). Any other people whose relationship to head suggests a family relationship (e.g. mother or mother-in-law of a married head, grand-child, niece or nephew) have been treated as relatives or kin. Any household with at least one person defined this way has been treated as a household with kin. The number of households with kin has been divided by the total number of households and multiplied by 100.	census instructions were not always clear about how to treat boarders and lodgers, let alone the grey areas in between (such as someone renting a room and using the kitchen). Lodgers were supposed to be recorded in households of their own. In some years census instructions to householders and enumerators made this more likely to have happened, and consequently the percentage of households containing only one person was higher, and the percentage containing boarders or more distant relatives (who may have also paid rent) was lower.
AV_AGE	Average age	The mean age of the population in the area	The average age of the population has been calculated using 'age last birthday' (i.e. whole numbers, with 0 for infants less than one year) as provided by each individual in the census enumerators' books. The age of every person who provided a valid age is added up, and the total divided by the number of people who gave a valid age.	
AV_AGE_F	Average age of females	The mean age of the females in the area		
AV_AGE_M	Average age of men	The mean age of the males in the area		
DEPEND	Dependency ratio	The number of dependents (children aged less than 14 and elderly aged 65 and over) per 100 working-age people (aged 14-64)	Everyone was asked to record their age in the census. We have counted the numbers of people in different age groups and divided the numbers of children (those aged under 14), elderly (those aged 65 and over), or both, by the number of working-age people (those aged 14-64) and multiplying by 100. We have identified dependent children as those under the age of 14, because many children older than this were earning money (see Children's work and schooling). Of course some children younger were also earning money - particularly at the beginning of the period - and many older children were not. Similarly many people carried on working past the age of 65, particularly before old age pensions were introduced in 1908 (even then, these were only	
C_WORK_AGE	Child dependency ratio	The number of children aged less than 14 per 100 working-age people (aged 14-64).		
ELD_WORK_AGE	Old age dependency ratio	The number of elderly aged 65 and over per 100 working-age people (aged 14-64)		

			available to those over the age of 70, and did not cover everyone). Men would have stopped working at various ages, depending on their health and resources, and married women of all ages were unlikely to have earned money outside the house although they would have been working hard running the household - important labour which, although unpaid, contributed enormously to the household economy. These factors mean that these dependency measures do not measure strict economic dependency, although they can be interpreted as measuring the potential dependency burden.
IRISH_BORN	Irish born	The number of people reported as having been born in Ireland, expressed as a percentage of the whole population	Calculated using the information on birth place reported in the individual level census returns.
SR	Sex ratio	The number of working-age men (14-64 years) for every 100 working-age women (age 14-64 years)	The numbers of men and women aged from 14 to 46 years have been calculated using the information on age and sex given for each person in the census. The number of men has been divided by the number of women and multiplied by 100.
HC1	Socio-economic status class 1	The number of men aged 14-64 years in HISCLASS 1, expressed as a percentage of all men aged 14-64 years.	HISCLASS is an international historical socio-economic status (SES) scheme, designed to allow comparisons across different periods, countries and languages (http://www.hisma.org/HISMA/HISCLASS.html). It allocates each occupational title to one of 12 classes, but here we have summarised those into just five larger groups. These five socio-economic groups are: 1 (HISCLASS 1 & 2): high skilled non-manual workers such as higher managers and professionals; 2 (HISCLASS 3-6): lower skilled non-manual workers such as clerical and sales personnel; 3 (HISCLASS 7-8): higher skilled manual workers such as plasterers, blacksmiths, farmers, and fishermen; 4 (HISCLASS 9-10): lower skilled manual workers including miners and many factory workers; and 5 (HISCLASS 11-12): unskilled manual workers including farm labourers and general labourers. The number of men aged 14-64 in each group has been counted, divided by the total number of men aged 14-64 who gave an occupation, and multiplied by 100. It is important to bear in mind that this definition of socio-economic status is unlikely to match exactly to status or consumption hierarchies, and that the levels of 'skill' embedded in the categorisation may be challenged.
HC2	Socio-economic status class 2	The number of men aged 14-64 years in HISCLASS 2, expressed as a percentage of all men aged 14-64 years.	
HC3	Socio-economic status class 3	The number of men aged 14-64 years in HISCLASS 3, expressed as a percentage of all men aged 14-64 years.	
HC4	Socio-economic status class 4	The number of men aged 14-64 years in HISCLASS 4, expressed as a percentage of all men aged 14-64 years.	
HC5	Socio-economic status class 5	The number of men aged 14-64 years in HISCLASS 5, expressed as a percentage of all men aged 14-64 years.	
SC1	Social class 1	The number of men aged 15-64 years in social class 1 (as defined by the Registrar General in 1911) expressed as a percentage of all men aged 15-64 years.	This classification was designed by the Registrar General (RG) of England and Wales in 1911. It is based on occupation, and allocates each occupational title to one of five RG's classes, while also singling out three groups of occupations for special treatment. These three special groups are not included in the five RG's classes. The RG's classes are: I: professional and managerial (e.g. doctor, lawyer, accountant); II: Skilled non-manual/intermediate (e.g. farmer, dealer);
SC2	Social class 2	The number of men aged 15-64 years in social class 2 (as defined by the Registrar General in	

		1911) expressed as a percentage of all men aged 15-64 years.	III: Skilled manual (e.g. plasterer, blacksmith, electrician); IV: Semi-skilled manual (e.g. machinist, postman, barman); V: Unskilled manual (e.g. labourer,
SC3	Social class 3	The number of men aged 15-64 years in social class 3 (as defined by the Registrar General in 1911) expressed as a percentage of all men aged 15-64 years.	watchman). The three special occupational groups are: VI: Textile workers; VII: Miners; and VIII: Agricultural labourers. The number of men aged 14-64 in each group has been counted, divided by the total number of men aged 14-64 who gave an occupation, and multiplied by 100.
SC4	Social class 4	The number of men aged 15-64 years in social class 4 (as defined by the Registrar General in 1911) expressed as a percentage of all men aged 15-64 years.	It is important to bear in mind that this definition of class is unlikely to match exactly to status or consumption hierarchies, and that the levels of 'skill' embedded in the categorisation may be challenged.
SC5	Social class 5	The number of men aged 15-64 years in social class 5 (as defined by the Registrar General in 1911) expressed as a percentage of all men aged 15-64 years.	
SC6	Social class 6: textile workers	The number of men aged 15-64 years in social class 6: textile workers (as defined by the Registrar General in 1911) expressed as a percentage of all men aged 15-64 years.	
SC7	Social class 7: miners	The number of men aged 15-64 years in social class 7: miners (as defined by the Registrar General in 1911) expressed as a percentage of all men aged 15-64 years.	
SC8	Social class 8: agricultural labourers	The number of men aged 15-64 years in social class 8: agricultural labourers (as defined by the Registrar General in 1911) expressed as a percentage of all men aged 15-64 years.	
FMAR_PRATE	Married women working	The number of married women aged 15 or over recorded as having an occupation (other than housewife or household duties), expressed as a percentage of all married women aged 15 or over	These variables have been calculated using the marital status, age, sex, and occupation fields in the individual level census returns. The number of women aged 15 or over in particular marital status groups and in employment were divided by the number of all women aged 15 or over in that marital status group and the result multiplied by 100.
FNM_PRATE	Single women working	The number of single women aged 15 or over recorded as having an occupation (other than housewife or household duties), expressed as a percentage of all single women aged 15 or over	
FWID_PRATE	Widowed women working	The number of widowed women aged 15 or over recorded as having an occupation (other	

		than housewife or household duties), expressed as a percentage of all widowed women aged 15 or over	
F_DOM	Female domestic service	Women aged 14-64 working in domestic service, as a percentage of all working women aged 14-64.	The percentage of women working in domestic service, or in the textile industry, has been calculated using the age and occupation fields in the individual level census returns. The number of women aged 14 -64 reported to be employed in domestic service, or in the textile industry, was divided by the number of all women aged 14-64 in employment and the result multiplied by 100.
F_TEX	Female textile work	Women aged 14-64 working in the textile industry, as a percentage of all working women aged 14-64.	
C_TEACHER	Children per teacher	The number of children aged 4 to 13 years for every teacher	The number of children has been calculated by counting the number of people from the age of 5, up to the age of 13. Teachers have been defined by their occupation as given in the census. The number of children per teacher has been calculated by dividing the number of children by the number of teachers. It must be remembered that not all children will have been going to school, and not all teachers will have taught children of this age. Therefore this measure is more about educational provision than it is about class sizes. It is also important to remember that teachers may have been living in one area but teaching in another.
F_CL_1013	Girls aged 10-13 in work	Number of girls aged 10-13 with an occupation, expressed as a percentage of all girls aged 10-13	The percentage of children working has been calculated using the age, sex, and occupation fields in the individual level census returns. The number of boys (or girls) aged 10-13 (or 14-18) has been calculated by counting the number of boys (or girls) from the age of 10 up to the age of 13 (or from the age of 14 up to the age of 18) who report an employment, dividing this number by the number of all boys (or girls) in that age group and multiplying the result by 100.
M_CL_1013	Boys aged 10-13 in work	Number of boys aged 10-13 with an occupation, expressed as a percentage of all boys aged 10-13	
F_CL_1418	Girls aged 14-18 in work	Number of girls aged 14-18 with an occupation, expressed as a percentage of all girls aged 14-18	
M_CL_1418	Boys aged 14-18 in work	Number of boys aged 14-18 with an occupation, expressed as a percentage of all boys aged 14-18	