SOURCES AND METHODS

This series considers a range of sources and methods commonly used in local population history. Each contribution is written by an experienced population history practitioner, and will usually address both the possibilities and the pitfalls of the respective sources and methods under discussion. The methods described vary in sophistication and complexity, but are intended to be those which might be useful to the broad readership of *Local Population Studies,* and are accompanied by worked examples. The *LPS* Board is happy to enter into correspondence on this item, which should be addressed in the first instance to the *LPS* General Office.

ESTIMATING LOCAL POPULATION SIZES AT FIXED POINTS IN TIME: PART I—GENERAL PRINCIPLES

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Introduction

One of the most basic pieces of demographic information that the local population historian requires is knowledge of the size of the population of the locality being studied, and how this changed over time. Without this information it is very difficult to characterise a community accurately as a village, market town or town, to establish growth or decline, or to calculate other demographic variables, such as birth or death rates. From 1801 onwards, the decennial censuses provide this basic information at parish level in the published census reports, but before that, it is rarely available. For some communities, census-type information from before the nineteenth century does survive, in the form of the various community listings that were first effectively employed by Peter Laslett and Richard Wall at the Cambridge Group for the History of Population and Social Structure (CAMPOP) in the 1960s, and which have been used by several historians since, to explore the structure of the family and household in pre-industrial England.[1] They are, however, relatively few, the sample of 100 used by Laslett representing just a small fraction of the 10,000 English parishes. Even the full 600 or so extant documents relating to the pre-1841 period held at CAMPOP cover only a small sample of all parishes, particularly as some parishes feature more than once in this collection. They are also concentrated in some areas (notably Kent, London, Westmorland and Staffordshire) and are either rare or completely absent in others (such as Lincolnshire, Oxfordshire, Cornwall and Cheshire).

Moreover, they are chronologically bunched, with large numbers surviving for the 1690s and 1790s, relatively few for earlier dates in the seventeenth century, and very few indeed for the sixteenth century or earlier.[2]

To establish population totals, therefore, recourse must be had to other sources that were not designed to provide a complete list of inhabitants, but were drawn up for other purposes. Prominent among these are taxation returns, ecclesiastical surveys and muster returns, all of which represent only a sub-set of the entire local population. In consequence, they must be adjusted to allow for the omission of different categories of inhabitant, which will vary from case to case, but might include women, children (themselves of different age ranges), the elderly, non-communicants or recusants, those too poor to be taxed, those who managed to avoid taxation, and those deemed not to be able-bodied and capable of bearing arms. Not surprisingly, historians have interpreted these sources in different ways, which on occasion has resulted in estimates—not only of population sizes but also of long-term trends—that are completely at odds with each other.[3] Indeed, debate over the correct interpretation of some of these sources has featured in previous editions of *Local Population Studies* (*LPS*).[4] It is not possible in the space of a short article to complete a full survey of these sources, still less to discuss them in detail. But what we can do is, first, to describe some important principles that lie behind their use and interpretation and to offer some warnings and, second, to provide a list of the more important sources with brief details on their interpretation, notes on any continued disagreement about their use, and a select bibliography. In part I of this article we discuss general principles, and in part II (to be published in *LPS* **78**) we will provide a list of the main sources, advice on their interpretation and a select bibliography. The main focus of the article is on the pre-census period.

Purpose and coverage of sources

The first point to insist upon is that both the purpose, and the intended coverage, of a source must be established before analysis can begin. This may sound obvious, but it is good practice which is not always followed even by professional historians. To give an example, some historians have treated the Exchequer Lay Subsidies of 1524–25 as if they provide a list of heads of household, and have hence applied a household size multiplier to convert taxpayers to total population, usually with some further allowance for those who may have been exempt from, or may have avoided, taxation. But in fact the subsidies were payable by all males aged 16 years or over, as both Roger Schofield and John Sheail pointed out in their PhD theses, written as long ago as1963 and 1968 respectively.[5] The distortion that such misinterpretation can produce is illustrated by considering a community of 100 taxpayers. Assuming that taxpayers are equivalent to household heads, and adopting a household size multiplier of 4.75 produces an estimate for the population of 100 x 4.75 = 475. Assuming that the taxpayers were males aged 16 and over, and that those under 16 constituted 37.5 per cent of the population leads to an estimate for the total number of males of 100 x (100/62.5) = 160, and, assuming

further that the population contained equal numbers of males and females, to a total population of 320. The discrepancy is substantial, the first estimate producing a figure 67 per cent higher than the second. If these figures were to be compared with calculations made for an earlier or later date, it is quite possible that the long-term trend of population growth or decline would differ according to which one was adopted. This is not to argue that the second calculation is necessarily correct and the first entirely erroneous, and arguments have been offered in favour of the former interpretation rather than the latter. But given the clear remit of the Exchequer Lay Subsidies to tax males aged 16 and over, the burden of proof that these returns were in fact lists of male household heads must fall upon those who insist upon treating them in this way. It must also, of course, be remembered that these are *lay* subsidies, and so exclude the clergy, for which an allowance might be made where they are known to have been of significant number.

A related issue is that of the geographical area which is covered by the source. Most sources will identify themselves with the name of a place, but it is not always clear whether, for example, the details in the source relate to the population of the parish, or just of the main settlement within it. Some sources are based on manorial boundaries, which may not always coincide with parish boundaries. The issue of the geographical extent of the data provided in a source is especially relevant when using a series of different sources to establish long-term population trends in a particular place. In rural areas dominated by nucleated settlement, the problem may not be too severe, as most of the population of a parish or a manor tended to live in the main settlement. In urban areas, however, or in those rural areas characterised by dispersed settlement, the geographical area covered by a source may be both more difficult and more important to establish.

In more recent data sources, notably in the nineteenth century, the problem is not so much that the geographical area to which a source relates is unknown, but that different sources close together in time, and occasionally different tables within the same source (such as a published census report), might relate to different geographical units. An example would be the varying use of registration districts and urban and rural sanitary districts at the end of the nineteenth century. During the last few years, efforts have been made to construct new (mainly electronic) databases which map the data as originally presented on to a standard set of boundaries.[6]

Quality and survival of sources

A second important group of considerations to recognise is that these sources, even when their purpose and intended coverage is clear, can vary considerably in quality, be subject to local or regional variation, and fall foul of local ineptitude or inefficiency. They might also be lost for a particular area due to archival neglect or the chance ravages of rodent infestation or warfare, and where long runs of similar documents exist they can vary markedly in their coverage from year to year. Let us take some examples to demonstrate

these points, again beginning with the Exchequer Lay Subsidies of 1524–25. For many counties coverage is excellent, although for none is it entirely complete. However, the returns for the counties of Bedfordshire, Cornwall, Derbyshire, Gloucestershire, Hereford and Kent, and possibly also Lincolnshire, Middlesex and Shropshire, are clearly very deficient, while in Lancashire and Yorkshire the surveys were conducted very differently from those in the southern counties. In general, the tax assessed is much higher in the south and east of England than in the north and west. Furthermore, comparison of the returns for 1524–25 with 1543–45 (the only other period for which the lay subsidies appear to achieve substantial coverage) shows similar numbers at the two dates in the south and east, but larger numbers at the latter date in the north and north-west, indicating a possible shortfall in that region in 1524–25.[7] Even when full returns do survive for a particular locality, they can be subject to the ravages of time, and are not always completely legible even with the aid of ultra-violet light. One can easily be misled by an entry in the appropriate List and Index Society volume where a documentary reference appears to guarantee coverage of a particular locality, only to be confronted with a partly legible, mouse-eaten fragment when one arrives at The National Archives. Fortunately we now have Richard Hoyle's edition of John Sheail's gazetteer of the 1524–25 and 1543–45 returns to guide us, though local researchers should, of course, still consult the original documents from which this has been compiled.[8] The ecclesiastical returns of 1563 and 1603 are even more patchy in their coverage, surviving for only 12 dioceses out of 26 in 1563, and only 16 in 1603, with only seven possessing returns for both years.

Laxity or ineptitude can often be detected in lists which only give totals of inhabitants by the use of round numbers. Any total for a community which is a multiple of one hundred should be treated with suspicion for, although it may be a good approximation, in most cases it will be an estimate rather than a head count. Many such cases occur in the ecclesiastical return of 1563, the so-called 'Bishops' Census'. These include the towns of Birmingham (200 'houseling people'), Lichfield (400) and Canterbury (700), but it is not only towns for which estimated numbers appear to have been given.[9] In the introduction to their authoritative edition of the ecclesiastical returns of 1563 and 1603, Alan Dyer and David Palliser analyse the proportion of individual returns in 1563 that are rounded to multiples of 10, 12 or 20 in each diocese for which information survives. Overall this tendency was very marked, but it varied considerably between dioceses, with a range for multiples of 10 rising from 10.4 per cent in Worcester to 57.8 per cent in Canterbury, a generally greater tendency to provide round estimates in deaneries further away from the diocesan centre, and somewhat greater evidence of rounding in larger parishes rather than smaller ones.[10] As Dyer and Palliser conclude: '[t]he moral of this analysis for the researcher is obvious. Districts should be assessed for their tendency to approximate to particular values, and those numerals should be regarded with caution'.[11] The same considerations, of course, apply to any listing of population or households that gives suspiciously round numbers, and if this tendency was more marked in the mid-sixteenth century when numeracy was in its infancy, many similar

examples can still be found in the ecclesiastical census of the mid-nineteenth century, at the height of the Victorian statistical movement.[12]

The Hearth Taxes of the later seventeenth century provide a good example of a source that is—taken at face value—apparently consistent, but in practice variable in quality. The Hearth Tax was levied from 1662 to 1689, and returns survive from 1662–66 and from 1669–74: in the intervening and subsequent years the tax was farmed and detailed returns are unavailable. It was levied according to the number of hearths per household, at the rate of 1 shilling (5p) for each hearth every half year. Those not assessed either for church or poor rates due to their poverty, and those whose house was not worth over £1 per annum and did not possess other lands and goods to the value of £10, were exempt, although in 1664 such exemption was limited to those with two hearths or fewer.[13] It is clear that the tax applied to households and not to houses, so in theory it should be relatively easy to establish a population total by applying a suitable household size multiplier. In practice, however, the returns are less straightforward than one might expect: many lists are clearly incomplete, some include those exempt while others do not, the treatment of paupers is unclear and variable, and totals can differ substantially from year to year even for the same locality. Local variations in the practice of administering the tax clearly occurred, while surviving documents come from different stages in the tax's collection.[14] In some instances the returns for 1662 or 1664 appear to be the most complete, for others the best lists are often those for 1674. Where several lists survive for a particular locality, it is essential to compare and choose between them. Where this is not possible, for example in the case of the town of Reading where the only surviving list is for 1664 and excludes those exempt from taxation, the source must be approached with due scepticism and recognition that it may be of very limited value on its own for the purpose of establishing population size.[15]

Another source that can present similar difficulties is the Compton Census of 1676. This ecclesiastical return, at its best, lists men, women and children—those conforming to the Church of England, those who were nonconformists and those who were 'papists' or Catholics. For most parishes, however, the lists only include those of age to communicate, which at this time meant those over the age of 16, while in other parishes only the number of male communicants is given. Fortunately, 'conjectural interpretation' of the probable coverage of the Compton Census for the various parishes for which it survives has been provided in Anne Whiteman's authoritative edition of the returns, these interpretations having been made on the basis of a range of comparisons with the ecclesiastical returns of 1603, the Protestation Oath of 1641–42, the Hearth Taxes where available and other local sources.[16] Despite its wide coverage, however, it is not comprehensive. Within the province of Canterbury, for example, there are no returns for the archdeaconry of St Albans or for the archdeaconry of Suffolk, while several individual parishes and groups of parishes are omitted in peculiar jurisdictions. In the Province of York, returns exist for only two of the four dioceses: Carlisle and York.[17]

Multipliers

In most cases, once a source has been identified, its intended coverage established and its reliability explored, a suitable multiplier will need to be chosen to convert the raw numbers it provides to a population total (we have already considered the example of the Exchequer Lay Subsidy). Some suggested multipliers will be included in Part II of this article, from which it will be seen that for some sources there is virtual consensus, for others considerable disagreement. It is essential to be up-to-date with the most recent relevant literature before settling upon a particular figure, and to avoid simply adopting one found in a secondary source, or in a guide to local history sources that may have been written some time ago: the author of your secondary source may have a particular axe to grind, while, as our understanding of sources changes with time, multipliers once seen as credible may no longer be regarded valid. As an example of the latter, J.C. Russell once thought that the medieval age of communion was 14, but more recent research suggests an age as low as 7 before the Reformation.[18] Nor are such multipliers necessarily conformable over time: by the seventeenth century the age of communion was 16, and hence the ecclesiastical returns of 1603 and 1676 have to be treated very differently to the communicants listed in the Chantry Certificates of 1546 and 1548. The age structure of the population will also change over time, and hence so too will allowances for proportions of children in the population. As the best estimates available, recourse might be had to the age structure calculated by quinquennia in Wrigley and Schofield's *The population history of England*.[19] Similarly, in periods of rapid population growth, particularly when associated with high fertility, one might expect the average household size to be higher than during periods of population stability or decline. That said, local demographic variations, often associated with particular socio-economic factors, may exert an overriding influence. In this respect, a detailed census of part of the town of Cambridge for the 1620s revealed particularly small mean household sizes in the town's suburbs, despite the rapid growth the town was experiencing, which could be explained by the relative poverty of these areas and the high incidence of plague they experienced.[20] Potential variations of this kind have to be considered, particularly for parishes and communities that possess distinctive social and economic features. Even the apparently straightforward doubling of a list of men to allow for women might be suspect in certain circumstances, such as in towns from the late seventeenth century where sex ratios were often skewed towards women because of the employment opportunities they provided in domestic service and other service occupations.[21]

Ranges of estimates and comparisons between sources and over time

For any locality, uncertainty will remain no matter how much care is taken in the selection, inspection and conversion of sources to produce population totals. For this reason two further strategies are suggested. First, it makes sense to offer hypothetical upper and lower estimates, particularly where source interpretation is most controversial, such as in the case of the

Exchequer Lay Subsidies of 1524–25. At the very least, the approximate nature of any estimate must be emphasised, to avoid misleading any reader who might be less familiar with the complexity and uncertainty of interpretation involved. Second, wherever possible calculations from different sources at similar dates should be cross-checked against each other. This strategy proved particularly fruitful for Anne Whiteman's elucidation of the local coverage of the Compton Census, but it is quite rare to find two sources (in this case the Compton Census and the Hearth Tax) so close together in time. For this reason, where parish registers survive, comparison between estimated population totals from fixed sources and the vital events the registers contain can often be revealing. It was this procedure that suggested that the totals given in the Bishops' Census of 1563 for some parishes in the town of Cambridge and county of Hertfordshire were suspiciously low, for when the totals the Census produced were compared with numbers of baptisms in extant parish registers the resultant baptismal rates were often far higher than one would have expected.[22]

To expand on this point further, if population sizes for the same place have been estimated for several points in time using different sources, it is worth considering whether, when all the estimates are taken together, the story implied about the long-term evolution of the place's population is both plausible and consistent with what is known about national population trends and with the numbers of vital events recorded in the parish registers. Clearly local populations did not always follow national trends. Local migration patterns can lead to variations, and an apparently abrupt change in a place's population might be a real effect of some local economic event (though there might be independent evidence of the latter). However, if the population of a place estimated from an early fourteenth-century source was smaller than that estimated using the Poll Taxes of the late fourteenth century, it should probably arouse suspicion.

The assumption of rule of thumb parameters for feasible baptismal rates might often help determine whether or not a particular listing produces totals that are within the bounds of probability, although it must also be noted that parish registers themselves change of time in terms of their reliability. This is, of course, why Wrigley and Schofield applied different correction factors to raw totals of baptisms, marriages and burials for different periods in their study of English population history between 1541 and 1871, and local historians might consider following the same procedure. This approach is exemplified by Janet Hudson's article on Stonehouse in Gloucestershire, printed in this very issue of *LPS*, although one must always remember that 'national' correction factors might not always apply to local communities.[23]

Hudson's study attempts to establish whether or not it is feasible to use parish registers on their own to establish population totals. Although her employment of chronologically specific correction factors adds sophistication, this is by no means a novel idea, and was in fact suggested by W.E. Tate as long ago as 1951.[24] The procedure suggested by Tate was to multiply the

number of baptisms by 30 to give an approximate population total, which assumes a crude baptismal rate of 33 per 1,000. Clearly, individual figures for particular years might not be representative, and so calculations should be based upon averages of at least five years, avoiding periods suspected to be exceptional (for instance, due to the incidence of epidemic disease or famine). Now that Wrigley and Schofield have provided estimated national crude birth rates for each quinqennium from 1541 to 1871, these might be preferred to Tate's rule of thumb figure, though again the changing quality and coverage of baptism registers over time, and the possibility of distinctive local demographic circumstances, must be born in mind.

Used in this way, parish registers form an important supplementary source which covers an extensive time span (from 1538 onwards), and with good (if variable) geographic coverage too. But there is another reason for examining at least the trend that counts of vital events in a particular locality reveals, and this is that sole reliance upon sources that survive only for specific dates can force consideration of the long-term population trend into a framework within which it does not sit comfortably.[25] While it is useful up to a point to know that, say, the population of a locality was larger in 1676 that it was in 1563 or 1603, this does not tell us anything about fluctuations that might have occurred between those dates, or identify key periods of growth. If we are to chart population change with more chronological precision, therefore, recourse must still be had to parish register evidence where available.

NOTES

1. P. Laslett and R. Wall eds, *Household and family in past time*, (Cambridge, 1972); N. Goose, 'Household size and structure in early-Stuart Cambridge', *Social History*, **5** (1980), 347–85.
2. P. Laslett, *The world we have lost further explored* (London, 1983), 289–90.
3. There has been particular disagreement over later medieval population trends, especially in towns. See, for instance, A.R. Bridbury, *Economic growth: England in the later Middle Ages* (London, 1962); R.B. Dobson, 'Urban decline in late medieval England', *Transactions of the Royal Historical Society*, **27** (1977), 1–22; J. Hatcher, *Plague, population and the English economy 1348–1530* (London, 1977); S.H. Rigby, 'Urban decline in the later middle ages: some problems in interpreting the statistical data', *Urban History Yearbook* (1979), 46–59; A. Dyer, *Decline and growth in English towns 1400–1640* (Basingstoke, 1991).
4. N. Goose, 'The ecclesiastical returns of 1563: a cautionary note', *Local Population Studies*, **34** (1985), 46–7; A. Dyer, 'The Bishops' Census of 1563: its significance and accuracy', *Local Population Studies*, **49** (1992), 19–37; Goose, 'The Bishops' Census of 1563: a re-examination of its reliability', *Local Population Studies*, **56** (1996), 43–53.
5. R.S. Schofield, 'Parliamentary lay taxation, 1485–1547' (unpublished Ph.D. thesis, University of Cambridge, 1963), now published as R. Schofield, *Taxation under the early Tudors 1485–1547* (Oxford, 2004); J. Sheail, 'The regional distribution of wealth in England as indicated in the lay subsidy returns of 1524/5', 2 vols (unpublished Ph.D. thesis, University of London, 1968).
6. See H. Southall, '*A vision of Britain through time*: making sense of 200 years of census reports', *Local Population Studies*, **76** (2006), 76–89; for a methodological discussion of the issues connected with standardising areal unit boundaries, see I.N. Gregory and P.S. Ell, 'Breaking the boundaries: geographical approaches to integrating 200 years of the census', *Journal of the Royal Statistical Society, series A*, **168**, 419–37.

7. R.W. Hoyle ed., John Sheail, *The regional distribution of wealth in England as indicated in the 1524/5 lay subsidy returns*, 2 vols, List and Index Society, special series, 28 and 29 (Kew, 1998), vol. 1, 36.

8. Hoyle, *Regional distribution*.

9. C. Phythian-Adams, 'Urban decay in late medieval England', in P. Abrams and E.A. Wrigley eds, *Towns in societies: essays in economic history and historical sociology* (Cambridge, 1978), 171.

10. A. Dyer and D.M. Palliser eds, *The diocesan population returns for 1563 and 1603*, The British Academy, Records of Social and Economic History, new series, **31** (Oxford, 2005), xxxv–xl.

11. Dyer and Palliser, *Diocesan population returns*, xl.

12. J. Burg, *Religion in Hertfordshire 1847–1851*, Hertfordshire Record Publications, 11 (Cambridge, 1995), 97–200; K.D.M. Snell and P.S. Ell, *Rival Jerusalems: the geography of Victorian religion* (Cambridge, 2000), 50–1. In a recent paper it has been estimated that the effect of this rounding is to inflate the actual attendance at Anglican services by 11 per cent, and those of 'old dissent' by perhaps 15 per cent: see A. Crockett and R. Crockett, 'Consequences of data heaping in the British religious census of 1851', *Historical Methods*, **39** (2006), 24–46.

13. Statutes of the Realm, 14 Chas. II, c.10. See also T. Arkell, 'Printed instructions for administering the Hearth Tax', in K. Schürer and T. Arkell, *Surveying the people: the interpretation and use of document sources for the study of population in the later seventeenth century* (Oxford, 1992), 39–40.

14. C.A.F. Meekings ed., *The Surrey Hearth Tax of 1664*, Surrey Record Society, 17 (1940); C.A.F. Meekings ed., *Dorset Hearth Tax assessments 1662–4*, Dorset Natural History and Archaeological Society (Dorchester, 1951); T. Arkell, 'Assessing the reliability of the Warwickshire hearth tax returns of 1662–1674', *Warwickshire History*, **6** (1986–7); Arkell, 'Printed instructions', 39–40.

15. TNA, E179/76/460.

16. A. Whiteman, *The Compton Census of 1676: a critical edition*, The British Academy, Records of Social and Economic History, new series, **10** (Oxford, 1986).

17. Whiteman, *Compon Census*, lvi–lvii.

18. E.A. Wrigley and R.S. Schofield, *The population history of England 1541–1871: a reconstruction* (London, 1981), 565.

19. Wrigley and Schofield, *Population history of England*, 528–9.

20. Goose, 'Household size and structure'.

21. P. Corfield, *The impact of English towns 1700–1800* (Oxford, 1982), 99; N. Goose, P*opulation, economy and family structure in Hertfordshire in 1851: vol. 2 St Albans and its region* (Hatfield, 2000), 42.

22. Goose, 'Cautionary note'; Goose, 'Bishops' Census'. The debate over this issue continues: Dyer and Palliser, *Diocesan population returns*, xliv–l.

23. J. Hudson, 'Parish population reconstruction in Stonehouse, Gloucestershire: an experiment using Wrigley and Schofield's correction factors', *Local Population Studies*, **77** (2006), 24–41.

24. W.E. Tate, *The parish chest* (Cambridge, 1951), 81.

25. N. Goose, 'Urban demography in pre-industrial England: what is to be done?', *Urban History*, **21** (1994), 278.