A DRAFT AGENDA FOR THE ARCHAEOLOGICAL STUDY OF HISTORIC BURIALS IN GREATER LONDON

Allen Archaeology Limited

Report number: 2015083

Prepared for Historic England

June 2015

Allenarchaeology

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Document Control

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Version no.:	1.2	12/06/2015

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1.0 Introduction

1.1 - This document is based upon the results of an audit and resource assessment carried out by Allen Archaeology Ltd for Historic England and the subsequent discussions which took place at a seminar held at the Museum of London on 26th May 2015.

1.2 - The seminar also raised a number of concerns regarding the direction and practicalities of burial grounds studies. Foremost was the need for a synthesised approach which gives equal weight to osteological and archaeological evidence and includes better integration with other disciplines, particularly history and historical geography but also epidemiology, population statistics and computer modelling of spatial patterns. There was a call for greater use of primary historical sources such as diaries and for examining the potential contribution of oral history.

1.3 - London is uniquely positioned to enable such studies with a wealth of historical data available: Bills of Mortality, the reports of the Medical Officer of Health; records of hospitals, workhouses, the Coroner, parish churches, non-conformist congregations, guilds, and newspaper reports to name but a few. Osteological and archaeological studies can also be used to investigate the reliability of the historical accounts.

1.4 - The discussion group considered it important that the research questions in any agenda can be continuously refined and are easily accessible. Greater use of on-line resources and information sharing, particularly in regards to advice on specialist analyses, was called for. Finally the issues of budgeting for commercial analyses was raised and it was felt that a robust framework in which priorities could be established and resources applied appropriately, was essential.

1.5 - This document is intended to form a first draft for discussion of the construction of just such a formal research agenda for burials within Greater London 1066–1900. It should be read in conjunction with the resource assessment carried out as part of the previous stage of the project (AAL 2015a and b). At the top level the themes outlined are transferable to burial archaeology nationwide; beneath this lie London-centric themes and questions.

1.6 - How do we ensure that an agenda is kept up to date and how can the results of work be effectively fed back into that agenda? How can this be effectively linked with OASIS? An on-line solution seems the most plausible answer and should be further explored. It was suggested that a central location is needed for in which the results of destructive analysis could be registered as this is an area of study which changes rapidly. The British Association for Biological Anthropology and Osteoarchaeology (BABAO) is compiling a database of curated collections of human remains and this may provide a valuable source of comparative material.

2.0 Proposed research themes

2.1 - The Research Framework for London (Nixon *et al.* 2002) contains a number of framework objectives which relate, directly or indirectly, to the potential contribution of burial grounds to our understanding of the past. Under its major themes, burial studies can make a significant contribution to investigating regionality (TS2); identity, ethnicity and social status (TS4); demography, death and disease (TS5); ideology, cult and religion (TS6); and catastrophe and upheaval (TC3).

2.2 - With the inception of the Wellcome Osteological Research Database (WORD), White (nd.) wrote on what we then knew of London's past population and identified topics for discussion. Table 1 shows the synergies between these sources and recent research (see Table 2).

Area of recent research	Research priority/Framework objective (Nixon *et al.* 2002)		White (nd)
Biomechanics			
Burial practices	**M3**	**Understanding the differences between burial practices in the City and beyond it**	Burial practice – religious beliefs and social attitudes
	L6	**Establishing how the material expressions of religious belief changed through time**	
Catastrophe	**M5**	**The impact of the Black Death**	
Child health and nutrition	**M3**	**Addressing regional variations in the health of the population over time and with reference to urban regeneration issues**	
Climate change			
Congenital disorders			
Demography	**M3**	**Understanding how the archaeological record reflects changing demography with respect to ethnically and functionally distinct groups**	Demography
Dental disease			
Diet			Diet
Ethnicity	**M4**	**Attempting to identify religious and ethnic groups**	
Evolution of disease	**M3**	**Understanding they pathology of major diseases**	Paleopathology, epidemiology and the evolution of disease
Growth			Growth and physique
Health and disease	**M3**	**Addressing regional variations in the health of the population over time and with reference to urban regeneration issues**	Health and disease
Human evolution			
Infection			
Interpersonal violence			Interpersonal violence
Joint disease			
Metabolic disease			
Methods (age at death, sex estimation etc.)	**L4**	**Establishing and testing models for use in studying earlier, non-documented populations**	
Metrics			Growth and physique
Migration	**M4**	**Attempting to identify religious and ethnic groups**	
	M6	**Using the archaeological record to trace individual lives**	
Neoplastic disease			
Obesity			
Social activity and health			Social habits (smoking, fashion and community hygiene)
Stable isotopes	**M6**	**Using the archaeological record to trace individual lives**	

Area of recent research	Research priority/Framework objective (Nixon *et al.* 2002)		White (nd)
Status	**M3**	**Using the archaeological record to address issue of social status and develop models**	
Surgery and medicine			History of disease and advances in medicine, surgery and dentistry
Taphonomy			
Trauma			
Urbanisation	**L2**	**Understand how the proximity of the metropolis affected the lives of those living and working in the immediately surrounding area**	Urbanisation and industrialisation
	L4	**Characterising the effects of people's bodies of living in London**	
	L9	**Examining the wider issues relating to poverty, social deprivation and disease in the East End**	
			Care for the disabled
			Stress and activity

Table 1: Research themes identified by previous authors and covered by recent research

2.3 - This resource assessment has focused predominantly on osteological sources. To complete an effective research framework it is recommended that this is integrated with an evaluation of what we have learnt, and what questions we still have as the result of non-burial archaeology and from historical studies.

2.4 - A series of thematic topics, and sub-themes are presented below. The short statement of key findings are supplemented with summaries of recent research into London's population (Table 2) and for key sites (Appendix 2). Questions are proposed for each sub-theme. Whilst some sub-themes require a period-based approach, the overarching themes define fundamental ideas which can be universally applied. The examination of temporal and spatial patterns for all the topics outlined should be considered an overarching aim.

Environment and health (M3, L2, L4)

2.5 - When investigating the interaction of environment and health, it is important to consider zooarchaeological and botanical information and to draw on our knowledge of the wider environment when examining cemetery populations. At present there is a dearth of large comparative populations from outside London and this limits the potential for urban/rural comparisons. As throughout this agenda, it is vital to also consider documentary and historical evidence to compile the wider picture.

The impact of urbanisation

2.6 - The process of urbanisation did not occur as a uniform process across Greater London. Further, whilst the processes of industrialisation and urbanisation are intrinsically linked, they are not continuous and will effect human health in different ways.

2.7 - Whilst the enormous potential of smaller samples must not be overlooked, in order to draw conclusions about the wider environment, large cemetery samples are of particular value. It is also vital to integrate archaeological and osteological data with historic documents and to look to other disciplines, such as historical geography, in order to place individual sites and burials into their wider social context.

2.8 - Analysis of the medieval population of St Mary Spital has shown the impact which migration to an urban environment can have on human health (Connell *et al.* 2012). The population of London more than doubled in the first half of the 19th century and the metropolis expanded to absorb previously rural, discrete settlements. Examination of the population buried at St Marylebone Church showed that there may be observable differences in health status between those living within London and on its margins, reflected in lower rates of infections in the marginal population (Miles *et al.* 2008). The forthcoming publication of results from St Paul's Church, Hammersmith will make an important contribution to understanding populations living on the rural fringe of 19th century London but, due to a lack of excavated and published sites, our understanding of the direct impact on health of living suburbs and margins of the metropolis remain limited

- What tools and models can we create which will enable better evaluation of changes to the local environment over time?
- How does urbanisation affect health and wellbeing?
- What are the positive effects of urbanisation on health and access to resources?
- Can the emergence and distribution of certain pathological conditions, such as tuberculosis or neoplastic disease be used to define and locate the process of urbanisation?
- How does population expansion affect the prevalence of disease?
- How did urbanisation affect social organisation and influence health status?
- How does access to resources affect nutrition?
- What evidence is there of declining health associated with urban expansion?
- How did industrialisation influence child mortality, growth and development?
- What does the survivorship of deficiency disease such as rickets and scurvy tell us about environmental change and the density of habitation?
- How did increased pollution affect human health, for example with increased rates of respiratory disease?
- How does urbanisation affect family dynamics?
- Is there a direct correlation between increasing housing density and declining health?
- Does urbanisation lead to increased tension and interpersonal violence?
- How has subsequent land use biased the type of cemeteries which are now at risk from development?

Responding to catastrophe

2.9 - Mass burials from St Mary Spital have been shown to relate to periods of famine (Connell *et al.* 2012), whilst those at East Smithfield are definitively associated with the Black Death. The reason for mass graves at St Bartholomew's hospital remains unclear and the point at which a mass mortality event results in a change in burial practices, lends itself to further investigation.

2.10 - The relationship between the Great Famine and the Black Death is thought to be as reflected in interruptions in the formation of dental enamel (e.g. Antoine and Hillson 2005). Isotopic investigations of the mobility of this group, and of their contemporaries at West Smithfield, have also been carried out and have demonstrated a mobile population with some individuals undergoing migration-related dietary change (J Montgomery pers. comm.).

2.11 - We still have no direct archaeological evidence of the Great Plague and only one potential burial site which may relate to warfare, despite the potential for numerous medieval battle sites within Greater London.

- What are the long-term social and health implications for the survivors of catastrophe?
- How can age at death profiles tell us more about the cause of catastrophes?
- Can we identify population subject to 'normal' burial practices who died in periods of catastrophe?
- What variety is there in the social response to catastrophe as reflected in burial practices?
- How have different catastrophic events (e.g. famine, war, plague) interacted to affect London's population?
- Is there any archaeological evidence of the Battle of Barnet (1471)?
- Do stacked graves indicate a response to catastrophe?
- Did 17th century plague pits really exist and if so where are they?
- Can spatial analyses identify potential catastrophic burial sites?

The evolution disease (M3, M5)

2.12 - Systematic historical research which is directly related to the osteological evidence which excavation of burial grounds can provide us, is necessary to provide a fuller picture of the disease load and response of past populations.

2.13 - A key question must be how the mobility of the population of a City with well-developed and extensive trade links and involvement in international conflicts affected the acquisition and transmission of disease.

2.14 - With improvements in our understanding of the potential of DNA studies for examining pathogens, what are the most effective techniques to employ to minimise the impact of destructive testing whilst maximising information gained?

Defining the Black Death

2.15 - The recent work of DeWitt (Bos *et al.* 2012) and others has now definitively established the presence of Yersinia pestis DNA in individuals buried at the two, known Black Death cemeteries at East and West Smithfield. In order to evaluate the effect of the Black Death on the population and establish whether the historical accounts of its affects are accurate, it is necessary to compare buried populations from before, during and after the epidemic. Through just such a comparison it has been concluded that a high incidence of hypoplasia amongst the adults buried in the mass graves at East Smithfield is associated with their exposure to the Great Famine (1313–1317) during early childhood. However, establishing well-dated medieval populations is problematic and to date the excavations at St Nicholas Shambles and St Benet Sherehog remain the largest medieval parish cemeteries investigated in Greater London.

2.16 - We still do not fully understand when and how the population gets back on its feet after the upheaval of the epidemic, or what the longer term changes to the demographic composition of Greater London and to patterns of migration and settlement were. Manorial records remain under-explored in this respect and there are significant linkages to be made with the work of historical geographers. The documented reduction in the size of the population following the Black Death may have had positive effects, improving the local environment and reducing overcrowding, which in turn reduced the danger from diseases such as tuberculosis?

- Are the populations from east and West Smithfield representative of the proportion of the population killed by the Black Death?

- Did exposure to the Great Famine place individuals at an immune disadvantage later in life?
- Did the Black Death affect the population equally, regardless of socio-economic status?
- Does the presence of hypoplasia reflect status differences in those who were killed by the Black Death as opposed to those who were not?
- Is there evidence of improved health status, environment and/or access to resources in the post-Black Death population?
- Did population decline result in reduced rates of tuberculosis?
- How does London compare with the other major urban centres of medieval Europe?
- What was the impact of the Black Death on population structure and social organisation?
- Did the Black Death result in fundamental changes to the expression or incidence of other diseases?
- What does the apparently organised and planned response to burying the victims of the Black Death mean?
- Did the fear of contagion irrevocable alter burial practices or was the apparent change driven by pragmatic concerns?
- How did different parishes respond to the catastrophe?

The origins and development of syphilis

2.17 - Syphilis is a disease loaded with social implications. Pre-Colombian cases have been identified in the sample from St Mary Spital together with a rapid increase in the prevalence of treponematosis in the 15th to early 16th centuries (Connell *et al.* 2012). Further medieval examples are seen at Merton Priory (Miller and Saxby 2007) and St Thomas' Hospital, where the victims included a subadult. Evidence from outside London suggests an even earlier origin for the disease in Europe (Cole and Waldron 2011).

2.18 - Walker *et al.* (2014) noted little evidence of a change in the distribution of lesions over the medieval period. However, florid bony changes seen in examples from Christchurch Spitalfields (Molleson and Cox 1993), St Pancras (Emery and Wooldridge 2011), Red Cross Way (Brickley *et al.* 1999) and City Bunhill burial ground (Connell and Miles 2010). Tucker (2007) investigated chemical evidence for the use of mercurial treatments. How might these have affected the diseased?

- How does the expression and survivorship of venereal syphilis change over time?
- As aDNA extraction is not possible, what other methods are there for improving diagnosis of treponeamal disease?
- With the now clear evidence for pre-Columbian syphilis in Europe, does contact with South America result in increased virulence?
- Is there archaeological evidence of social stigma as the result of infection with venereal syphilis?
- Were the victims of treponeamal disease subject to differential burial practices?
- How often were treatments prescribed and used?
- What can the prevalence of venereal syphilis tell us about differences in social behaviour over time and between cultural or demographic groups?
- Is the assumption that many of those admitted to the asylums of the 18th and 19th century were suffering from the effects of tertiary syphilis true?
- Did changes in social behaviour change the nature of the disease itself?

Revealing invisible diseases -

2.19 - We have no osteological evidence of acute disease or those which leave no direct trace on the skeleton and this includes some of the biggest killers in past populations. To date there has been just one study on the possibility of identifying malaria in London populations and this is an area which would benefit from further research. Two possible cases of smallpox osteomyelitis have been reported (Miles *et al.* 2008; and CHB summary for REW92).

2.20 - In order to investigate the impact of waterborne disease is it necessary to examine differences between urban and sub-urban populations, those with known risks and those from environments where the risk is believed to have been low.

- Is it possible to identify 'invisible' diseases from the presence of concurrent conditions, differences in burial practices or other archaeological evidence?
- What was influenza known as in the past and is there evidence of periodic epidemics?
- Can the impact of waterborne diseases such as typhoid and cholera be seen in the archaeological record?
- Is there any evidence of documented epidemics (e.g. cholera in the early 19th century)?
- How might different diseases impact upon the demographic patterns seen in buried populations?
- How are the clinical signifiers of disease reflected in the osteological record?
- What are the implications of concurrent conditions for diagnosis of specific disease?
- How can we target burials for DNA studies for 'invisible' diseases?

Emerging and declining diseases

2.21 - The decline in leprosy and concurrent rise in tuberculosis is well-attested but as yet there is little archaeological evidence of the former amongst medieval samples (e.g. Grainger and Phillpotts 2011) and one example dating from the post-medieval period (Miles *et al.* 2008). A Lock Hospital for Lepers was established at Lock Fields, Elephant and Castle, the site of the recently demolished Heygate Estate.

2.22 - Some conditions are thought to be related to post-industrial environmental changes. Observed rates of cancer are generally low in archaeological populations but metastatic carcinoma is reported from All-Hallows-by-the-Tower (Melikian 2006), St Pancras (Emery and Wooldridge 2011) and the London Hospital (Fowler and Powers 2013); malignant chondrosarcoma from Merton Priory and a nasopharyngeal carcinoma from New Bunhill Fields, Southwark (Miles 2012). There remain few reported examples of poliomyelitis and congenital conditions such as Downs' syndrome and achondroplasia appear similarly rare.

2.23 - Cases of rheumatoid arthritis also appear to be associated with populations of more recent date (e.g. Miles *et al.* 2008), whilst alcoholism is also suggested to be a modern problem that, whilst it is unlikely to leave a direct trace on the skeleton, may result in increased risk of injury, interpersonal violence, lower age at death and birth defects in the children of alcoholic parents.

- What was the 'Sweating sickness' of the Tudor period?
- Do diseases recorded in the documentary record genuinely disappear or do they re-emerge or evolve to become known as different conditions?
- Can we draw conclusions on the period of time between emergence and outbreak for different diseases?
- How do the osteological, historical and documentary evidence for the prevalence, signs and symptoms of infectious diseases compare?

- Can we determine the relationship between the prevalence of tuberculosis and leprosy?
- Was tuberculosis an indiscriminate killer?
- What evidence is there for the emergence of new diseases and what are the implications for their evolution?
- Are some conditions, such as rheumatoid arthritis, intrinsically associated with 'modern life'?
- Why do some now relatively common congenital conditions appear underrepresented in past populations?
- Is there any archaeological evidence of the effect of the 'gin craze' of the 18th century on public health?
- Did the increased efforts to implement measures to improve public health in the 19th century have a notable effect on the population of London?
- Can the impact of the introduction of inoculations and vaccinations be seen in the burial record?
- How did the mobility of Empire effect the transmission and emergence of disease?
- Has pollution increased over time and adversely affected health?
- Did the widespread introduction of smoking lead to a rise in cancers?

Population structure and composition (M3)

Demography

2.24 - Conheeney (1999) undertook a preliminary investigation of comparative demography for medieval London and identified issues and questions. Since then, Gowland and Chamberlain (2005) carried out Bayesian analysis of the demography of the population buried at East Smithfield and substantiated the archaeological contextual information that the Royal Mint population resulted from an epidemic with high mortality. Further work at St Mary Spital (Connell *et al.* 2013) thoroughly investigated the differences between attritional and catastrophic populations, but the problems of establishing a statistically significant sample of a suitably refined date (as seen at St Martin of Tours, Chelsfield (Compass Archaeology 2007)) remain. Small numbers of infant burials have been noted at several medieval sites (e.g. Compass Archaeology 2007; Connell *et al.* 2013). Elsewhere, sample biases have artificially inflated post-medieval infant mortality. Demographic biases have also been noted elsewhere such as the disproportionate quantity of males at the Savoy Hospital burial ground, Westminster, thought to be related to the proximity to a barracks (L Sibun *pers. comm.*).

2.25 - There appear to be discrepancies between the documented and archaeologically recovered numbers of children. Crypt samples are inherently demographically (and socially) biased, but we do not know what affect this bias may also have on the demography of the extra mural cemetery.

- Are our assumptions about child mortality rates correct?
- How can DNA analysis contribute to our understanding of childhood?
- Are sex ratios stable over time?
- Is the apparent male bias in past populations genuine or methodological?
- Are there demographic profiles which are typical of family plots?
- What level of demographic zonation is seen?
- What interpretative limitations are imposed by recovery and sampling strategies?

Growth, morphology and metric analyses

2.26 - Morphological studies have been conducted to investigate activity related change in Augustinian monks and to examine hand preference in 18th century seamen. Investigations of adult stature have fairly consistently concluded that there is no difference in overall attained height between groups of different status (e.g. Miles *et al.* 2008), but there are some results which conflict with this (Boyle *et al.* 2005). A wealth of skeletal and dental metric data has been collected, but as yet relatively little has been done to draw out patterns within it or conclusions from it.

- Can differences in adult stature be seen between populations of different date and presumed status?
- What is the wider potential of morphological studies?
- Can metric analysis be used to improve methodologies for estimating subadult sex?
- Is the reported change in cranial shape over time genuine and what does it mean?

Social stratification and differentiation (M3, L9)

2.27 - For the medieval period, work at St Mary Graces' has suggested that there was no particular differentiation related to social status (Grainger and Phillpotts 2011). There has been much work examining the differences between monastic populations and the lay populace, but we do not have a comprehensive overview of possible inequalities.

2.28 - It is now possible to compare populations from different types of cemetery as well as of different dates (e.g. private cemetery vs religious establishment). Lower status groups include St Bride's Lower Churchyard with its association with Bridewell workhouse and Fleet prison. However, the pattern is not simple and many burial grounds contained a wide spectrum of individuals.

2.29 - Weapon related trauma and other evidence of interpersonal violence is relatively sparse but injuries conforming to patterns expected of sporting activities have been noted (Miles *et al.* 2008).

2.30 - Burial grounds containing socially distinct groups, such as those interred at the naval burial ground in Greenwich provide the potential for effective investigations of occupation related skeletal changes.

- What influence did social and economic factors have on the health of medieval Londoners?
- How does social change affect the risk and transmission of disease throughout life?
- Are high levels of trauma, infection, congenital anomalies and metabolic disease particularly associated with some socio-economic groups?
- Can seasonal population variations be identified?
- Can incidence of interpersonal violence be linked to social stratification or status related conflict?
- Is there any evidence of judicial execution?
- Is stature a reliable indicator of status?
- At what point was the social status required for crypt burial attained in life?
- Does the gap between rich and poor change over time and if so, how is this reflected in their health status and burial practices?
- Are there reliable osteological indicators of occupation?

Mobility and migration (M3) -

2.31 - Results from St Mary Spital (Connell *et al.* 2013) and recent biochemical analyses undertaken on burials from West Smithfield have shown that medieval migration may have been commonplace (J Montgomery *pers. comm.*.), but studies remain limited at present. The samples from Bermondsey Abbey have been identified as having the potential to identify individuals of French origin.

2.32 - By the time of the 1841 census, 40% of Londoners had been born elsewhere. A French émigrés presence has been seen at St Pancras (Emery and Wooldridge 2011) and evidence suggests the Catholic Mission of St Mary and St Michael served a migrant population chiefly of Irish descent and there is a documentary account of the burial of a 'Lascar' at Sheen's Burial ground (Henderson *et al.* 2013).

2.33 - The mobility of the population will have influenced health, introducing or enabling exposure to new pathogens and increasing population stress.

2.34 - People did not just move to London, they also left it, through choice and necessity: post Dissolution, the Poor Law required those needing to access parish charity to return to the place of their birth. Individuals who lived and died in workhouses might have lived their economically productive years elsewhere. The sick and inform may also choose to go home to die, perhaps leaving the City and returning to its hinterland resulting in a merging of urban and rural characteristics in the buried populations.

- How mobile was the population of medieval London?
- What factors influenced the movement of people between the towns which now comprise Greater London?
- Can we examine the role of economic migration and the impact of communication between the urban centre and rural hinterlands and between urban settlements?
- How did the Great Famine influence regional migration patterns?
- What can we say about the diversity of London's population and how this changed over time?
- How can metric analyses assist with the identification of individuals from different ethnic groups?
- Can migrant workers and merchants from the far reaches of the Empire and beyond be identified in the burial record?
- Can evidence of 'exotic' diseases be used as an indicator of migration?
- How many migrants to London returned home to die?
- Should we look for Londoners in cemeteries outside London?
- Were the dead transported significant distances for burial?
- Does the City pull people in to die?

Child health, mortality and nutrition

2.35 - Work at St Mary Spital enabled a detailed examination of child health in the medieval period and of the influence of the practice of apprenticeships on wellbeing (Connell *et al.* 2013). Adolescents at monastic assemblages such as Merton Priory (Miller and Saxby 2007) have been identified as possible novices. Reports of infant mortality rates vary, but have been reported to be lower than expected from the London Bills of Mortality (Miles *et al.* 2008). Growth retardation and high rates of active rachitic changes have been seen at a number of lower status sites such as Sheen's Burial ground and the Catholic Mission of St Mary and St Michael (Henderson *et al.* 2013), but also amongst higher status groups,

notably St Marylebone (Miles *et al.* 2008). Isotopic studies on weaning are also being undertaken. Examples of traumatic injury remains few and far between but include two greenstick factures from St George the Martyr. Other unusual and largely unexplored conditions include three sites with cases of Hystiocytosis X.

- When did childhood start?
- Was the timing of puberty later in the past?
- What evidence is there for status related differences in child health?
- Can examples of child neglect be seen?
- What factors affected growth in past populations?
- What influence did the timing of changes in diet and of weaning have on child health?
- Did wet nursing have an adverse effect on infant health?
- Did apprenticeships increase risk and result in an 'adult' health status for children?
- How does childhood growth compare with dental age across time and across Greater London?
- Are out assumptions that the past was a period of high infant mortality correct?
- How many children did the average family have and how did family size affect child health?
- Does the inclusion of a child in an adult grave indicate a genetic or social relationship between the two?
- Is there evidence of the clandestine burial of infants in adult graves?

Diet

2.36 - Whilst diseases associated with dietary deficiency have been relatively extensively investigated, at least for assemblages of more recent date, with the exception of Patrick's (2007) study of DISH and its presumed link to obesity in monastic burials, there has been little investigation of the ill effects of dietary excess. Gout is reported relatively frequently, whilst a general decline in dental health over time is reported and assumed to be linked to the increasing availability of refined sugars. Dental caries is commonly seen in 19th century subadults, including examples of 'bottle caries' which reflect poor infant feeding practices. Differing diets may also be a reflection of cultural differences: for example, work at St Mary and St Michael's has shown that an incoming population maintained their traditional diet despite movement to a new area (Henderson *et al.* 2013).

- Can differences in the health of monastic populations be linked to the dietary regimes followed by the orders?
- Does both adult and child dental health decline at a similar time and pace?
- What evidence is there for malnourishment?
- Is there evidence for dietary excess, the introduction of new foodstuffs or alcohol intake?
- What contribution can stable isotope studies make to our understanding of past diet?

Ageing

2.37 - Waldron's 1992 study of osteoarthritis in the Black Death cemetery at the Royal Mint found age related patterns, and comparison with those buried in the crypt of Christchurch Spitalfields identified that whilst prevalence rates were different, the pattern of sites affected was the same. He suggested that an increase in female osteoarthritis was likely to be a recent phenomenon, but what more have we learnt since 1992? Examples of senile osteoporosis and of cancers associated with ageing have also been seen.

- What is the evidence for life expectancy and the health of the aged?
- Is ageing influenced by social status or primarily by individual variation?
- What evidence is there for the care of the elderly?

- Which areas were served by workhouses?
- Do the buried populations associated with workhouses reflect a predominantly elderly demographic?

Exploring the value of named assemblages (L4)

2.38 - It is widely acknowledged that the discovery of named individuals provides a wealth of opportunities or research, but how widespread is such information? At present named assemblages and individuals from Greater London are largely limited to those contained within cemetery assemblages from the 18th and 19th centuries, with a few notable exceptions such as Anne Mowbray (d.1481). We must also acknowledge the limitations of such evidence: better preserved depositum plates will tend to be those manufactured from more expensive materials and coffin plates could not be afforded by many ordinary people. Some religious groups did not undertake such practices. The study of named individuals therefore has inherent bias and we must be cautious not to further marginalise those of lower socio-economic status in our interpretations of past society. Innovative use of burial ground plans may enable identities to be assigned to those without surviving depositum plates or memorials.

2.39 - Named individuals have the potential to provide control groups for a variety of scientific, archaeological and forensic studies. The value of named individuals to public outreach should also be considered and has been noted in relation to the positive publicity surrounding the excavation of Christ Church, Spitalfields (Mays 1999, 332). There is a clear and increased interest in family history and genealogical studies and effective, well-presented research can provide a tool for deeper public engagement.

Biographies and methods development

2.40 - Biographic data studies, providing individual life histories, have been carried out regularly as part of developer funded work. High status groups such as St George's Bloomsbury, St Brides and Christchurch Spitalfields have now been joined by well documented named samples from flat cemeteries (e.g. Bow Baptist church, Sheen's burial ground), providing greater potential for studies which consider social status and religious affiliation. Some attempts have been made to match osteological information to contemporary records of health and disease (for example Archbishop Arthur Richard Dillon at St Pancras (Powers and White 2011), or the Reverend Newman at Bow Baptist church (Henderson *et al.* 2013).

2.41 - The potential to link named individuals with documented events, not just through wills but through coroners' records, accounts of criminal proceedings and so forth, remains. Named samples have and are being used, as was proposed by Molleson and Cox (1993), for methods development for example, developing a revised methodology for auricular surface ageing using the known age burials from St Brides, Fleet Street.

- How can we establish the potential for correlating historical accounts with known individuals to provide a direct connection to past people?
- What areas of methods testing and development remain unexplored?
- How can analysis of named, family groups improve our understanding of non-metric traits?
- How can we better apply the lessons learnt from studying named individuals to our analyses?
- What can biographic data tell us about age, sex, seasonality, movement and occupation and the interaction of these factors with individual health?
- Can archaeological information be correlated with that from Coroner's records?

- Can skeletal data be linked with wider documentary information for named individuals to provide a more fully rounded personal story?
- What can the creation of family biographies add to our understanding of London's population?
- How can fertility and child rearing practices be examined through examination of named groups?
- What evidence is there that the wishes of the dead pertaining to their burial, as expressed in their wills and other documents, reflect actual events?
- How can osteological and archaeological data be used to determine bias and inaccuracy within the historical record?

Belief, religion and non-conformity (M3, M4, L6, TS6)

2.42 - When examining the influence of religion on burial practices, demography and health it is necessary to acknowledge that belief and personal expression of belief are not fixed throughout the life of an individual. The doctrines of religious groups also change over time with divisions emerging and groups becoming joined or subsumed into one another. Examining a theologically fluid process via the fixed point presented by the death of an individual is problematic, but osteobiographies and individual burial practices may provide clues to individual behaviour, whilst cemetery layout and organisation may enable interpretation of the views of the wider community.

Dissention, division and non-conformity

2.43 - Although by far the greatest proportion of burials originate from Christian cemeteries, the diversity of religious groups is now better represented than was the case a decade ago. Monastic samples dominant our knowledge of medieval London and there large samples associated with Cistercian and Augustinian establishments though Bermondsey Abbey remains the only sizable Cluniac cemetery. Female monastic establishments remain far less well studied with only a few individuals excavated from Syon House and Holywell Priory.

2.44 - Despite a known significant presence in London from the medieval period onwards, there is very little archaeological evidence of the Jewish population. There have been no excavations of Jewish burial grounds or of (identifiably) Jewish individuals. Whilst the archaeological study of such populations poses logistical and ethical challenges, they formed, and continue to form, and important part of London's population and there are examples of successful studies of populations from medieval and later Spanish sites, for example in Toledo, Barcelona and Valencia (Márquez-Grant *et al.* 2011).

2.45 - Execution by burning was, historically, the punishment for the crime of heresy and one which was repeatedly invoked during the medieval period and into the 16th and early 17th centuries. Although burning was also used as a punishment for other offences (and continued to be used as such into the 18th century). Whilst there are documented execution sites in London, for example at West Smithfield, no archaeological or osteological evidence of the process or of the barbaric results has been identified.

2.46 - The Quaker burial ground, Kingston was the first Quaker cemetery to be fully excavated and remains the only significant sample of its kind from Greater London. Interestingly, graves here were predominantly aligned north-south, whilst those at St Mary and St Michael were reversed (head to the east). In addition to Bow Baptist Church, a small

assemblage of Baptist burials was recovered from Wakefield Street. Bunhill fields is one of London's largest non-conformist burial grounds (*c.*1820–1860), but burials recovered from private, unconsecrated or non-denominational cemeteries now number the low thousands. The Jesuit Cemetery, Whitelands College, Roehampton provided limited information about the burial practices of this distinct group (Melikian 2004). Catholic groups also remain represented by a single assemblage, St Mary and St Michael (Henderson *et al.* 2013).

2.47 - The historical records available for non-conformist groups, who were not required to provide centralised registers of births and deaths until the 1830s, will vary considerably. Previous studies have shown that Quaker and Baptist communities were often very efficient record keepers.

- Do female monastic burials display significant differences to their male counterparts?
- What was the size and demographic composition of the medieval Jewish population?
- How has religious persecution influenced the visibility of differential burial practices?
- What are the differences in material culture between non-conformists and members of the Church of England?
- How does cemetery layout vary within and between groups (e.g. burial plots for children in Baptist burial grounds)?
- Does cemetery layout conform to that required by written doctrine?
- Can different religious groups be identified through characteristic burial practices or demographic patterns?
- Can we derive predictive models for burial orientation, density and so forth where religious affiliation is known?
- Are non-conformist cemeteries disproportionately affected by disturbance and development, both in the past and at the present time?
- Are non-conformist cemeteries more likely to undergo a change of use?
- How reliable is the historic map evidence regarding the number and location of non-conformist burial sites?

Marginal and unexplained burial practices

2.48 - A small number of isolated burials from the Thames foreshore have now been securely (radiocarbon) dated but their origins remain unclear (Cohen and Wragg 2013), as do isolated examples such as two burials associated with a Civil War ditch at St Mary Spital. A small number of individuals have been interred with domestic crockery, predominantly plates. The motivations for this practice are as yet unclear though an association with the burials of women and of children seems possible. Containers thought to be for salt have also been found. The medieval burials from Holywell Priory included a high status individual who may have undergone post-mortem ablation of the heart; a practice for which there is very little archaeological evidence (D Walker, *pers. comm.*).

- What burial practices are to be considered unusual in this period?
- Are isolated post-medieval burials and those within domestic settings exclusively those of non-conformists?
- To what extent is individuality and 'folk belief' reflected in non-normative burial practices?
- What does the practice of burial with domestic crockery signify and is it limited to the 19th century?
- Can we find evidence of early embalming or separation of body parts in the medieval period?
- Is it possible to identify the point at which embalming became commonplace in the 19th century?

- Was the influence of family bonds stronger than that of religious doctrine?

The material culture of burial archaeology

2.49 - Medieval monastic burial practices have been thoroughly investigated by Gilchrist and Slone (2005), but as yet there has been no similar study of lay burial for the medieval period. The post-medieval period is seen as one of uniformity and yet the material record does not entirely support this. Our knowledge of coffin furniture has significantly improved since the excavations at Christchurch, Spitalfields. New designs of coffin furniture were recorded at St Pancras and at Bunhill Fields burial ground, Southwark (Emery and Wooldridge 2011; Miles 2012).

2.50 - Burial clothing, textiles, floral tributes and personal items have been found at Bunhill Fields (Miles 2012), St Paul's Church, Hammersmith, Paddington Street burial ground, Westminster and St Mary and St Michael (Henderson *et al.* 2013). Excavations at St Mark's Church, Surbiton changes in funeral furnishings to more religious iconography, wider adoption of floral tributes and cremation and inhumation together in family graves (Ives 2013). The 21 wooden grave markers from Kilday's burial ground Bethnal Green remain a very rare discovery (Ives *et al.* forthcoming).

- What is the value of the artefactual evidence (textiles, wood, floral tributes, metalwork)?
- Are there demographic or status related patterns in grave goods?
- Can a change from shrouded to clothed burial be identified?
- Is there archaeological evidence of changes associated with the Burial in Wool Act?
- Are there patterns in the types of objects included within graves in the medieval and post-medieval periods?
- How was childhood commemorated?
- Considering taphonomic issues, how frequent were floral tributes?

Past attitudes to the dead

2.51 - No substantial evidence of the use of medieval ossuaries remains in London, although there is limited information from St Mary Spital both in terms of the contents of the charnel house and in its eventual clearance.

2.52 - There are a number of other sites which provide sometimes contradictory evidence of past attitudes to disturbing the dead. At St Bride's lower churchyard, individuals in the vault had been moved to make space for later interments (Brickley *et al.* 1999) whilst a similar movement of coffins at Christchurch Spitalfields left one individual propped up, head downwards (Molleson and Cox 1993). At St Mary's Newington, Southwark, some of the disarticulated bone resulting from the partial clearance of the graveyard in the 19th century had been arranged in patterns. A high degree of truncation and intercutting was seen at Sheen's Burial ground (Henderson *et al*. 2013) and St John's Bethnal Green (Ives *et al*. forthcoming) whilst elsewhere there are notable attempts at preventing the intercutting of graves and at moving bodies to prevent their disturbance by building works (e.g. Fowler and Powers 2013).

2.53 - Evidence from St Mary Axe demonstrates how much human remains may move, with the same group of skeletons having been excavated and reinterred three times, in 1860, 1951 and 1989.

2.54 - A preserved foetus in a jar found at St James, Bowling Green Lane remains unique and its presence in a cemetery, intriguing (Ives and Melikian 2009).

- How did our ancestors view the disturbance of the dead?
- How is this reflected in cemetery management, disuse and reuse?
- Did burial by strangers have an adverse effect on the individuality of burial practices?
- Does truncation and reuse of graves reflect a lack of respect for earlier individuals or a pragmatic attitude to the issue of burial density?
- Is it possible to establish the period of time which elapsed between burial and disturbance and does this change through the medieval and post-medieval periods?
- What evidence is there of the length of time between death and burial?
- There is evidence of both family plots with reopening of grave shafts, and of pragmatic use of space - how can we tell the difference?
- To what extent were the documented wishes of the deceased followed?
- Deeply stacked burials appear to be the norm in later burial grounds, but how much is this a reflection of the spatial sample bias towards inner city grounds?
- Which cemeteries are well organised and why – can we develop predictive models for spatial arrangement?
- How has the Victorian way of death altered modern perceptions of past burial practice?
- What can archaeological evidence tell us of the working practices of the gravedigger?
- How much does the physical evidence support that contained within burial registers?

The history of medical and dental treatment

Dentistry

2.55 - The expense of dentistry in the late 18th and early 19th century made it the preserve of the wealthy. With the exception of Whittaker's seminal work at the crypt of Christchurch Spitalfields in the early 1990s (Molleson and Cox 1993; Whittaker 1991; Whittaker and Hargreaves 1991), reports on 18th and 19th century dental prosthesis and fillings is limited.

2.56 - A wealth of evidence has been collected (e.g. Boston *et al.* 2009; Miles *et al.* 2008; Emery and Wooldridge 2011), but the number of examples recorded at each site is generally low and little work has been undertaken on the composition of the materials from which these prostheses were made. That which has been carried out has yielded some surprising results requiring a re-assessment of our assumptions on aesthetics and functionality in regards to price (Pohl 2006).

2.57 - Trade directories can identify dentists who were working in particular locales and there is the potential for comparison with the collections of odontological museums.

- What are the demographic and spatial patterns within the dataset?
- Who had access to dental treatment?
- Was experimental dentistry offered to the poor free of charge?
- How successful were the dental treatments of the past?
- To what extent was restorative dentistry a purely cosmetic concern?
- How can trade directories help us to understand the archaeological evidence?
- Is there any osteological evidence of the extraction of teeth from the living or the dead to provide raw materials for dental treatment?
- Is it possible to create a chronological and typological framework to inform future investigations?

Anatomical teaching and the Enlightenment -

2.58 - There have been many social historical investigations of dissection and anatomical teaching in the period spanning the Anatomy Act but few have referred in detail to the contemporary skeletal assemblages. Recent excavations at Farringdon, Red Cross Way, St. Pancras and Marylebone cemeteries, current excavations in Whitechapel and previous excavations elsewhere have uncovered small numbers of individuals with craniotomies indicating a post-mortem had taken place (Roberts and Cox (2003) cite a total of 28 autopsied individuals from London).

2.59 - Evidence of autopsy has now been found at a large number of sites of varied dates and status (e.g. St Benet Sherehog, Sheen's burial ground, Christchurch Spitalfields, St. Mary's Newington), with both adults and children affected, though the preserved foetus in a jar found at St James, Bowling Green Lane remains unique (Ives and Melikian 2009), and raises many question about burial practices and attitudes to the dead (see above). The ongoing work of Dittmar is examining the possibility of differentiating between autopsy and dissection through microscopic study of toolmarks, whilst others have suggested differentiation based on patterns across the skeleton (Fowler and Powers 2013), but there remains a degree of confusion in the publication record as to the significance of evidence of post-mortem intervention.

2.60 - Much of this evidence pre-dates the Anatomy Act, for example assemblages associated with St Bartholomew's (GLS01) and with the London Hospital (Fowler and Powers 2013), yet documentary records indicate that dissection took place on a huge scale after 1832.

2.61 - Direct evidence of bodysnatching remains limited to the empty (save for a blonde wig) lead coffin of Anna Barnard at the Quaker Burial ground Kingston (Bashford and Sibun 2007) and disturbed graves in Surry (R Ives *pers. comm.*).

- What demographic pattern is there to the subjects of autopsy and dissection found at archaeological sites?
- What osteological evidence is there for potential fatal conditions that might explain the need for an autopsy?
- Where is the evidence of Dissection post-dating the Anatomy Act of 1832?
- Can Coroner's record assist in differentiation between autopsy and dissection?
- What is the prevalence of autopsy and how does it vary by age and sex and over time?
- Is there evidence of conflict between individual or family wishes and the behaviour of medical institutions?

Treatment, care and the development of medical and surgical techniques

2.62 - There is a growing corpus of evidence of medical and surgical treatment, notably the early examples of a presumed hernia belt and three cases of surgical intervention, including a trepanation, from Merton Priory (Miller and Saxby 2007) and examples from St Mary Spital (Connell *et al.* 2013). The assemblage from St. George the Martyr included a possible example of cranial surgery.

2.63 - At the Quaker cemetery, Kingston, walnuts were found buried with the body, and their folk medicine association with madness may indicate that the occupant was considered to be mentally ill (Bashford and Sibun 2007). It is possible that some burials recovered from Broadgate (LSS85) are from the nearby post-medieval Bethlem Hospital (see also ongoing work for Crossrail under site code XSM10) and other sizeable hospital assemblages of both medieval and post-medieval date have now been excavated.

2.64 Osteological studies have now presented us with numerous examples of individuals who suffered from ailments which would have left them requiring care. The population at St Mary Spital provided sufficient examples to enable Redfern and Mitchell (2011) to devise a new classification system for developmental hip anomalies. Small numbers of obstetric deaths are recorded (e.g. Emery and Wooldridge 2011), as are examples of maternal osteomalacia.

- How does the expression of disease relate to treatments, 'cures' and long-term survivorship?
- How widespread was access to surgery in the medieval period?
- Where were London's leper hospitals and what level of care did they provide?
- Was medical treatment the preserve of the wealthy in the post-medieval period?
- What evidence is there for the use of prosthetic limbs and/or crutches?
- What evidence is there of changing surgical techniques over time?
- What evidence is there for the treatment of medical conditions?
- What do we know about female health, obstetric care and maternal mortality?
- What can the archaeological record tell us about the risks of obstetric death?
- How do the buried populations from cemeteries associated with hospitals compare to those from non-hospital sites?
- How widespread is the archaeological evidence of medical or surgical treatment?
- What is the archaeological evidence for medical equipment production sites?
- How can the archaeological and documentary records of hospitals be used to complement one another?
- How can archaeological studies make better use of the specimens held in medical institutions collections?
- How do the quoted rates of surgical procedures such as amputations compare with the archaeological evidence?

The science of burial archaeology (M6)

2.65 - Recent guidance has highlighted the potential of destructive analysis of archaeological human tissue (Mays *et al.* 2013). However, there is a need to ensure that destructive analysis is driven by robust and well-integrated research questions, driven by the 'traditional' archaeological data, and that expectations are realistic. The potential of destructive analysis should be discussed from project inception, and appropriate specialist advice sought, particularly where remains are to be reinterred.

2.66 - In the commercial sphere, such work will usually require collaboration with a Higher Education Institute and there is a need for early consultation to enable mutually achievable costs and timetables to be agreed. Contracting organisations need to ensure that they have, or have access to the resources to enable them to interrogate and understand the significance of the results of such studies. There should be an emphasis on making accessible the results of such analysis, even when they are unsuccessful or will not form part of a formal publication, to ensure that the learning process can be shared widely, but speculative studies should not be discouraged as it is often these that enable method development.

2.67 - It is acknowledged that within Greater London, the collections curated by the CHB have been particularly heavily used for scientific analyses and that there is a need for new collections to prevent oversampling leading to the loss of other osteological information.

DNA -

2.68 - Problems of poor preservation may compromise the potential for DNA studies but they remain a source of potential information for the study of ethnicity and population dynamics and for establishing the sex of subadults, which can then in turn enable further research into demographic patterns in health, disease and burial practices. DNA can also be used to investigate some pathogens and their evolution (for example recent work confirming that the organism which caused the Black Death was indeed *Yersinia Pestis* – see above). Best practice for tissue sampling needs further development.

- How can DNA studies enhance our understanding of the interaction between sex and gender?
- How can DNA analysis contribute to our understanding of childhood?
- Can familial relationships be determined and do they support the documentary evidence?
- How did the major pathogens affecting London evolve over time?
- How do individual genetics and the incidence and expression of disease interact?
- Why was the mortality rate of the Black Death so high?

Stable Isotopes

2.69 - Bone represents an averaged chemical signature whilst hair, fingernails and teeth capture discrete data. Using destructive analyses of tissue samples it is possible to build 'life histories' examining diet, population movement, and exposure to pollutants. Despite the wealth of developer-funded excavation within greater London, the potential of such study is still under-explored. Isotopic study of hair samples was undertaken at City Bunhill burial ground (Connell and Miles 2010) and a comprehensive study undertaken of St Mary and St Michael and Bow Baptist church (Henderson *et al.* 2013).

Dental calculus

2.70 - Recent work is starting to show the potential of studies of dental calculus for contributing to our understanding of health, disease and environmental. Calculus can provide information on the oral biome and traps environmental and dietary particles.

- Can particulates within dental calculus provide information on wider environmental pollution and individual occupation?
- What information can dental calculus provide on individual health status?

Environmental sampling

2.71 - Samples for stomach contents and parasites taken at St Mary Spital proved negative but there is still a lack of agreement as to the value of such samples and of soil sampling as a means of investigating taphonomic change. On site sampling needs to consider contextual integrity and the potential of contamination from nearby water sources and cannot be carried out in isolation from the contextual information or without adequate control samples.

2.72 - Environmental sampling of grave fills may also provide evidence of the remains of floral tributes and organic materials used to line coffins.

Taphonomy

2.73 - The analysis of post-medieval remains in particular presents opportunities to advance our understanding of diagenesis and to feed the results of that study back into the fields of forensic archaeology and anthropology.

- What new and recent scientific developments have there been?
- How can deposited assemblages be revisited to provide answers to new questions?
- How do soil conditions and burial practices affect the preservation of different archaeological materials within burial grounds?
- What is the potential for constructing 'life histories' of individuals and groups using coordinated biochemical, osteological and documentary studies?
- What can biochemical studies tell us about the living environment?
- How do the levels of exposure to pollutants vary across Greater London and over time?
- Can isotopic studies of human remains be used to examine rainfall patterns?
- When should archaeologists consider the sampling of soft tissues and autopsy of well-preserved individuals?
- What is the potential of soil samples from within graves?
- How can SEM analysis add to osteological studies?
- How can radiocarbon dating be best targeted to enable the most comprehensive and useful results?
- Is radiocarbon dating of value in the post-medieval period?
- Is the sampling of soil from within the sacrum an effective mechanism for investigating parasite load?
- Under what taphonomic parameters does evidence of parasites survive?

A sense of self: fashion and social identity

2.74 - Walker and Henderson (2010) established that pipe smoking appears to have been culturally influenced, perhaps even providing a population level indicator of a migrant group and that smokers had significantly higher rates of pulmonary disease and lower life expectancy.

2.75 - Elsewhere, hallux valgus has been tentatively linked to fashionable footwear (Miles *et al.* 2008). We know that shoes were not always made for the wearer and that, in later periods, there was an extensive trade in second hand clothes. Rib deformities resulting from corsetry have been recorded (e.g. Powers and White 2011), predominantly, but not exclusively, affecting females. Whilst an example from medieval Yorkshire has been reported (Groves *et al.* 2003), none have yet been noted in London populations of this date.

2.76 - Personal items recovered from graves also provide information on appearances, for example hair ornaments, clothing and jewellery (Henderson *et al.* 2013) and ribbons from City Bunhill burial ground (Connell and Miles 2010). There is now a significant corpus of such items which may form the basis of further study.

2.77 - By examining burial practices and grave inclusions in conjunction with osteological evidence it may be possible to examine the differences between social and biological maturity in past populations and to start to examine gender.

2.78 - Skeletal evidence of the effects of castration has been found in an individual from post-medieval Italy (Belcastro *et al.* 2011). Whilst the phenomenon of the *castrati* (boys and young men who were castrated to preserve their unbroken voices) was not as widespread in England as elsewhere in Europe, given population mobility it is not impossible that such individuals would have lived and/or died in London.

- Is personal identity reflected in burial practices, grave inclusions and dress for burial? -

- Does burial dress reflect the clothing and personal adornment worn in life?
- To what extent can social variation and stratification be seen to be reflected in burial dress?
- To what extent did working women wear corsets?
- At what date does deformity resulting from restrictive corsetry start to be seen?
- At what age might corset deformity be expected to occur and does the osteological record reflect this?
- Can integrated cemetery studies enable investigations of gender as opposed to biological sex?
- What evidence is there for transvestitism in past populations and is this reflected in the burial record?
- Is there any evidence of the presence of *castrati* in London?
- Can integrated cemetery studies enable us to distinguish between social and biological maturity across time and in different population groups?
- Can skeletal indicators of habitual smoking be used as a cultural identifier?
- How widespread was the anti-slavery movement's boycott of sugar and can it be seen to have had a positive effect on dental health?

3.0 Conclusions

3.1 - There are significant temporal gaps in the current evidence. There are few sizable early-medieval samples and populations from the period between the Dissolution and the end of the 17th century remain under-represented. This includes archaeological evidence of the Plague.

3.2 - There remains a lack of information on female ecclesiastical establishments (nunneries): excavations at Holywell Priory (HLW06) and Syon Park have both produced samples of <50 individuals and tentative evidence for an ability to identify nuns through evidence of religious clothing (staining from pins associated with headdresses).

3.3 - Although a number of medieval hospital samples exist, there is no published synthetic study of this group. There have still been no excavations of leper hospitals in London.

3.4 - Similarly, although several excavations have impacted on burial grounds associated with workhouses at Poland Street (MSR06), Bridewell (FAO90), and St Giles (YKW01), there has been no specific study of such a population group, the poorest of post-medieval society.

3.5 - Although there have been several recent excavations of Baptist groups of which Bow (PAY05/BBP07) is the largest, there remains a dearth of Dissenters with excavations at the City Bunhill Burial ground (GDA06) providing the largest group. Evidence is often little more than anecdotal, for example the watching brief carried out at EWERST87 which recorded Dissenter burials which had been reinterred when railway arches were built over a known 17th–18th century Quaker burial ground in 1864 or the presumed 18th century burial ground at Mansell Street (MAN82). No Jewish populations have been examined to date.

3.6 - There has been less work on non-osteological aspects of these cemetery samples and on synthetic, thematic examination: Gilchrist and Sloane (2005) examined monastic burial practices in great detail and more recently Henderson *et al.* (2013) and Miles and Powers (2011) have looked at the influence of religion on burial practices in the post-medieval period.

3.7 - There are significant spatial gaps in the available evidence: we know little about marginal settlements and parishes, particularly in earlier periods.

4.0 Acknowledgements

4.1 - Allen Archaeology Ltd wish to thank Sandy Kidd of Historic England for commissioning this audit. Particular thanks are due to Stuart Cakebread and Sarah-Jane Hathaway of the GLHER and to David Gordon, who collated the original version of 'the Book of the Dead' upon which this study has drawn. Thanks are also due to Chris Constable and Adrian Miles who provided additional data for the gazetteer of sites, and to all those who attended the seminar at the Museum of London on 26th May 2015.

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Appendix 1: Recent osteological research involving assemblages from Greater London -

Theme	Who	When (end date)	What	Samples used (if known)	References
Biomechanics	L Cashmore	2007	Hand morphology, hand preference and laterality	KWK99	BABAO Annual review 2006: February 2007, Issue 8
	C Bennet		Activity-related bone changes in Augustinian monks	MPY86	CHB website
	A McCarthy		Musculo-skeletal markers of the skeleton	REW92	CHB website
Burial practices	R Wroe Brown	2014	Coffin plates from St Marylebone	clearance	MOLA records
	A Matthews		Archaeological evidence for recognition of priestly burials	MPY86	CHB website
Catastrophe	M Prentice	1999	aDNA analysis of teeth for Yersinia pestis	MIN86	CHB website
	D Antoine and S Hillson	2005	Famine, Black Death and health in fourteenth century London	MIN86	CHB website; Antoine, D.M. and Hillson, S.W. 2005. Famine, Black Death and health in fourteenth century London, Archaeology International 8, 26-28.
	H Poinar	2007	aDNA analysis of teeth for Yersinia pestis	MIN86	CHB website
	S DeWitte *et al.*	2012	Genetic study of the Black Death (y pestis)	MIN86	CHB website; Bos, K.I., Stevens, P., Nieselt, K., Poinar, H.N., DeWitte, S.N. and Krause, J. 2012. Yersinia pestis: new evidence for an old infection. PLoS One. 2012;7(11):e49803; Bos, K.I., Schuenemann, V.J., Golding, G.B., Burbano, H.A., Waglechner, N., Coombes, B.K., McPhee, J.B., DeWitte, S.N., Meyer, M., Schmedes, S., Wood, J., Earn, D.J., Herring, D.A., Bauer, P., Poinar, H,N., and Krause, J. 2011. A draft genome of Yersinia pestis from victims of the Black Death. Nature 12.478.7370, 506-510; DeWitte, S.N. 2012. Sex differences in periodontal disease in catastrophic and attritional assemblages from Medieval London. American Journal of Physical Anthropology 149, 405-416; DeWitte, S.N. and Bekvalac, J. 2011. The association between periodontal disease and periosteal lesions in the St Mary Graces cemetery, London, England AD 1350-1538. American Journal of Physical Anthropology 146, 609-618; DeWitte, S.N. 2010. Sex differentials in frailty in Medieval England. American Journal of Physical Anthropology 143, 285-297; DeWitte, S.N. 2010. Age patterns of mortality during the Black Death in London, AD 1349-1350. Journal of Archaeological Science 1.37, 3394-3400; DeWitte, S.N. 2009. The effect of sex on risk of mortality during the Black Death in London, A.D. 1349-1350. American Journal of Physical Anthropology 139, 222-2.34; DeWitte, S.N. and Wood, J.A. 2008. Selectivity of Black Death mortality with respect to pre-existing health. Proceedings of the National Academy of Sciences 105.5, 1436-1441; Schuenemann, V.J., Bos, K., DeWitte, S., Schmedes, S., Jamieson, J.,

Theme	Who	When (end date)	What	Samples used (if known)	References
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	V Mueller	2013	The end of the world? Famine, plague and climate change in 14th century London	MIN86	BABAO Annual Review 2007: February 2008, Issue 9; Kendall, E.J., Montgomery, J., Evans, J.A., Stantis, C. and Mueller, V. 2013. Mobility, mortality, and the middle ages: identification of migrant individuals in a 14th century Black Death cemetery population. American Journal of Physical Anthropology 150, 210-222.
Child health and nutrition	I O'Donnell	2003	An investigation of the radiographic features of rickets and infantile scurvy with reference to a lower class population from industrial London	REW92	BABAO Annual Review 2003: February 2004, Issue 5
	D Antoine	2003	Did the Great Famine of AD 1315-1323 have a detectable effect on the growth of people who experienced it as children?	MIN86	BABAO Annual Review 2003: February 2004, Issue 5; CHB website
	R Ives and T Kausmally	2006	Lytic lesions in infantile human skeletal remains from post medieval London	FAO90	CHB website
	R Pinhasi *et al.*	2006	Morbidity, rickets and long-bone growth in post-medieval Britain	LSS85	Pinhasi, R., Shaw, P., White, B. and Ogden, A.R. 2006. Morbidity, rickets and long-bone growth in post-medieval Britain- a cross-population analysis. Annals of Human Biology 33: 372-389.
	A Ogden *et al.*	2007	Gross enamel hypoplasia in molars from subadults in a 16th to 18th century London graveyard	LSS85; REW92	CHB website; Ogden, A. R., Pinhasi, R. and White, W.J. 2007. Gross enamel hypoplasia in molars from subadults in a 16th to 18th century London graveyard. American Journal of Physical Anthropology 133: 957-966.

Theme	Who	When (end date)	What	Samples used (if known)	References
	A Ogden *et al.*		Gross dental hypoplasia in subadults	LSS85	BABAO Annual review 2006: February 2007, Issue 8
	L Calderwood		Differential Infant and Childhood Morbidity and Mortality in 19th century London		BABAO Annual Review 2010: February 2011, Issue 12
	B Hassett		Changing world, changing lives: enamel hypoplasia and child health in post-medieval London		BABAO Annual Review 2010: February 2011, Issue 12
	A Tsang		The impact of socio-economic and environmental status on metabolic and environmental indicators of stress in non-adult skeletons from two post-medieval sites in London	REW92	CHB website
	S Newman		child health in post-medieval England	PAY05; BPB07	MOLA records
Climate change	C Stantis	2011	Reconstructing a catastrophic climate: exploring climate change in 14th century London using stable oxygen isotopes		BABAO Annual Review 2011: February 2012, Issue 13
Congenital disorders	R Redfern and P Mitchell	2005	Congenital and developmental diseases of the hip	SPRP98	BABAO Annual review 2005: February 2006, Issue 7; Mitchell PD and Redfern RC (2011) Developmental dysplasia of the hip in medieval London. American Journal of Physical Anthropology 144: 479-84
	M Piyaratna	2007	The relationship between spondylolysis, spina bifida occulta and transitional vertebrae: a case-referent study of archaeological human skeletal remains. UCL Institute of Archaeology. MSc research.	ONE94; FAO90; BA84; LSS85; MIN86; NLB91; OCU00; GYE92; MPY86; REW92; SPT82	CHB website
Demography	T Waldron	1988	Palaeodemography at a Black Death site	MIN86	CHB website
	B Margerison and C Knüsel	2002	Palaeodemography	MIN86	Margerison, B.J. and Knüsel, C.J. 2002. Paleodemographic comparison of a catastrophic and an attritional death assemblage. American Journal of Physical Anthropology 119, 134-143
	R Gowland and A Chamberlain	2003	Bayesian statistical analysis of palaeodemography	MIN86	BABAO Annual Review 2003: February 2004, Issue 5; Gowland, R.L. and Chamberlain, A.T. 2005. Detecting Plague: The Palaeodemographic Characterisation of a Catastrophic Burial Assemblage. Antiquity 79, 146-158
	S Bello		Demographic comparison of crypt	CAS84	BABAO Annual review 2005: February 2006, Issue 7

Theme	Who	When (end date)	What	Samples used (if known)	References
			and general population		
Dental disease	A Caffell	2004	Dental caries in medieval Britain (AD 450-1540). Temporal, geographical and contextual patterns	MIN86	CHB website
	C E De La Rosa	2007	Prevalence of carious lesions in Medieval and Post Medieval London skeletons and its relationship to diet	FAO90; MIN86; MPY86	CHB website
	A Ogden *et al.*	2008	Nothing new under the heavens: MIH in the past?	LSS85	CHB website; Ogden, A.R., Pinhasi, R., White, W.J. 2008. Nothing new under the heavens: MIH in the past? European Archives of Paediatric Dentistry 9.4, 166-171.
Diet	M Tanahata		Diet, health disease in urban and rural populations	REW92	CHB website
Ethnicity	J Mikamo-White	2006	Forensic craniometry: metrical characteristics of "Caucasian" skulls	FAO90	CHB website
Evolution of disease	A Wilson *et al.*		Digitised Diseases: 3D textbook of key examples of pathology	Numerous	WEBSITE REF
	A Bouwman	2000	Analysis of early modern bone for venereal syphilis by Treponema pallidum DNA	ONE9; FAO90	CHB website
	D Walker		The development of treponeamal disease in medieval London	SRP98	AJPA REF
	G M Taylor	2000	aDNA distinction between Mycobacterium tuberculosis, M. bovis and Brucella abortus infection in human skeletons	MIN86	CHB website
	M Spiegelman and C Reeves		aDNA evidence for malaria in Early Modern London	REW92	CHB website
	N Powers	2014	Syphilis in Post-Medieval London	NLB91	CHB website
Execution?	T Waldron	1996	Legalized trauma	FAO90	CHB website; Waldron, T. 1996. Legalized trauma. International Journal of Osteoarchaeology 6.1, 114-118
Growth	G J Williams	2009	Survivors and non-survivors: investigating juvenile growth in catastrophic and attritional cemetery populations	MIN86	CHB website
	D Antoine		Interdisciplinary study of human growth in London	FAO90	CHB website

Theme	Who	When (end date)	What	Samples used (if known)	References
			over the past 1500 years		
Health and disease	C Boston		Lobsters and Tars: an osteological study of the origins, lifestyles and health of 18th-19th century sailors and marines of the Royal Navy	KWK99	
Human evolution	C Buckley	2005	A matter of evolutionary life and death: An ecological model of growth and development in Homo Erectus	OCU00	CHB website
Infection	G Western	2012	X-radiography of osteomyelitis	RLP05	MOLA records
Interpersonal violence	T Kausmally	2006	Fracture patterns as indicators of violence in post medieval populations of different status.	FAO90	CHB website
	S Lockyer	2011	Fracture patterns in 18th- and 19th-century London		BABAO Annual Review 2011: February 2012, Issue 13
Joint disease	T Waldron	1992	Osteoarthritis	MIN86	Waldron, A.H.1992. Osteoarthritis in a Black Death cemetery in London. International Journal of Osteoarchaeology 2, 235–240.
	T Waldron *et al.*	1994	Rheumatoid arthritis case study	FAO90	CHB website; Waldron, T., Rogers, J. and Watt, I. 1994. Rheumatoid arthritis in an English post-medieval skeleton. International Journal of Osteoarchaeology 4.2, 165-167
	K White	2007	Diagnosing osteoarthritis in skeletal material: a study of methodology	MIN86; MPY86	CHB website
	C Rando	2007	Temporomandibular joint disorders and dental attrition in medieval and post-medieval British assemblages	FAO90; MIN86; OCU00; MPY86	BABAO Annual Review 2010: February 2011, Issue 12; CHB website
Metabolic disease	S Argarwal	2001	Comparison of prevalence of osteoporosis in Romano-British and Early Modern London	FAO90; MIN86	CHB website
	R Ives	2004	Metabolic Bone Disease and Cortical Bone Dynamics in Post-Medieval Urban Collections	ONE94; REW92; OCU00; REW92	BABAO Annual Review 2004: February 2005, Issue 6 (see subsequent book); CHB website
	R Ives	2006	Cortical bone loss in early modern populations	FAO90; REW92	CHB website
	S Day	2007	Some people really are hard-headed. A study comparing hyperostosis frontalis interna and osteoporosis in	FAO90	CHB website

Theme	Who	When (end date)	What	Samples used (if known)	References
			Post-Medieval populations		
	K Adia	2007	An Investigation into the relationship between healed vitamin D deficiency and age-related bone loss in historical populations	LSS85	CHB website
	M Brickley	2002	Age-related bone loss and osteoporosis	FAO90; REW92	CHB website; Brickley, M. 2002. An investigation of historical and archaeological evidence for age-related bone loss and osteoporosis. International Journal of Osteoarchaeology 12.5, 364-371
	R Spencer		DISH, stable isotopes and other methods	MIN86; MPY86	CHB website
Methods	J Buckberry and J Bosiljcic	2006	The reliability of the auricular surface ageing and the influence of auricular surface shape on the age related changes	OCU00	CHB website
	H Schutowski		Auricular surface ageing	St Brides Crypt	BABAO Annual review 2005: February 2006, Issue 7
	A Bayliss	1999	Calibration using known age samples	MIN86	CHB website
	S Hillson	1989	A new technique for casting tooth crowns	ONE94	CHB website
	R Wright		CRANID – development of a method of establishing ethnicity form cranial metrics	SRP98	BABAO Annual Review 2007: February 2008, Issue 9
	A M Bentley	2006	Are men a lost cause: sex determination of juvenile archaeological remains and the possible variance of MTDNA copy number between juveniles and adults	MIN86	CHB website
	A Lo Pinto	2006	Cervical measurements of permanent dentition in attempt to estimate sex from mixed dentition via discriminant function	MIN86	CHB website
	I Scott	2006	Sexual dimorphism of the superior mandibular ramus	OCU00	CHB website
	A Clark	2007	Investigating the effects of secular change on metric sexing techniques in British skeletal populations	LSS85; OCU00	CHB website

Theme	Who	When (end date)	What	Samples used (if known)	References
	A Clement	2007	A New Method for Recording Tooth Wear	MIN86; MPY86	CHB website; Clement, A. 2007. A New Method for Recording Tooth Wear. In White, W. and Zakrewski, S. (eds.), Proceedings of the 7th Annual BABAO Conference. Oxford, BAR International Series 1712, 72-81.
Metrics	A Sabieth	1999	Cephalometric changes in shape of faces over time	MIN86; SPT82	CHB website
	A Mitchell	2006	Forensic craniometry of the orbits, bi-zygomatic and bi-parietal widths	FAO90	CHB website
	R Storm	2009	A biometrical study of fluctuation asymmetry to assess health and social status	OCU00	CHB website
	C Buckley		Correlation of stature, dental age, craniometry and economic indicators in ancient London skeletons	REW92	CHB website
Migration	J Beaumont		Irish names in a London Cemetery: is it possible to identify Irish immigration in 19th-Century Lukin Street?		BABAO Annual Review 2007: February 2008, Issue 9
Neoplastic disease	Roehampton University	2005	George Grenville, Prime Minister from 1763-5, who demonstrates an extensive case of multiple myeloma		BABAO Annual review 2005: February 2006, Issue 7
Obesity	P Patrick	2007	BMI estimation from skeletal remains	BA84; MIN86; MPY86	BABAO Annual review 2005: February 2006, Issue 7; CHB website; Patrick, P. 2002. Creaking in the Cloisters: Observations on Prevalence and Distribution of Osteoarthritis in Monks from Medieval London. In, Helmig, G. Scholkmann, B. and Untermannm, M. (eds.), Centre, Region, Periphery: Medieval Europe Basel. Hertingen, Folio-Verlag, 89-93; Patrick, P. 2007. Overweight and the human skeleton. In White, W. and Zakrewski, S. (eds.), Proceedings of the 7th Annual BABAO Conference. Oxford, BAR International Series 1712, 62-71; Patrick, P. 2000. Greed, Gluttony and Intemperance"? Testing the stereotype of the 'Obese Medieval Monk'. Institute of Archaeology, UCL, PhD
	V Yorke-Edwards		Obesity in London 1700-1850: the archival evidence and osteoarchaeological evidence		BABAO Annual Review 2010: February 2011, Issue 12
Social activity and health	A Cross	2006	Morphological modifications of the vertebrae, ribs and pelvis that may be	OCU00	CHB website

Theme	Who	When (end date)	What	Samples used (if known)	References
			linked to wearing corsets		
	D Walker and M Henderson	2010	Smoking and health in London's East End	LUK04	Walker, D, and Henderson, M, 2010, Smoking and health in London's East End in the first half of the 19th century, Post-Medieval Archaeology 44(1): 209–22
Stable isotopes	M Trickett	2004	Staple isotope analysis (Carbon, Nitrogen, Strontium, Oxygen and lead isotope analyses) of the named individuals of Old Church Street, Chelsea and Redcross way, Southwark	OCU00; REW92	CHB website
	A Millard		Age of weaning via stable isotope analysis	REW92	CHB website
Status	M Mant		Diet, sex and status in post medieval London		BABAO Annual Review 2010: February 2011, Issue 12
Surgery and medicine	F Tucker	2006	Analysis of early modern ribs for mercury content. UCL Institute of Archaeology. MSc research	ONE94; FAO90; NLB91; REW92	CHB website; Tucker, F. 2007. Kill or Cure? The osteological evidence of the mercury treatment of syphilis in 17th to 19th-century London. London Archaeologist 11.8, 220–224
	M Start	2006	Craniometry and autopsy procedure	FAO90	CHB website
	J Dittmar	2012	Tool marks and differentiating autopsy and dissection	RLP05	MOLA records
	A Witkin		Trauma and surgical interventions in naval service	KWK99	BABAO Annual review 2005: February 2006, Issue 7
	T Greenslade and N Malahn		Trauma and surgical interventions in military service	Chelsea pensioners	BABAO Annual review 2005: February 2006, Issue 7
	T Kausmally		The anatomy school of William Hewson at 36 Craven Street (1772-1778): an investigation into the day-to-day running of an anatomy school and the life of an anatomist prior to the 1832 anatomy act		BABAO Annual Review 2010: February 2011, Issue 12
Taphonomy	L Tryzelaar	2003	Histological study of the destruction of bone	MIN86	CHB website
Trauma	M Mant	2013	Peri-mortem trauma in post-medieval London	RLP05	MOLA records
	D Walker	2013	Parry fractures change through time	Various	MOLA records
Urbanisation	C Melisch and N Powers	2016	Comparison with 12th/13th century Berlin	SRP98	MOLA records

Theme	Who	When (end date)	What	Samples used (if known)	References
Neoplastic disease	M Melikian	2006	Case study of metastatic carcinoma	AHT99	Melikian M, 2006, A case of metastatic carcinoma from 18th century London, International Journal of Osteoarchaeology, Volume 16, Issue 2, 138–144

Table 2: Recent osteological research involving assemblages from Greater London

Appendix 2: Summary site information for large and key excavations

The following section contains additional information samples >100 individuals and on key sites producing <100 individuals. It provides an overview from which key findings and areas of importance can be drawn. Where appropriate, these have been indicated in bold.

AHT99: All Hallows-by-the-Tower

1.5m of stratigraphy. 10,7000 fragments of disarticulated bone. An unusual group of burials. The close proximity of the church to the Tower meant beheaded individuals were buried here. The 7th century church was one of only eight City churches to survive the Great Fire. The burial register includes both aristocracy and relatively low status individuals such as soldiers and immigrants. The church served the City and the port. The churchyard was closed in 1853. Eighteen individuals were found with associated coffin plates. Anne Sumpter (died 25th May 1794, aged 31) had **metastatic carcinoma**.

References

Melikian M, 2006, A case of metastatic carcinoma from 18th century London, International Journal of Osteoarchaeology, Volume 16, Issue 2, 138–144

http://www.aocarchaeology.com/key-projects/research-key-projects/cancer-in-the-18th-century-a-case-from-all-hallows-london

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BA84: Saint Saviour, Bermondsey Abbey

Founded in c.1089 by William Rufus. The earliest recorded named burial in this area was of Hadwise (d. 1099). Nineteen stone and mortar cist burials and one 'pillow' burial. Maximum stature estimates appeared high. High frequency of trauma (healed fractures, 10%, blunt force trauma, 2%). Several cases of DISH. Possible use of teeth as a tool. Noticeably high prevalence of hypoplasia. **Potential remains to identify if any of the individuals came from France**. No other **Cluniac** burial ground of comparable size has been excavated.

References

Dyson, T, Samuel, M, Steele, A and Wright, S M, 2011, The Cluniac priory and abbey of St Saviour Bermondsey, Surrey: excavations 1984-95, MOLA monograph 50

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Medieval+cemeteries/bermondseyabbey.htm

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BBM02: St George's Church, Bloomsbury

Work involved recording the crypt, and small scale investigations in the churchyard. 781 burials found in seven vaults leading off the central chamber of the crypt. These were recorded prior to their removal for reburial by Burial Ground Services. All were in triple coffins. The names of 86% of the assemblage were identified from depositum plates. Osteological analysis of 111 skeletons recovered from open lead coffins was undertaken on site. The burial population represented the wealthy upper middle classes: lawyers, doctors, MPs, imperial administrators and librarians of the British Museum,

but also a servant, butcher and carpenter. Wealth of evidence for **dental surgery and prostheses**. Limited documentary research was carried out on named individuals.

References

Boston, c. Boyle, A. and Witkin, A. 2009 'In the Vaults Beneath', Archaeological recording at St George's Church, Bloomsbury, OA Monograph, Oxford

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BGQ06: St James, 10 Bowling Green Lane, Clerkenwell

High density of burials. Overflow burial ground for St James' Church. 15 individuals excavated during evaluation, 3 left in situ. During subsequent excavation 12% section of site sampled (extended when burials found to be less dense than expected). 692 skeletons retained for analysis. Approx. 3000 further individuals excavated by contractors under watching brief conditions. Charnel pit containing at least 25 individuals. Evidence of **autopsy** on 15 individuals, incomplete joint re-articulations, and **a foetus preserved in a jar**. Large sample of well-preserved post-medieval burials with infections, trauma, metabolic bone disease, joint disease. Work ongoing.

References

BABAO Annual Review 2006: February 2007, Issue 8

Ives R & Melikian M 2009. Current findings and research potential of a post-medieval osteological collection from London. Paleopathology Newsletter, 145, 15–21

London Archaeologist Round-up 2006

BVQ09 and BVB10: Cure's College, Borough Market Viaduct, Thameslink, Park Street, rear of Hop Exchange, College Burial Ground.

Circa 332 burials and large amount of disarticulated bone were recovered from the burial ground known as College Yard or St Saviour's Almshouse Burial Ground (c. **1730-1860**), proving that the **recorded history of the cemetery which included its clearance, was incorrect**. The date of the establishment of the burial ground is not clear as a broadsheet issued in 1613 provides for burial costs in what is now Southwark Cathedral, in the adjacent churchyard or in the significantly cheaper College Churchyard. The burial ground is associated with almshouses founded by Edward Alley, who died in 1626. A significant volume of charnel, approximately six tonnes, was recovered from the site. The disturbance was due to the construction of the London Bridge to Charring Cross Railway during the 1860s.

References

http://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-702-1/dissemination/pdf/molas1-78265_1.pdf

https://docs.google.com/file/d/0B1KfB41ZfnB9eFdpdEhaQXd2RjlFTEFzWFUyNzVYeVFlSG1J/edit?usp=docslist_api

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St Bride's Church Fleet Street

The skeletal remains from the St Brides' crypt predate the parameters of the project as they were excavated in the 1950s but they are a valuable resource due to the **biographical data** available for 225 individuals and have been used for methodological development as well as population based studies.

References

Scheuer, J L, and Bowman, J E, 1995, Correlation of Documentary and Skeletal Evidence in the St. Bride's Crypt Population, In Saunders, S R and Herring, A, *Grave Reflections: Portraying the Past through Cemetery Studies*, Toronto, Canadian Scholar's Press, 49–70

CAS84: Christchurch, Spitalfields

Wealth of supporting documentary information. Identified **methodological issues with age at death estimation** for the first time and provided information burial practices, including burial dress. Established a type series for **coffin furniture**. The children were found to be small for their age with delayed dental eruption. Established that it was **not possible to determine from pelvic 'scars' whether a woman has had a child**. Demographic profile was skewed with fewer children and greater numbers of older adults, but though to reflect burial practices. **Autopsies**, lots of evidence of **dentistry**.

References

Molleson, T, and Cox, M, 1993, The Spitalfields Project Volume 2 - The Anthropology, The Middling Sort, CBA Research Report 86

CXL06: Sheen's Burial Ground, 52–58 Commercial Road

Private burial ground. Evaluation as BKL93 determined spatial extent but had no impact on the burial ground. Lead coffins passed to an exhumation company for reburial. **Named burials**. 15 **headstones**. Elm and deal coffins including triple shelled examples. Hair pin and **hair ornament**. **High degree of truncation and intercutting** for cemetery of its date. 265 burials excavated. 254 underwent osteological examination. **Documentary account of interment of a 'Lascar'** in the cemetery in 1823. **Male to female ratio unusual** as 0.65:1. Amongst **17 perinates was a 28 week old foetus**, presumably a still birth. Retarded growth of children. High rate of dental disease including **subadults with dental abscesses and ante mortem tooth loss**. Ivory **dental prosthesis**. Osteomyelitis in a subadult. Low rate of TB and syphilis but very florid caser of the latter. **Cranial (weapon) trauma** including peri-mortem blunt force. Trauma. **Craniotomy i**n adults and subadult. Spinal joint disease increased with age. Four cases of DISH. Possible case of **reactive arthritis** (erosive changes). **Osteochondroma**. **Perthe's** disease. **Multifocal Paget's disease with sarcoma and pathological fracture**. Rickets and scurvy.

References

Henderson M, Miles A and Walker D with Connell B and Wroe-Brown R, 2013, 'He being dead yet speaketh' Excavations at three post-medieval burial grounds in Tower Hamlets, east London, 2004-10, MOLA Monograph Series 64

DVL05: New Bunhill Fields, Deverell Street, Southwark

A representative sample of approximately 10% was archaeologically excavated, with the remainder exhumed by TCS Ltd under a watching brief. 354 coffin plates. 766 burials assessed and a subsample

of 519 individuals analysed. Rare **nasopharyngeal carcinoma**. **Osteogenesis imperfecta**. **Autopsy**. **Plate burials**. Burial **clothing** and **floral tributes** surviving. Stacks up to 14 coffins deep. Coffins very well preserved. **New designs of coffin furniture recorded**. Demographic bias due to excavation impacting mostly on the upper burials in stacks, which led to more subadults than adults being excavated.

References

Miles, A, with Connell, B, 2012, New Bunhill Fields burial ground, Southwark: excavations at Globe Academy, 2008, MOLA Studies Series 24

FAO90: St Brides lower churchyard, 75-82 Farringdon Street

606 individuals were excavated. 544 available for analysis. 30 burials orientated north south. Most in elm coffins. **Stacks up to 8 deep**. Recovered from the vault (47 individuals) and the open yard (497 individuals). Individuals in the vault had been moved to make space. Includes individuals from **Bridewell workhouse** and **Fleet prison**, and most of **low socioeconomic status**. Metabolic disorders such as rickets were common and **osteomalacia** was seen in two individuals. Rib and nasal fractures common. Possible cases of Langerhans Cell (**Hystiocytosis X**). Syphilis and tuberculosis. **Craniotomy and autopsy**. **High prevalence of caries and calculus**. One **gold filling**.

References

Miles, A, and Conheeney, J, A Post-medieval population from London: Excavations in the St Bride's Lower Churchyard 75–82 Farringdon Street, City of London, EC4, Unpublished publication draft

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/St+Brides+lower.htm

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GDA06: City Bunhill Burial Ground

A non-conformist ground for **dissenters**, built on part of the site of a previous brewery. All burials were aligned east-west and were in wooden coffins. Burial registers (1833-1853) indicate c. 18,000 burials took place. Of 239 individuals, **just over half were sub-adults** (n=122). Rickets including subadults with **pathological fractures**. Four year old child with **lupus vulgaris** (facial tuberculosis). Advanced case of venereal syphilis. **Autopsy of both adults and children**. **Isotopic study** of hair samples undertaken.

References

Connell, B and Miles A, 2010, *The City Bunhill burial ground, Golden Lane, London: excavations at South Islington schools, 2006*, MOL Archaeology Studies Series 21

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/citybunhillburialground.htm

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GLS01: St Bartholomew's Hospital, 150-164 Goswell Road

Part of an 18th/19th century burial ground, used for the interment of unclaimed bodies from St Bartholomews Hospital. Three **mass burial pits**. Burial rows with **stone markers**. A third phase of grave

pits. Graves generally in organised rows, with cemetery use intensifying over time. Evidence of **autopsy/dissection** pre-dating the Anatomy Act.

References

GLHER entry

GLY01: Glasshouse Yard, General Baptist Ministry, Islington

19 grave cuts of which 16 were **north-south** orientated. One **prone burial**. Coffin handles dated **1650–1750**. Evidence of shrouds (pins).

References

Daykin, A, 2007, Therese House, *29–30 Glasshouse Yard, London: a post-excavation assessment and updated project design*, unpublished MOL report

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GSP08: St Sepulchre, Giltspur Street

Two distinct phases, the earliest sealed by up to a metre of cemetery soil containing disarticulated bone. Results not yet published

References

GLHER entry

London Archaeologist, forthcoming

HLW06: Holywell Priory

The medieval burials included a high status individual who may have undergone **post-mortem ablation of the heart**.

References

BABAO Annual Review 2010: February 2011, Issue 12

HW-SL83, HW-LT94: St Mary, Stratford Langthorne Abbey

647 burials were analysed and form the **largest sample from a Cistercian site in Europe**. The publication provides evidence on burial customs, cemetery management, health and disease, including evidence of **medical care**. The remains were reburied.

References

Barber, B, Chew, S, Dyson T and White B, 2004, The Cistercian abbey of St Mary Stratford Langthorne, Essex, MoLAS Monograph 18

IGN96: New Bunhill Fields, Islington Green -

Monitoring of the commercial clearance of the New Bunhill Fields burial ground. Exceptional preservation led to the collection of **1450 coffin plates**: **a unique collection**.

References

Authors own notes

KWK99: Royal Naval Hospital, Greenwich

Excavation in the ratings' burial ground of the Royal Hospital Greenwich, which originally held the remains of c.20,000 **retired seamen and marines** of the Royal Navy. 1400 burials moved in the 1870s and 4000 in 1925. 107 skeletons recovered from 55 graves. Most were **older adult males**, small number of women and adolescents. High prevalence of a wide range of pathological conditions: **fractures, rickets, tuberculosis, syphilis, scurvy, cancer** and **non-specific infections**. **Amputations and craniotomies**. Wooden coffins and shrouds. Samples for stomach contents were taken from approximately 25% of the burials.

References

Boston, C, 2007, The Royal Hospital, Greenwich, London. Archaeological Excavation Report, Oxford Archaeology, https://library.thehumanjourney.net/2454/1/KWK99.pdf

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LRK93: Quaker burial ground, Kingston

The first Quaker cemetery to be fully excavated produced evidence for a prosperous middle-class community. Only 10% of graves were aligned east-west. And there was an attempt to avoid disturbing earlier graves whilst digging later ones.

In one lead coffin, four whole **walnuts** were found buried with the body. Those still in situ had been placed in the mouth, between the knees, and between the feet. There is a folk medicine, association with madness, which may indicate that the occupant was mentally ill. The empty (save for a blonde wig) lead coffin of Anna Barnard whose remains may have been **stolen by `body-snatchers'**.

References

BABAO Annual Review 2006: February 2007, Issue 8

Bashford, L, and Sibun, L, 2007, Excavations of a Quaker burial ground at 84 London Road, Kingston-upon Thames, *Post-Medieval Archaeology* 41/1, 100–154

LSS85: New Churchyard, Broad Street Station (Broadgate)

'New Churchyard' founded in 1569 (in use until 1714). Bias towards **lower status** burials until late 17th century. Several hundred skeletons were reburied on site and a sample c400 individuals was retained for full analysis. 137 individuals recorded so far. High rate of **rickets**. A few **named individuals**. It is possible that some burials are from the nearby post-medieval Bethlem Hospital. (See also ongoing work for Crossrail under site code XSM10).

References

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/Broadgate.htm

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LUK04: Catholic Mission of St Mary and St Michael (Bishop Challoner School), Lukin Street, Whitechapel

705 individuals (268 adults and 437 subadults) buried between 1843 and 1854. **Little intercutting** of graves. 98.7% of the inhumations (750/760) were arranged with the **head to the east** for reasons unknown. Large quantity of **grave goods** (rosaries and religious pendants, a Holy water stoop, a mourning brooch) and **clothing** showing people were dressed for burial. **Plate burial** of a child. **Medicine bottle** deliberately placed in adult grave. Evidence suggests this burial ground served a **migrant** population chiefly of Irish descent, some of whom came to England during the **Great Famine of 1847-8**. **Subadult mortality** peaked around one year of age. A large number of infants who died between one and six months of age had suffered from **rickets and/or scurvy**. High number of adult males with **pipe notches** which may reflect cultural and socio-economic factors. Smokers suffered increased levels of chronic disease and an earlier death. Comprehensive **isotopic study** undertaken.

References

Henderson M, Miles A and Walker D with Connell B and Wroe-Brown R, 2013, 'He being dead yet speaketh' Excavations at three post-medieval burial grounds in Tower Hamlets, east London, 2004-10, MOLA Monograph Series 64

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/stsmaryandmicheal.htm

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MAN82: Mansell Street

More than 100 burials most in stacked wooden coffins up to 9 per stack. Of the 74 whose ages it was possible to estimate, 57 were adult, 7 children and 10 infant. Documentary sources suggest that this was a **Non-Conformist** burial ground in the 18th century.

References

GLHER entry

MBH04: St Marylebone, Westminster (also MAL92)

Approximately 20% of the total development was excavated, the rest subject to a watching brief. High incidence of documentation (particularly wills). **Higher status suburban** group. Subadult deaths peaked around one year. Relatively small percentage of young adults. Mean height and the level of sexual dimorphism were similar to those found at other sites within and beyond London, indicating that **status is not reflected in adult height**. Two (named) cases of **rheumatoid arthritis**, one of **tetanus** (lockjaw). Young adult male with **leprosy** and surgical amputation. Possible **smallpox**. **Prevalence of rickets higher than any other reported post-medieval cemetery**. A**utopsy** of adults and children. **Juvenile idiopathic scoliosis, scaphocephaly, hydrocephalus, pectus carinatum** (pigeon chest), **hip dysplasia** and a calcaneal hindfoot deformity. Hallux valgus tentatively linked to **fashionable**

footwear. **Simple (solitary or unicameral) bone cyst** of right ilium, **Paget's disease**. Rib deformities resulting from **corsetry**. Senile **osteoporosis**. Low rates of gout. Three sets of **false teeth and two fillings**. Smaller proportion of infants than expected from Bills of Mortality: low infant mortality is the most likely explanation. **Significantly lower rate of non-specific periostitis and osteitis** than other contemporary sites.

References

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/stmarylebone.htm

Miles A, Powers N, Wroe-Brown R with Walker D, 2008, *St Marylebone Church and Burial Ground: Excavations at St Marylebone Church of England School, 2005*, MOLA Monograph Series 46

MHY03: The Jesuit Cemetery, Whitelands College, Manresa House, Roehampton

Toop Exhumation Services Ltd carried out exhumation. 108 bodies and 82 headstones recovered and reburied nearby. Due to the preservation of soft tissue and **clothing**, and at the request of the Jesuits, no osteological recording took place. 73 ordained priests (5 of whom were novices), 26 brothers, and 4 priests in training. **Rosaries and crucifixes**.

References

Melikian, M, 2004, An Archaeological Watching Brief of the Exhumation of the Jesuit Cemetery at Manresa House, Roehampton, *London Archaeologist*, 230–233

MIN86: St Mary Graces (The Royal Mint)

Cistercian abbey (1350–1540). 420 burials. 389 individuals analysed. No particular differentiation in burial related to social status (intramural vs cemetery burials). Sir Simon Burley was decapitated in 1388 for treason and buried in the Presbytery of St Mary Graces. The overall male to female ratio was 2:1 with a fairly even distribution through the age categories. Only five subadults were aged below 1 years old. **Possible leprosy** and **possible syphilis**. Three cases of **tuberculosis**. Trauma was observed predominantly in the males. High incidence of hypoplasia in the adults, though to be associated with the **Great Famine**.

MIN86: East Smithfield Black Death cemetery

The first **Black Death** cemetery established in London (2 ha in size). 558 burials excavated; **mass graves** and single inhumation graves. Previous research on the collection had led to the removal of some skeletal remains with pathology. This age at death profile reflects a typical death curve for a catastrophe. **High rates of enamel hypoplasia** may suggest a large proportion of the young adults were exposed to the **Great Famine** (1313–1317) during early childhood.

References

Grainger, I, Hawkins, D, Cowal, L and Mikulski, R, 2008, *The Black Death cemetery, East Smithfield, London*, MOLA monograph 43

Grainger, I, and Phillpotts, C, (eds), 2011, *Excavations at the Abbey of St Mary Graces, East Smithfield, London*, MoLAS Monograph 44

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Medieval+cemeteries/StMaryGraces.htm

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Medieval+cemeteries/ESmithfieldBlackDeath.htm

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MKU09: St Mark's Church, Surbiton

Coffins and burials recorded under watching brief during exhumation by BGS. 200 burials exhumed including 7 cremations (20th century). Rapid osteological assessment on 36 unsealed burials. Burials represent local parishioners. **Brick-built graves**. Of 193 inhumations, 85% adult. 73% 19th century the rest 20th century. **Dental disease, fillings, dentures, trauma, healed fracture with secondary infection and partial plaster cast in situ, infections, rickets**. **Change in funeral furnishings** to more religious iconography, wider adoption of floral tributes/wreaths, family plots, mixed modes of burial practice i.e. cremation and inhumation in family graves.

References

Ives, R, 2013, Life and death in suburbia: archaeological work at St. Mark's Church, Surbiton. London Archaeologist, 13, 205–210

MPY86: Merton Priory -

Monastic and lay individuals. **Prone burials**, stone cist burials, single and **multiple inhumations**, **stone coffins** and **ash burials**. Grave goods included a pendant lamp, chalices, a paten and gold thread, a copper alloy buckle and a **leather hernia belt**. Mostly adults aged over 35 years. Of the sexed adults, over **90% were male**. Subadults represented less than 5% of all individuals, with most being adolescents. **Diaphyseal aclasis**, with **possible malignant chondrosarcoma**. **Treponemal infection**. DISH was observed in 6% of males. Blunt force trauma more prevalent in females than in males. There were three cases of **surgical intervention**, including a trepanation.

References

Miller, P, and Saxby, D, 2007, *The Augustinian priory of St Mary Merton, Surrey: excavations 1976–90*, MOLA monograph 34

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Medieval+cemeteries/MertonPriory.htm

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MSR08: St James's Church, Piccadilly Extramural burial ground, Marshall Street, Westminster

Several phases of burial associated with two of St James' Church, Piccadilly's extramural burial grounds and the **Poland Street workhouse** and spanning the 17th to 18th centuries. The group of remains form **one of the largest post-medieval assemblages** excavated in the UK. **Coffin plates**. Analysis incomplete but publication programme in progress as of May 2015.

References

BABAO Annual Review 2010: February 2011, Issue 12

MTC06: St Martin of Tours, Chelsfield

135 burials (including one from trial trenches). Three medieval, two 19th century, 27 probably 18th century, seven 16th–19th centuries. **Not possible to derive any statistically meaningful information** relating to change through time. **Equal number of men and women**. The age-at-death profile of the assemblage differs from a model life table for a stable population with moderate life expectancy, because there are very **few infant burials**.

References

http://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-461-1/dissemination/pdf/compassa1-24315_1.pdf

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NLB91: St Thomas' Hospital

Burial trenches with **mass graves** associated with St Thomas' Hospital (paupers or epidemics). 227 articulated individuals. Large quantity of disarticulated bone. 193 individuals analysed. Extremely **high prevalence of syphilis** including one subadult.

References

Knight, H, 2002, *Aspects of Medieval and Later Southwark: Archaeological Excavations (1991-8) for the London Underground Limited Jubilee Line Extension Project*, MoLAS Monograph 13

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/StThomasHospital.htm

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OCU00: Chelsea Old Church

290 skeletons excavated. 198 analysed. Two burial vaults and two brick lined graves. Wooden and lead coffins. **Coffin plates** for 25 individuals. **Subadults underrepresented**. Two obstetric deaths. Most adults lived into old age. **DISH and gout**. Trauma commonplace particularly in males. **Metabolic disorders frequent**. Residual rickets and **osteomalacia** in adults. Osteoporosis. **High rate of ante mortem tooth loss and caries**. **High status suburban** population.

References

Cowie, R, Kausmally, T and Bekvalac, J, 2008, *Late 17th- to early 19thcentury burial and earlier occupation at All Saints, Chelsea Old Church, Royal Borough of Kensington and Chelsea*, MOLA studies series 18

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/Chelsea.htm

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OLR00: St Luke's Old Street

Family groups. Shaft graves and vaults in eth open cemetery contained 2–9 individuals. Mean of 3.43 interments per vault within the crypt. **Differences between named and unnamed sample** were not as great as had been assumed. No difference in stature. Unnamed group had lower life expectancy. Similarity to Christchurch Spitalfields noted.

References

Boyle, A, Boston, C and Witkin, A, 2005, *The Archaeological Experience at St Luke's Church, Old Street, Islington. Archaeological Recording Action Report*, Oxford Archaeology, http://lso.co.uk/burials

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ONE94: St Benet Sherehog

274 burials excavated. 270 were retained for analysis. 39 medieval, the rest post-medieval. **Mixed status**. High male to female ratio (2.8:1). Six individuals of known age and sex. **High incidence of trauma** throughout the adult population. Large subadult sample. Tuberculosis and syphilis. **Histiocytosis X**, **scurvy and rickets**. **Early craniotomy** of a child. **Pipe smoking**. Dental pathology high.

References

Miles A and White W, with Tankard, D, 2008, *Burial at the site of the parish church of St Benet Sherehog before and after the Great Fire: excavations at 1 Poultry, City of London*, MOLA Monograph 39

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Medieval+cemeteries/St+Benet+Sherehog.htm

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PAY05: Bow Baptist Church, Payne Road, Bow

TCS Ltd exhumed 50% of PAY05 (later phase BBP07 100% archaeological excavation – published as one sample). 348 burials, (site code BBP07 recovered an additional 83 individuals including the Reverend Newman and his wife, key members of the **Baptist** community in Bow). **Highly organised** and **well documented**. Probably the **largest group of named individuals from a flat cemetery** (as opposed to a crypt or vaults) archaeologically excavated in this country. **Stable isotope** analyses carried out (including **hair**). Graves arranged in neat, parallel north-south rows. **Little intercutting**.

References

Henderson M, Miles, A, and Walker, D, with Connell, B, and Wroe-Brown, R, 2013, *'He being dead yet speaketh' Excavations at three post-medieval burial grounds in Tower Hamlets, east London, 2004–10*, MOLA Monograph Series 64

PGN12: Paddington Street burial ground, Westminster

Western edge of the extra-mural burial ground for St Marylebone (see MBH04). 5 brick vaults. 120 stacked graves in 3 N-S aligned rows. 348 burials in wooden coffins, 45 lead coffins. c. **80 named individuals**. **No intercutting**. Evidence of **reuse of graves**. Good survival of **textiles**. Publication due for completion 2015 (A Miles *pers. comm.*).

References

GLHER entry

PGV10: North East London Cemetery, Cambridge Heath/Road Burial Ground/Keldy's Ground, St. John's Church of England School, Bethnal Green

The burial ground was privately owned and never consecrated. The owner, a pawn-broker, officiated over the first 3000 burials himself. Over 1000 post-medieval skeletons were excavated: 20,000 burials were originally interred and excavated area represents approximately 10% of the burial ground. Burials were found in vertically stacked grave shafts. An **empty grave shaft** and one filled only with juvenile burials were more unusual findings. Stacks were up to 7.5m deep. Layers of up to 20 burials were found in some grave shafts. Twenty-one **wooden grave markers** mimicking the style and decoration of gravestones are a very rare discovery. **High proportion of juveniles**, **vitamin D deficiency**, **rickets** and **infectious disease**. A partial **maxillary denture** was found in situ.

References

BABAO Annual Review 2010: February 2011, Issue 12

BABAO Annual Review 2011: February 2012, Issue 13

Ives, R, MacQuarrie, H, and Hogg, I, Forthcoming 2015, *An East End Opportunity - Insights into post-medieval life, death and burial from excavations at Kilday's Ground, Bethnal Green*, AOC Archaeology Monograph

PCQ09: St Paul's Church, Hammersmith

649 individuals from 331 graves, some with associated coffin remains, **clothing**, **personal items** and remains of shrouds. Important contribution to understanding of demography, health, disease and funerary practice of populations living on the **rural fringe** of 19th century London. Work is now in progress to publish the results (L Loe *pers. comm.*).

References

http://oxfordarchaeology.com/professional-services/case-studies/33-burial-archaeology/104-archaeology-st-pauls-church-hammersmith

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QCS11: Savoy Hospital burial ground, Westminster

Burials thought to be associated with hospital for the poor built by Henry VII (later parish church). Approx. 600 removed from area of 100m^2, excavated to a depth of 3m. Burials continued below this horizon. Mostly 19th century. Disproportionate quantity of **males** thought to be related to neighbouring barracks. Work on-going (L Sibun *pers. comm.*).

References

GLHER/BoD

REW92: Cross Bones burial ground

Served the poor of the parish of St. Saviour's, Southwark, but originally established as a single women's (prostitutes') cemetery. Documentary evidence that **c.18% came from the workhouse**. Rate of Schmorl's nodes and ethesopathies though to relate to **high levels of manual** work. Over one third of the sample perinates. **Apparently high infant mortality rate influenced by sampling strategy**. Evidence of **smallpox** and **treponemal** infection. **Histiocytosis-X**. **Metabolic conditions** (scurvy and rickets). **Peri-mortem surgical intervention**. **High rate of dental caries**.

References

Brickley, M, Miles, A, and Stainer, H, 1999, *The Cross Bones burial ground, Redcross Way, Southwark, London: archaeological excavations (1991-1998) for the London Underground Limited Jubilee Line Extension Project*, MOLA studies series 3

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/Cross+bones.htm

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RLP05: London Hospital, Whitechapel

Founded 1740 and the largest voluntary General Hospital in the country by the 19th century. Hospital burial ground, used for burial of unclaimed patients' c 1825–1841. 265 burials and 89 coffins of **dissected remains**. Minimum of 259 people. **Mostly adult and male**. Human dissection and surgical practice taking place alongside vivisection of animals, including several exotic species. Sample divided into articulated individuals, dissected body portions and disarticulated bones for analyses. One area

contained **coffins stacked on the ground surface** and covered when they were moved for building work in 1841. Dental disease fairly high but characteristic of post-medieval London. **Pipe smoking**. Infections including sinusitis, pulmonary infections, osteomyelitis. **Venereal syphilis**. Fractures and evidence of **interpersonal violence**. **Secondary carcinoma** (possibly spread breast or lung cancer). Evidence of **treatment of injuries** within the hospital. Probable case of **Duchenne's MD**. **Resolved rickets**. Pressure necrosis (**bedsores**).

References

Fowler, L, and Powers, N, 2013, *Doctors dissection and resurrection men: excavations in the 19th-century burial ground of the London Hospital, 2006*, MOLA Monograph Series 62

RMI05: Royal Mint Square

The integrity of the assemblage was poor. Significant pathology noted consisted of a **metastatic carcinoma**, probably prostate cancer. A disarticulated cranium showed evidence of **trepanation and peri-mortem trauma**.

References

BABAO Annual Review 2006: February 2007, Issue 8

Miles, A, and Bekvalac, J, 2014, Excavations at Royal Mint Square. The excavation of a post-medieval burial ground, *London Archaeologist* Vol 14, No. 2, 231–236

SAY88: St Mary Axe

Disarticulated remains only and no apparent record of analysis: 150 burials thought to have been disturbed in 1860 were excavated and reburied in 1951 and re-excavated 1989–90.

References

GLHER entry

SGY05: St. George the Martyr, Southwark

The remains were associated with the pre-1734 church. 163 burials reinterred after assessment. High rates of dental disease. One case of probable gout. Ten adults had evidence of trauma including **two 'greenstick' fractures**, a case of myositis ossificans and **possible evidence of cranial surgery**. An adult male had advanced skeletal changes as the result of Paget's disease.

References

BABAO Annual Review 2006: February 2007, Issue 8

Powers, N, 2006, Assessment of human remains excavated from the Church of St George the Martyr, Borough High Street, Southwark SE1, Unpublished assessment report HUM/ASS/13/06

SJN97: St John's Churchyard, Scandrett Street

c.430 individuals, **126 named**. Communal burial vault and ten family burial vaults. Re-interment pit containing large quantity of disarticulated bone (MNI >1700). Reburied.

References

GLHER entry

SMC11: St Mary's Newington, Southwark/Elephant and Castle Leisure Centre

St Mary's Newington is documented as the parish church for Walworth and Newington from, at least, the 13th century. It may be the successor church to an earlier church located on a different site in Walworth, referenced in Domesday. The graveyard expanded in 1738 to 1792–99. Mid-19th century crypts, some empty, some with lead coffins, others filled with disarticulated bone which may have been placed there following demolition of the church and partial clearance of the graveyard or during the construction of St Gabriel's (consecrated 1874). In one vault these had been **arranged in patterns** with long bones to the centre and skulls either side. Excavation recovered **316 individual inhumations** dating from the mid-19th century until the closure of the burial ground. **Five named burials** were found in the excavation. Within the excavated burials 21 had undergone some form of **post-mortem dissection**. The surprisingly high proportion of dissections may be linked to the selling of inmates' human remains by the masters of Newington Workhouse. A court case, Rex v Feist in 1858 implies this is a long-running problem. The realignment of Newington Butts into the south side of the churchyard, and the demolition of St Mary's Church and building of a new chapel resulted in a significant volume of charnel being placed in empty burial vaults.

References

GLHER entry

http://planbuild.southwark.gov.uk/documents/?casereference=14/AP/4241&system=DC

http://www.oldbaileyonline.org/browse.jsp?div=t18580222-354

SRP98: St Mary Spital, Spitalfields Ramp Project

Unprecedented **accuracy of dating and phasing** combining stratigraphic and radiocarbon dating. Analysis enabled discussion of the effects of **urban living on child health**; the role and influence of the hospital and the reasons behind the **mass burial** of almost 4000 people. Pits contained up to 40 people. The first phase in the mid-12th century, utilised disused quarry pits. In the mid-13th century there were two phases of mass burial and mass burials continued until the end of the cemeteries use. Up to 40% of the original cemetery had been truncated by later activity. The mass burial pits did not display a standard 'catastrophic' profile but conforms to that expected in a famine, where the 'normal' distribution of deaths is amplified. Osteological analysis indicated that the population experienced prolonged stress. Results also indicated the **impact of urbanisation** (rather than industrialisation alone) on transmission of diseases, particularly **tuberculosis** and **increased risk of injury**. **Some of the earliest cases of syphilis in Europe**. Impact on health of the age at which employment began and for apprenticeships. Similarities with rural sites also supports evidence for **migration of adolescent females**. Fracture patterns suggest children were involved in similar activities to adults from a young age and that both sexes were equally involved. Differences in **adult stature (smaller)** though to relate

to the effect of the urban environment on health. Small number of subadults with **scurvy and rickets**. - Low prevalence of **osteomalacia**.

(NB: see also SPT82 and SPT85)

References

Connell, B, Gray Jones, A, Redfern, R, and Walker, D, 2012, *A bioarchaeological study of medieval burials on the site of St Mary Spital: excavations at Spitalfields Market, London E1, 1991–2007*, MOLA Monograph 60

Thomas, C, Sloane, B, and Phillpotts, C, 1997*, Excavations at the priory and hospital of St Mary Spital, London*, MOLA monograph 1

http://archive.museumoflondon.org.uk/Centre-for-Human-Bioarchaeology/Database/Medieval+cemeteries/stmaryspital.htm

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YKW01: Old St Pancras, St Giles workhouse, York Way

High infant mortality. High proportion of older adults. 1,302 burials recorded, 699 were recovered for osteological analysis, 603 removed by exhumation contractor. The locations of an additional 81 burials, recovered for osteological analysis, were not recorded. **Many immigrants**, particularly **French émigrés**. Larger number of **named individuals**. Two **obstetric deaths**. **Craniotomy**. **Florid syphilis**. **Kidney or bladder stone**. Possible **hydatid cyst**. **Senile osteoporosis. Paget's disease** of bone. **Rickets** (active and resolved). **Osteomalacia**. Transverse rib fractures and Bennett's fracture possibly related to the fashion for **bare-knuckle boxing**. **Surgical amputations** of the lower limb and possible **cranial surgery**. **Sprengel's deformity**. **Congenital kypho-scoliosis**. One instance of **metastatic carcinoma**. Rib deformation resulting from **restrictive corsetry**. **High levels of caries** and antemortem tooth loss. Two individuals with **fillings** (one gold and two of grey metal). Two **porcelain dental prostheses**.

References

BABAO Annual Review 2011: February 2012, Issue 13

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