The White Man’s Grave revisited –
settler mortality rates on the pre-colonial Gold Coast

Authors: Klas Rönnbäck (University of Gothenburg, klas.ronnback@econhist.gu.se) and Stefan Öberg (University of Gothenburg, stefan.oberg@econhist.gu.se)


Introduction
There has been a lot of research into the historical demography of many parts of the world. Due to a lack of primary sources, however, the historical demography of Africa has so far not received very much research. At the same time, new and very influential studies, for example in the field of institutional economics, have shown a renewed interest in the demography of developing countries. One aspect of historical demography that has come into particular focus is the settler mortality rates, which some scholars have used as an instrumental variable for the institutions that settlers in colonies could bring with them (Acemoglu, Johnson and Robinson (AJR) 2001; 2012). This strategy is weakened since very few estimates of settler mortality rates are available before the nineteenth century and since the available estimates show very different results. Estimates of settler mortality rates from West Africa vary between about 10 and 67 percent per year (Figure 1), depending on time-period and sample studied. This paper tries to contribute to the literature by an in-depth study of the settler mortality rates from the so-called “White Man’s Grave”, in pre-colonial West Africa. The paper focuses upon the Gold Coast at the time before effective preventive measures and malaria prophylactics were introduced during the 19th century, drastically reducing settler mortality rates in tropical regions (Curtin 1990; 1998).
Figure 1 Summary of most previous estimates of crude death and mortality rates for the Gold Coast and West Africa, 1684–1914.

Sources:
[G] British Asante expedition, 2 months on the Gold Coast, 1874 (annualized crude death rate), Curtin (1990), p. 75.
[H] British Cape Coast Command, Gold Coast, 1823–1826 (crude death rate), Curtin (1968), table 1.

In most previous studies it has not been possible to study the experiences of European settlers in detail and so these studies have not been able to test different possible explanations for the widely varying estimates. Possible explanations for the high degree of variation among previous estimates are that mortality varied a lot over time and between groups in different ways. Firstly, the mortality risk varied for individuals with the time spent...
in West Africa, the so called “seasoning” effect. Secondly but relatedly, since lack of previous exposure to the tropical disease environment was the most important factor increasing the mortality rates the rate also varied depending on the origin of the settlers. Men that had just arrived from Europe had a much higher risk of dying than “seasoned” veterans or locals (Davies 1975: tables 2–3). Thirdly, mortality rates could also have varied over time for everyone, for example as a result of epidemics but also as a result of adaptations and introduced preventive measures (Feinberg 1989; Curtin 1990).

In this paper we test these three explanations by tracing the life-course of a sample of employees of the English Royal African Company, stationed on the Gold Coast, in the eighteenth century. The sources of information and longitudinal data structure allow us to calculate not only the crude death rates (i.e. deaths per thousand persons present) but also, for the first time, also the mortality rate (i.e. deaths per thousand person-years of exposure to risk). We estimate quantitatively the effect of the seasoning of settlers by estimating how the mortality risk varied with time spent in West Africa. The results show that encountering a new range of diseases in West Africa led to initially very high mortality rates of the Europeans relocating there. Even if there is some degree of “seasoning” effect in our data, the risk of death remained high also after more than two years in West Africa. To our knowledge, this is the first study that can show quantitatively the effect of seasoning on mortality rates among Europeans in the “white man’s grave” in pre-colonial West Africa.

The effect from previous exposure to the diseases is also shown by the differences in mortality among the employees with different geographical origins. Men arriving from England had much higher mortality rates than men that were employed locally. The results also show that, even if the risk of death remained high throughout the mid-eighteenth century, the rate varied over time.

**Previous research**

Information on population sizes and changes are important parts of the puzzle for understanding the experiences of people in different times and regions. Information on demographic behaviours can also provide insights into the reasoning and living conditions of populations. There is, so far, quite little research on the demographic history of pre-colonial Africa, largely due to a lack of primary sources that could shed any light on the issue.
Attempts have however been made to backcast population estimates from the 20th century (see for example Manning 2014; Frankema and Jerven 2014).

Studies of historical demography have, in recent years, also played a role in a whole host of studies have incorporated demographic variables in analyses of economic development. One well-cited example has attempted to use data on European settler mortality rates around the world as an instrumental variable when studying long-term economic development, where the disease environment is argued to have an impact through institutional development (Acemoglu, Johnson and Robinson 2001; 2003). The data used in this research has however been criticized for being seriously flawed (See, for example, Albouy 2012. See also the response to Albouy in Acemoglu, Johnson and Robinson 2012). The discussion about the effect from institutions on economic development and what make appropriate instruments is ongoing (examples of recent contributions are Acemoglu, Gallego and Robinson 2014 and Prayon and Baten 2013).

There was a widespread idea in early-modern Europe that West Africa was something of a “White Man’s Grave” during the early modern period (Curtin 1961; Acemoglu et al 2001). This idea was certainly based on historical experience: mortality rates among European settlers were many times higher in West Africa than practically anywhere else in the world. The most frequently cited studies of mortality rates among Europeans migrating to tropical parts of the world have been undertaken by Philip Curtin. His studies are based on the mortality rates of British soldiers stationed in various places around the world during the nineteenth century. His figures show that the mortality rates indeed were very high among the British soldiers stationed in West Africa in particular, compared to soldiers stationed practically anywhere else in the world. The crude death rate among troops stationed in in the Caribbean (otherwise famous for a rather high mortality rate among Europeans) was around 80 per 1,000 persons per year in the early nineteenth century (Curtin 1989: table A.9). The crude death rates during a few years in the early nineteenth century were for the Sierra Leone Command as high as 483 per 1,000 persons, and the figures for the Cape Coast Command were a staggering 668 per 1,000 persons (Curtin 1968: table 1; Curtin 1990: table 1).
Harvey Feinberg has however contested the very high death rates found in the previous research by Curtin. Feinberg established that the figures Curtin relied upon were calculated over a period of several years rather than as the death rate per year. Estimating the death rate per year showed a crude death rate of on average 353 per 1,000 persons for the Sierra Leone Command, and 562 per 1,000 persons (range 256–982/1,000) for the Cape Coast Command (Feinberg 1974: 358–9). Even if this is lower than the rate estimated by Curtin, these death rates are still disastrous compared to the rates among troops stationed in Britain by this time: around 15–20 per 1,000 persons (Curtin 1989: table A.1–2).

Feinberg himself furthermore estimated the death rate among the European employees in the Dutch fort Elmina on the Gold Coast, 1718–1760. His figures indeed show that the crude death rate at Elmina was considerably lower than that estimated by Curtin, at around 185 per 1,000 persons on average, but varying from 91 to 408 per thousand in different years. The death rate was furthermore varied over the period studied, from a level of 242 per 1,000 persons per year in the first decade, dropping to a minimum of 128 per 1,000 persons in the period 1740–49, before increasing to 182/1000 again in the period 1750–1760 (Feinberg 1974: 365–6; Feinberg 1989:37–38). Apart from the revisions of estimated crude death rates, Feinberg attributed the lower results to the fact that Curtin’s study was based on a sample of soldiers: the employees of the Dutch slave-trading company rarely had to participate in battle as the soldiers in Curtin’s study might have had to, with a resulting lower mortality rate.

There are also studies of the death and mortality rate among European crewmen working on slave-trading ships indicating a similarly high mortality rate among Europeans travelling to the West African coast. Richard Steckel and Richard Jensen have for example shown that the mortality among the crew on slave ships was high while the slave ships were loading slaves on the African coast, estimated at 238 deaths per 1,000 persons on average (Steckel and Jensen 1986: table 2). Stephen Behrendt has found an even higher mortality rate among the crewmen in a sample of Liverpool ships, when disaggregating the data by voyage leg in the triangular trade. His findings show that the death rate while waiting off the African coast on average was 45.8 per 1,000 crew per 30-day period, i.e. around 550 per 1,000 persons (Behrendt 1997: table 6; see also Stein 1980).
The vast majority of those who died, did so due to various “fevers”, most importantly malaria and yellow fever (Steckel and Jensen 1986: table 2), against which Europeans had acquired no immunity. Victims who contracted these diseases, but survived them, could however acquire a resistance or even immunity to the disease, for example, and most importantly, yellow fever. This naturally reduced future mortality rates among those who had become “seasoned” to West Africa in this way (Curtin 1961). Some scattered data assembled by Curtin seem to support this hypothesis: whereas the death rate for the Sierra Leone Company for example was 49 per cent in their first year of operation, the death rate decreased to 10 per cent among the remaining staff the following year (Curtin 1964: 483–4). This conclusion is further supported by Steckel and Jensen’s study of mortality rates among crewmen in the slave trade, where the mortality rates were particularly high during the second and third month that the crewmen stayed on the African coast (Steckel and Jensen 1986: table 2). Feinberg, for his part, unfortunately only calculated a crude death rate for the whole group of employees at Elmina, without separating between the newly arrived ones and the ones that stayed longer on the coast (and thus already had experienced a period of seasoning). K.G. Davies did however include the chronological aspect to the death rate in his study of employees of the English Royal African Company in the early eighteenth century. His findings show that the crude death rate among the English employees amounted to around 270 per 1,000 persons. He could however also study the death rate among a small sub-sample of new arrivals, during the first year after arriving. His findings on this issue indicate that the mortality rate was much higher, around 570 per 1,000 persons, during this first year after arrival on the coast (Davies 1975: tables 2–3). How the mortality rate developed in this small sub-sample of employees after this first year was however not studied by Davies.

The mortality of settler populations depended partly on the difference in epidemiological environment in the areas of origin and destination. This is shown in the experience of English migration to the northern and southern parts of North America where mortality rates were much higher in the southern colonies (Dobson 1989; Hacker 1997; Warren 1997). There was a geographical gradient in the difference of the mortality rates of blacks and whites in the US (Warren 1997). Death rates were higher among Americans of African origin than among those of European origin in Baltimore and further north. In the southern colonies the rates
were on par or higher among the people of European decent. This is a strong indication that the differences in mortality were strongly influenced by the differences between the groups in inherent resistance and acquired immunity which made them more or less vulnerable to the different disease environments in the north and south. This is also supported by differences between the groups in the seasonal patterns of mortality and by geographical patterns in the susceptibility to epidemics. It was of course not only people of European origin that got sick from encountering a new disease environment. Living in a “European disease environment” in Philadelphia was more of a threat to lives of the black slaves than the African diseases was to the white population (Klepp 1994). Still there were diseases that caused higher death rates among the whites than the blacks, for example "diarrheal diseases, malaria, yellow fever, dengue fever, scarlet fever, and diphtheri" (Klepp 1994, p. 495).

The tropical areas of the world in general have different infectious agents than temperate areas as well as a larger variety (Smith et al. 2007). The increased mortality in the tropical environment was a result of being exposed to a new range of pathogens, including yellow fever and the more deadly *falciparum* malaria (Klepp 1994; Coelho and McGuire 1997). The vast majority of those Europeans who died in West Africa, did so due to various “fevers”, most importantly malaria and yellow fever (Steckel and Jensen 1986: table 2), against which Europeans had acquired no immunity.

**The aim of this study**

There is thus no doubt that the West African coast indeed formed something of a “white man’s grave”: mortality rates were indeed very high prior to the mortality revolution induced by effective preventive measures and medicines (such as the introduction of quinine to prevent malaria). Previous studies of early modern mortality rates in West Africa have however arrived at widely differing results as to how high the death and mortality rates really were. We believe that this largely is a result of very different samples used for the studies – in some cases temporarily stationed soldiers (often newly arrived on the coast), in other cases crewmen on ships temporarily staying off the coast, and in yet other cases European staff more permanently stationed on the West African coast. The differences between the samples are an important explanation to these differences, for the simple
reason of “seasoning”, i.e. acquiring resistance or immunity to local diseases. We ought therefore to expect that the mortality rates would be high among Europeans just arriving on the African coast for the first time, for example as newly stationed staff at a European enclave, or as crewmen on a slaving ship. For people that had been stationed at an enclave on the coast for a longer period of time, however, we ought to expect a considerably lower mortality rate. It is also clear that the risk of death varied over time (Figure 1). We calculate mortality and crude death rates for sub-periods of our sample and test if we can find support for a decline of the mortality risk over time.

The aim of this paper is to make an in-depth study of mortality among male employees of the English Royal African Company, and its successor the Company of Merchants Trading to Africa, to test if there was a “seasoning” effect for the employees. We will also estimate mortality rates for newly arrived and locally recruited employees separately. This provides an additional test of the effect from inherent and acquired resistance and immunities. We use a newly constructed dataset on employees of the English Royal African Company, 1713–1766, created from (mostly) bimonthly Pay Bills and a Registry of Servants. We have linked these Bills and can thus follow the employees over time from arrival (or first appearance) until death, discharge or disappearance. The Registry of Servants lists employees, stating the date they started and ended their employment along with the reason for the end, i.e. for example if they died. We use methods of survival analysis and divide our sample into subgroups to utilize also observations with only some information, for example an individual present during parts of a year without information on recruitment or reason for ending the employment.

Sources
The paper will use the accounts of the English Royal African Company, i.e. the English chartered slave-trading company (later reassigned to be in charge of maintaining the English castles and forts along the coast) as the source for a sample of European and local employees that were stationed in West Africa. We use two sets of similar sources for the analyses. The first set of sources used is the lists of payments, Pay Bills, to employees of the English Royal African Company from between 1713 and 1745. The contents of the lists were extracted to study the levels and differences in income in colonial Western Africa (see e.g.
The payment lists were created with an interval of one to six months, most commonly bimonthly. The employees were listed with names, occupation, pay and notes on occurrences (moves, promotions, etc.). The comments also include dates of arrivals, employment and deaths. If an employee happened to die, cause of death is as a rule unfortunately not reported. The accounts then often recorded that any wages owed to the employee were paid to a third person, designated as the heir of the deceased. The Company therefore had an interest in recording the exact date of death.

The records are neatly kept, in standardized tabulated lists, throughout the period studied. The Pay Bills were generally divided into two sections: a first section including high-ranking staff (such as the governor, factors, writers and high-ranking officers), and a second section including all the other employees (such craftsmen, soldiers and various labourers).

The Pay Bills were created each time the Companies paid their employees. The lists were created frequently enough to allow imputing dates with reasonable accuracy in the few cases where they were missing. The extracts of the different lists were nominally linked through a semi-automated procedure to create longitudinal observations of the employees' stays in Western Africa.

The second set of sources is Pay Bills from 1751 and 1760 combined with a Registry of Servants covering approximately the years from 1747–1766. The registry is a list of employees of the Company with names, titles, dates of recruitment, arrival to the Cape Coast Castle (CCC) for those arriving from Europe (or date of entering into the service of the Company for those employed locally) and the date and cause of the termination of the employment. The original lists seem to have been set up carefully and accurately. There are few cases with missing or obviously inaccurate information. Both the employer and the employees had monetary, if conflicting, incentives to get the lists right. The quality of the record keeping in the Registry seems to have been good up until December 1767. After this time, however, the final fate of the employees is rarely recorded. We therefore only include individuals arriving in CCC before December 1767 in the analyses.

The Company also produced a series of documents called “Lists of Living and Dead”, which formed the basis for Davies (1975) previous research on the death rates among the Company’s employees. Since Davies’ goal only was to calculate the crude death rate, he did
seemingly not attempt to link these lists. He did therefore not report how he dealt with the
problem of people disappearing without a trace between two consecutive lists. These lists
were assembled quite irregularly – occasionally a couple of times per year, but at other
times only at intervals of several years. For that reason, we preferred to use the information
in the Pay Bills, which provide data at a higher frequency. A second strength of using the Pay
Bills instead of the Lists of Living and Dead, is that the Pay Bills generally took explicit note, in
the column for “Comments”, of when people started working for the Company. This
information is generally missing in the Lists of Living and Dead, particularly in the case of the
lists from the Gold Coast. Most importantly, furthermore, two phrases were commonly used
in the Pay Bills: either that the person in question “arrived on” a particular (often named)
ship, on a particular date, and started working for the Company, or that the person in
question “entered into the service of the Company” (sometimes only shortened to
“entered”) on a particular date. The “arrivals” sometimes have notes on the person arriving
“from England” or of payment left behind in London. Persons “entered” into service seem to
be a more mixed group. For example the African employees are noted as “entering”.

Methodology

By linking the information about the individual employees on the various Pay Bills over time,
it becomes possible to follow the life-course of the staff working for the Royal African
Company. The information available for linking the individuals are thus the full name, the
occupation and the geographical place he was stationed at. The sample is quite limited each
individual month. This does however make linking the records easier, since there are very
few individuals who have identical names.

The payment lists were created each time the Companies paid their employees. The extracts
of the different lists were nominally linked through a semi-automated procedure to create
longitudinal observations of the employees' stays in Western Africa. The spelling of the
names was standardized in the initial extraction of the data. Links were then created
between observations with the same name that appeared in two consecutive lists. The lists
are often missing for the outforts along the Gold Coast and a person could also be left out
from the payment list if they were, for example, sent on a journey. We checked all short
gaps manually and bridged them where there was enough information to conclude that it
was the same individual. We, for example, concluded that John Whitford employed as a carpenter at the Cape Coast Castle with a note stating that he was sent to Tantumquerry in March 1723 was the same individual as John Whitford who came to Cape Coast Castle in November 1723 with a note that he came from Tantumquerry even if we had no information from Tantumquerry on his stay there. We bridged gaps of up to a year but the longer the gap, the more non-conflicting information was required to accept the link.

We also checked cases where a linked individual seemed to be in two places at the same time. The absolute majority of these cases were a result of that the lists were created bimonthly and individuals moved from one fort to another during this time period. In these cases we adjusted the start and end dates to remove the overlap. Also other cases with conflicting information could almost always be solved by checking the pictures of the original lists. We detected a small number of repeated entries of the same individual and a few cases where information had ended up on the wrong row. Overall we can therefore conclude that the extraction of information in the lists was done in a careful and accurate way. In all cases where it was not possible to make an unambiguous link we left the observations unlinked. These cases are treated as left-truncated and/or right-censored observations in the analyses. We also double-checked all individuals without information on how and when they were employed or ended their employment.

When conducting nominal linking of sources there is always a risk of false links, i.e. assuming that different individuals with the same name are the same person. The risk of false links is especially high when there is little additional information besides the name to use for the linking as is the case in the materials used for the present study. But, the materials have several features reducing the risk of false links. Firstly, notations were made in the payment lists each time the Company paid an employee which was most often done monthly or bimonthly. The high frequency of observations reduce the likelihood of a person with a certain name leaves or dies unnoticed and another person with the same name appearing before the creation of the next payment list. Secondly, the notaries as a rule made notes in the lists if a person had just arrived, was moved to another location or died. We have used the information available in the notes to evaluate the nominal links. Thirdly, both the Company and the employees had incentives to include the right people in the lists. The Company had incentives to have correct information so as to pay the correct amount of
wages, just as the employees had incentives to actually get paid. What might be problematic is that the accountants might have had incentives to keep dead souls on the Pay Bills, in order to try to embezzle some of Company’s money (reportedly paid as wages) into their own personal pockets. The number of dead would then be underreported. Since the Company required that several high-ranking officials guarantee that the accounts were correct, they stood a lot to lose if they were found out cheating.

The payment lists are not complete enumerations of the European population present in the area. There are many people in the lists that were employed locally. Some of them were Africans but there are also persons with European names that seem to have been employed locally. The Company normally seem to have recorded the ethnicity of a number of the staff (i.e. adding comments such as “black”, “negro” or “mulatto”). This information was recorded in the “Comments”-column. It is uncertain if the Company systematically recorded the ethnicity of every non-European on the Pay Bills, or if this variable might be underreported to some extent. We have still created a variable indicating all persons with any comment about being of non-European origin. We also coded persons with typical local African names as non-Europeans. Since the aim of the paper is to study the settler mortality rates, we include all people for which there is no information that they were of African or mixed European/African origin in the sample studied.

The paper will focus upon the European employees stationed on the Gold Coast in particular, leaving out staff that were stationed in other places along the West African coast (for example Gambia or Ouidah). The accounts of the Royal African Company are not complete enough from many of these other places along the coast to enable following the Europeans over any period of time. Even for the Gold Coast, the accounts are not kept in their entirety. For one thing, the account books are missing entirely for some specific years during the period studied. Furthermore, the Pay Bills were most years recorded separately for the Cape Coast Castle, and each of the outforts along the Gold Coast (e.g. Sekondi, Dixcove, or Accra). Information from the outforts is almost completely missing until 1730. We limit our sample or add controls when we estimate the changes over time.

As was noted above, the Pay Bills make a distinction between people who “arrive” on the coast, and people who “enter” into the Company’s service. We have interpreted “arrivals”
and information on payment left in London as indicating that this is the first time a person appears on the Gold Coast. We have on the other hand assumed that the wording “entering” indicates that a person was being employed on the coast. There are also cases where we have not been able to determine when or from where a person was employed. To begin with we investigated this group separately from the others but they did not differ in any way from the group employed locally so these two groups are analysed together.

Results
The sample consists of 2169 (as far as it is possible to determine) unique men of (to the best of our knowledge) European birth that were working on the Gold Coast for the English Royal African Company and its successors between 1713 and 1766. These individuals are followed over a total of 2934 person-years on the Gold Coast during which time 716 of them die. Table 1 presents summary statistics for sample and the calculated mortality and crude death rates. The first conclusion from our results must be that it does make a difference if we estimate mortality or crude death rates. The differences should be expected to be larger when we do the calculations over a longer time period since this increase the differences in the denominator between persons and person-years. We see in Table 1 that the differences between the mortality and crude death rates are especially large in the sample covering 1747–1766 where we have longer follow-up times due to how the source was originally constructed.
Table 1 Summary statistics of the analysed sample of male employees of European origin working on the Gold Coast between 1713 and 1766

<table>
<thead>
<tr>
<th></th>
<th>Individuals</th>
<th>Observations</th>
<th>Person-years</th>
<th>Deaths</th>
<th>Median survival time</th>
<th>Mortality rate</th>
<th>Crude death rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A. 1713-1745</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>1539</td>
<td>12150</td>
<td>1844.3</td>
<td>469</td>
<td>0.8 years</td>
<td>254/1000</td>
<td>305/1000</td>
</tr>
<tr>
<td>Arriving from England</td>
<td>316</td>
<td>2312</td>
<td>324.6</td>
<td>133</td>
<td>0.6 years</td>
<td>410/1000</td>
<td>421/1000</td>
</tr>
<tr>
<td>Employed locally/Unknown</td>
<td>1223</td>
<td>9838</td>
<td>1519.7</td>
<td>336</td>
<td>0.8 years</td>
<td>221/1000</td>
<td>275/1000</td>
</tr>
<tr>
<td><strong>Panel B. 1747-1766</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>630</td>
<td>635</td>
<td>1089.7</td>
<td>247</td>
<td>3.4 years</td>
<td>227/1000</td>
<td>392/1000</td>
</tr>
<tr>
<td>Arriving from England</td>
<td>379</td>
<td>381</td>
<td>684.2</td>
<td>182</td>
<td>2.8 years</td>
<td>266/1000</td>
<td>480/1000</td>
</tr>
<tr>
<td>Employed locally/Unknown</td>
<td>254</td>
<td>254</td>
<td>405.5</td>
<td>65</td>
<td>&gt;4 years</td>
<td>160/1000</td>
<td>256/1000</td>
</tr>
</tbody>
</table>

We could link on average 7.9 consecutive observations per individual in the sample covering 1713–1747. The difference in successful links is not very large between the men coming from England and recruited locally. We linked on average 7.3 observations for men from England and 8.0 for men recruited locally or with unknown origin. We should expect a lower linking rate among the men arriving from England given the much higher mortality rates among them.

The crude death rates in our sample are reassuringly very much in line with previous estimates from the eighteenth century (Table 1 and Figure 1). The crude death rate among men arriving from England between 1713 and 1745 is in the high end of previous estimates, but it should then be remembered that the previous estimates not are separated the men by origin. Also previous studies have found that men arriving from Europe had higher death rates than others (Davies 1975: tables 2–3).
Figure 2 Cumulative hazard of dying among European employees on the Gold Coast, 1713–1745, by origin at recruitment

Figure 3 Cumulative hazard of dying among European employees on the Gold Coast, 1747–1766, by origin at recruitment
When we do a longitudinal analysis of the risk of death for men by the time spent on the Gold Coast we do find some effect from “seasoning” (Figure 2 and 3). The cumulative hazards presented in Figures 2 and 3 can be interpreted as the expected number of events occurring for an individual after a certain time of exposure to the time-dependent risk. What is estimated is the statistically expected number of events. Because we study mortality, each individual can only experience an event or not. We can conclude from the results that the men working on the Gold Coast really did have slim chances of returning to Europe. Very few could expect a typical posting of between three and five years.

The risk of dying is increasing faster in the first six months on the Coast than after for men arriving from England. There is then also a further tendency for the risk to decline over time, but the confidence interval is getting wider as the number of observations becomes fewer. There is a similar pattern of attenuated risk over time among the men recruited locally or with unknown origin. After the first six months the risk is increasing at the same rate, i.e. they are proportional if at different levels (results not shown). The pattern is very similar among men working between 1747 and 1766 (Figure 3). We can therefore confirm the statements from contemporary observers and previous studies that there indeed was a “seasoning” period for men relocating to the Gold Coast. But the attenuation of the risk was relatively modest so that the risk remained high also after being on the Coast for several years.

Even if we seem to have been about as successful to link the newly arriving men and the locally recruited ones (including the men with unknown origin) we do see a clear difference in patterns between the 1713–1745 and 1747–1766 samples. The differences in the cumulative hazard between the two groups are smaller in the later sample based on the “pre-linked” source. This could be a result of the different sources leading to differences in possibilities for following the men over time but the smaller difference between the groups is mostly a result of a lower cumulative hazard among the newly arriving men in 1747–1766 than 1713–1745.
Figure 4 Share surviving among European employees on the Gold Coast that were recruited from England, 1713–1745 and 1747–1766.

Figure 5 Share surviving among European employees on the Gold Coast that were recruited locally (including unknown origin), 1713–1745 and 1747–1766.
We see a tendency in Table 1 and Figures 2 and 3 of a lower risk of dying in the later than in the earlier period. We investigate this further by plotting the survival curves for the two datasets together but separately for men arriving from England and being recruited locally (or with unknown origin) in Figures 4 and 5. Among the men arriving from England we see a slightly lower mortality in the later sample, especially after about 1.5 years on the Gold Coast (Figure 4). Here we need to remember the difference in the underlying data due to the different sources used which is likely to create just this kind of difference in the results. The Pay Bills used for the earlier period have gaps that make it challenging to link individuals over several years. The survival curves are similar also for the men recruited locally (or with unknown origin) (Figure 5). The survival curves are again statistically different but now especially for the first few years of exposure. We should expect lower mortality rates for the later period given that this source did not require any linking and so increased the chances of accurately capturing also the men surviving for many years on the Gold Coast.

Previous research has shown that there were considerable short-term variations in the death rate of Europeans in West Africa (Figure 1). We therefore investigate the change over time more carefully by calculating mortality rates by sub-periods of our sample. The sub-periods for the earlier sample are determined by gaps in the data. We also divided the longest continuously covered period, 1733–1740, in two. The mortality rate for men arriving from England has a very high spike in 1718–1720 when the mortality rate is above 1064/1000. It can reach a level higher than one thousand since it is standardized to one thousand person-years. In practice 84 newly arriving men spent 30.9 person-years on the Coast in these three years during which time 33 of them died. The reason behind the spike is that several newly arrived men died within one or two weeks from arriving at CCC.

We cannot conclude anything about the cause of death for the men dying very soon after arriving on the Coast. Yellow fever could possibly kill a person within a week. But it is also possible that the men had become ill during the sea voyage and died from this disease after arriving. Hamish Maxwell-Stewart and Rebecca Kippen have followed convicts sentenced to transportation to Australia in the early nineteenth century before, during and after the sea voyage. This unique study shows that the death rate increased during the latter part of the sea voyage and during the first two months in Australia (Maxwell-Stewart and Kippen 2015, fig. 3.1). This indicates that at least some of the earliest deaths could have been due to
diseases contracted during the voyage instead of on the Coast. If some died because of being ill when landing on the Coast this would strengthen our result of a quite weak “seasoning” effect, i.e. only a weak reduction of the risk of dying over time on the Gold Coast.

Besides the spike in 1718–1720 the mortality rate does not show any strong variations over time. The rate is higher also in 1722–1725 than earlier or later. There is a trough in the 1740s as was also found by Feinberg (1974: 365–6; 1989:37–38). There is no obvious explanation for this temporary reduced risk in the 1740s but there is a slight tendency for a decline of the mortality over time even if we disregard the 1740s. The crude death rate does not show any corresponding spike but also varies some over time (Figure 7). Here we cannot see any decline over time but rather variations around a high stable rate.

Figure 6 Development over time of the mortality rate among European men working on the Gold Coast, 1713–1766, by origin

Note: The 90% confidence intervals (CI) were generated through 100 bootstrap samples sampled with replacement. The upper bound is the 95th percentile of the 100 estimates and the lower bound is the 5th. The lines correspond to the median of the 100 estimates.
Figure 7 Development over time of the crude death rate among European men working on the Gold Coast, 1713–1766, by origin

Note: The 90% confidence intervals (CI) were generated through 100 bootstrap samples sampled with replacement. The upper bound is the 95\textsuperscript{th} percentile of the 100 estimates and the lower bound is the 5\textsuperscript{th}. The lines correspond to the median of the 100 estimates.

The men arriving from England and the men recruited locally (or with unknown origin) responded similarly to changes between years in the mortality risk. We calculated the mortality and crude death rate per year for the period 1713–1745. The rates for men arriving from England and the men recruited locally (or with unknown origin) are correlated with a Pearson’s correlation coefficient, \( r = +0.5 \).

There are several potential weaknesses of our data and approach. We were, for example, more willing to link observations of men with uncommon names than for men with common names. We tried estimating the death rates also for a sample with a stricter linking requiring, for example not linking across the known gaps in the data. The resulting rates were almost identical to the ones presented above. We therefore concluded that our linking strategy resulted in sufficiently accurate links to produce stable results.
Discussion

The paper has, for the first time, presented mortality rates and quantitative estimates of the “seasoning” effect for European men working in the “White man’s grave”, West Africa. We can show that it does matter if we calculate mortality or crude death rates since the mortality rates are lower. But even if the mortality rates are lower than the crude death rates they were still extremely high, comparable to the high contemporary infant mortality rates in Europe rather than to contemporary adult mortality rates. Our results of the level of death rates are in line with previous research.

We also, just as previous studies, find strong variations over time. It is therefore not obvious which rate should be chosen as characteristic if one wants to use it, for example, as an instrument. What results we get can depend a lot on from what source and time the information is from. Acemoglu, Gallego, and Robinson (2014) argue that institutions matter more for economic development than human capital. They rely on estimates of school attendance and the presence of Protestant missionaries to estimate the effect from human capital. Prayon and Baten (2013) assess the relative contributions of institutions and human capital using a new and larger dataset of human capital estimates for former colonies (estimated from age heaping in censuses). They find that both institutions and the human capital endowments of the local population mattered for later economic development.

The strength of settler mortality rates as an instrument for institutional development (as used in for example Acemoglu, Johnson and Robinson 2001; 2012) depends on that the mortality rate is stable over time and exogenous to human choices. We contribute mortality rates for the eighteenth century which should be preferable to later estimates since they are closer to “the critical early periods for settlements and institutional development” (Acemoglu, Johnson and Robinson 2012, p. 3082). But we also show that the rates varied strongly and possibly also declined over time.

The perceptions of the prospects for Europeans to be able to live healthy lives in a region did not always influence the streams of settlers in the expected way.

"Despite all the dangers and the alien environment, however, English people went to the rich southern mainland of North America and the West Indies in overwhelmingly larger numbers in the seventeenth century than to northern regions that were considered to be more like England." (Kupperman 1984, p. 232)
Others have shown the same thing for other regions with the addition that the changes over time not were exogenous to human choices. The hardship of the very first settlers in New England, for example, led to very high mortality. Still, the mortality rates of the later, established colonies in the area were moderate and probably lower than the contemporary English rates (Dobson 1989). The risks for Europeans in the Caribbean and the southern colonies of North America, in contrast, increased in the eighteenth century with the introduction of *falciparum* malaria and yellow fever from West Africa (Kupperman 1984; Coelho & McGuire 1997). This introduction can about through the choice of using slave labour from West Africa on the plantations. This choice thus changed the possibilities and perceptions of possibilities for settlements in the Caribbean for the worse.

It is not self-evident that there was a specific point in time when the decision to create a settler or an extractive colony was made. The different perceptions about the prospects for European settlement in different regions of the world changed over time (Harrison 1996; Burnard 1999; Johnston 2013). The settlers tried their best to adjust to the local climate and conditions (Kupperman 1984; Johnston 2013). It is likely that the effort and resources available for these adjustments depended on also other things than the mortality rate encountered in the area initially. This adds to questioning how exogenous the encountered mortality rates were to available resources, prospects for a European business activities etc.

We see no reason to doubt that the European mortality rates were much higher in the tropical areas than in other colonies (Dobson 1989; Warren 1997; Cilliers and Fourie 2012; Ouellette et al. 2012). But it is not clear how much detailed information about differences in exogenously determined mortality rates for European settlers it is possible to extract from the historical sources.

**References**


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