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Marriage, families, and survival in the Roman imperial army: demographic aspects

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Abstract: This paper provides a survey of marriage and family formation in the army of the Principate, and assesses the main determinants of the life expectancy of professional Roman soldiers.

Marriage and families

General context

In the standing army of the Principate, the term of service in the legions rose from sixteen to twenty and later twenty-five years, while metropolitan guardsmen served for twelve to sixteen or even twenty years. Recruits committed much of their lives to the military: perhaps half of them did not live to see their discharge, and half of those who did would be dead twenty years later. A statistically 'average' soldier who enlisted for twenty-five years at the age of twenty could expect to spend up to three-quarters of his remaining life span on active duty.[1] Under these circumstances, family formation was difficult to reconcile with military service. While Republican soldiers had often served in their late teens and twenties and married afterwards in keeping with conventional norms, this sequence became less practicable for imperial soldiers as the length of (continuous) service grew both formally and de facto. In addition, the peripheral deployment of most imperial troops that placed many recruits in alien environments may have further impeded marriage until more localized modes of recruitment became more common from the second century AD onward.

The 'marriage ban' for Roman soldiers

Legal provisions only exacerbated this problem.[2] From the early Principate, and most likely since the reign of Augustus, Roman soldiers were legally incapable of entering recognized marriages. At the very end of the second century AD, Septimius Severus was said to have granted them the right to 'live with' (i.e., marry) their wives. By the fourth century AD, in any case, wives and children had come to be considered typical features of soldiers' lives, although the earliest surviving explicit reference to their formal marital capacity dates from as late as AD 426. We do not know if officers such as *centuriones* were also subject to the ban while it was in effect. Equestrian and senatorial commanders were exempt, yet barred from marrying women from provinces in which they performed their duties.

However, soldiers were not physically prevented from cohabiting with women or raising children: the state merely denied them and their conjugal families the legal entitlements that conventionally accrued from marital unions. Moreover, we do not know of any penalties for soldiers who established such relationships. Thus, 'non-recognition' of marriage might be a more precise term than the traditional label 'ban'. The legal issues involved are elucidated by a number of papyrus documents from Roman Egypt. The most important text lists seven cases that were tried between AD 114 and 142 and show that children born during their fathers' military service were deemed illegitimate, regardless of whether these fathers were Roman citizens and whether they served in legionary or auxiliary units. In consequence, such children had no claims to their father's estate unless they were named heirs in their fathers' wills. Wives likewise lacked the usual legal entitlements, and could not sue for the return of dowries that had been handed over upon (quasi-)marriage, even if they had been concealed as deposits to circumvent the official ban on military unions (and apparently even after soldiers had been discharged). At the same time, gifts between soldiers and their de facto wives, which Roman law prohibited for regular spouses, were permitted in this context, and could not be reclaimed either.

In recognition of real-life practice, sporadic governmental interventions helped ameliorate this situation. In AD 44, Claudius granted soldiers the conventional legal privileges

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[1] Based on the section on 'Survival' below, with select projections from A.J. Coale and P. Demeny, *Regional model life tables and stable populations*, New York [2]1983, 42-43.

[2] S.E. Phang, *The marriage of Roman soldiers (13 B.C. – A.D. 235): law and family in the imperial army*, Leiden 2001, 16-52, 86-133, 326-383 is now the fundamental study and the basis for this section.

that Augustus had reserved for married citizens. More importantly, and expressly for humane reasons, Hadrian decreed that the children of soldiers who had died inestate be treated as the equivalent of cognate relatives, which meant they were able to inherit if there were no legitimate children or agnate relatives who took precedence. In practice, however, this required illegitimate children to be able to establish descent from soldiers who could not formally count as their fathers. In Roman Egypt, birth declarations (which sometimes noted that registered children were illegitimate because of 'military restrictions', i.e., the marriage ban) could presumably be used to support such claims. We cannot tell how such cases were adjudicated in less bureaucratized parts of the empire.

References to dowries show that military unions could in fact be established in much the same way as formal marriages if the parties so desired, and thus point to a wide gap between legal fiat and social practice. This is particularly noteworthy given that soldiers' wives suffered obvious legal handicaps: if their husbands died intestate, they would lose her dowries and consequently find it (even) harder to remarry or support themselves. In this context, wills must have assumed especial importance, and it is tempting to speculate that married soldiers ought to have paid particular attention to this safeguard. Unfortunately, we have no means of determining the relative frequency of intestacy among soldiers.

The state's rationale for its disapproval of military marriage is not discussed in the extant sources and remains an object of debate. Modern notions that this policy was designed to create a pool of illegitimate sons who grew up in a military environment and had a strong incentive to join the army in order to gain citizenship are implausible: there is no evidence that such individuals would obtain citizen status upon enlistment, and the 'internal replacement' model of Roman recruitment is unlikely for demographic reasons as well. In the most elaborate discussion to date, Sara Phang argues that the 'marriage ban' was meant to emphasize the masculine qualities of the professional army, restore order after the turmoil of the preceding civil wars, and symbolically dissociate soldier from civilian. While this measure obviously inflicted only disadvantages on soldiers' wives or children, it is unclear to what extent it was considered beneficial to (or by) the soldiers themselves. On the one hand, the lack of formal recognition of their unions shielded active soldiers from legal claims by civilians; yet on the other, the Severan legalization of regular marriage (alongside a pay raise) was supposed to make military service more attractive, which (if true) implies that soldiers may somehow have perceived the 'ban' as a handicap as well.

Privileges for veterans

Discharge diplomas, small personal bronze copies of official documents that survive from the reign of Claudius onward, record various privileges that were conferred upon new veterans of the metropolitan guards, the fleets, and provincial auxiliary units. While non-citizens were granted the franchise, all veterans were given the right to marriage (*conubium*) with one (and only one) existing partner or future wife regardless of her civic status: this means that an enfranchised veteran could not enjoy more than a single legitimate union with a non-citizen woman, but was of course free to wed other Roman citizens. Up to around AD 140, existing children of auxiliary soldiers also obtained citizenship, whereas veterans' wives never came to enjoy that status by virtue of their unions. Notwithstanding the inexplicable geographical and chronological limitations of the existing veteran diplomas, these policies seem to have been fairly universal. In addition, imperial edicts on two (known) occasions (in 32/32 BC and AD 88/89) summarily bestowed citizenship on veterans' parents, wives and children. We cannot tell how exceptional or common these provisions were. Once again, these texts acknowledge the existence of de facto unions with quasi-wives and children.[3]

[3] Phang (2001) 53-85.

The demographic character of military unions

Numerous military unions are known from the epitaphs of Roman soldiers. Modern scholarship has focused on patterns of commemoration that are thought to reflect underlying family structure. In their pioneering study of regional samples of tombstone inscriptions from the western half of the empire during the Principate, Richard Saller and Brent Shaw observed substantial differences between military and civilian dedications. Wife-to-husband commemorations regularly outnumber husband-to-wife commemorations in military families, while the opposite is true of civilian funerary commemorations (table 1). In addition, we encounter considerable geographical variation. Much like civilian tombstone inscriptions throughout the western provinces, military epitaphs from North Africa, Noricum, Pannonia and Spain (and to a lesser extent for the Praetorian Guards in Rome) are dominated by commemorations within the nuclear family (with rates of 60-80% and 70-90% for the military and civilian spheres, respectively). By contrast, soldiers' epitaphs from Britain, the Rhine provinces and the Horse Guards in Rome are dominated by dedications executed by unrelated heirs, while members of their nuclear families commonly account for a mere 30-40% of all cases (table 1). To some extent, this discrepancy may be chronological rather than geographical in nature: Sara Phang's more detailed analysis shows that the incidence of commemorations from within the nuclear family consistently increases across different parts of the empire, from generally low rates in the first century AD to higher ones in the second and still higher ones in the third (table 2).

Table 1 Civilian and military dedications by commemorator (in per cent)

Sample	Husband to-wife	Wife-to-husband	Within nuclear family	Heirs & friends
Republican Rome/Latium	41	8	75	10
Italy: Latium	20	11	77	5
Italy: Regio XI	27	7	79	4
Rome: Lower orders	20	13	78	2
Rome: Equites singulares	***2***	***5***	***29***	***63***
Rome: Other soldiers	***12***	***14***	***61***	***27***
Spain: Civilian	13	11	83	8
Spain: Military	***9***	***17***	***71***	***15***
Britain: Civilian	28	8	80	11
Britain: Military	***9***	***17***	***40***	***49***
Germania Inferior: Civilian	26	10	86	9
Germania Inferior: Military	***6***	***12***	***34***	***75***
Germania Superior: Civilian	20	8	89	1
Germania Superior: Military	***5***	***4***	***34***	***58***
Noricum: Civilian	22	6	91	1
Noricum: Military	***6***	***8***	***76***	***12***
Pannonias: Military	***13***	***11***	***73***	***17***
Africa: Lambaesis – Civilian	23	12	91	3
Africa: Lambaesis – Military	***8***	***23***	***82***	***11***
Africa: Caesarea – Civilian	15	11	89	6
Africa: Caesarea – Military	***4***	***12***	***63***	***33***

Key: Military samples in ***bold italics***
Source: Saller and Shaw (1984) 147-155

Table 2 Commemorations of soldiers dedicated by their wives (in per cent)

Region	Century (A.D.)		
	1st	2nd	3rd
Africa (legionary)	15	27	37
Danube (legionary)	15	33	45
Danube (auxiliary)	16	39	
Rome (praetorian)	5	11	28

Source: Phang (2001) 404-409

In the first century AD, marital dedications may have been scarce because soldiers commonly manned garrisons far away from home and local same-status women were in short supply. In this environment, soldiers were more readily commemorated by fellow-soldiers, especially by those whom they had designated heirs. Greater troop mobility in the early Principate might have been another factor, in as much as it interfered with the creation of stable de facto unions. Dedications by members of the conjugal (as well as the birth family) increase in the second century AD, a trend that continues into the third. This development may have been spurred by a rise in provincial recruitment that helped preserve links to the birth family and facilitated relationships with local women. Even then, however, the Praetorian Guards in Rome continued to lag behind (table 2), and the ethnically distinct Horse Guards even more so.[4]

Age at marriage can only be indirectly inferred by observed changes in the identity of the principal commemorators. For instance, if teenage women are predominantly commemorated by their parents and women in their twenties more often by their husbands, we may interpret this shift as evidence of widespread female marriage around age twenty. The replacement of parents by wives at correspondingly higher ages indicates the same for men. Such readings suggest a typical age of first marriage of around twenty for women and of around thirty for men in Roman Italy, a distribution that is consistent with the later 'Mediterranean' type of early female and late male marriage and has been used as the basis of a computer simulation of Roman kinship structure that matches the surge in male marriage around age thirty reflected in the epitaphs from the city of Rome as well as in smaller samples from other parts of imperial Italy. Pertinent information gleaned from the census returns of Roman Egypt points to a more gradual rise in the male marriage rate from the twenties into the forties (figure 1). Conversely, the epitaphs of Roman soldiers generate a markedly different pattern. Dedications by de facto wives appear relatively late and do not exceed one-third of the total until the late forties, that is, for as long as soldiers were in active service. They begin to approach (but nevertheless fall short of) civilian levels only among veterans. The exclusion of samples with a notably low incidence of wife-to-husband commemoration (viz., from the first-century AD frontiers and the first- and second-century AD Praetorian Guards) does not greatly change this picture (figure 1).

[4] R.P. Saller and B.D. Shaw, 'Tombstones and Roman family relations in the Principate: civilians, soldiers, and slaves', *Journal of Roman Studies* 74 (1984) 139-145, 152-155; Phang (2001) 142-164.

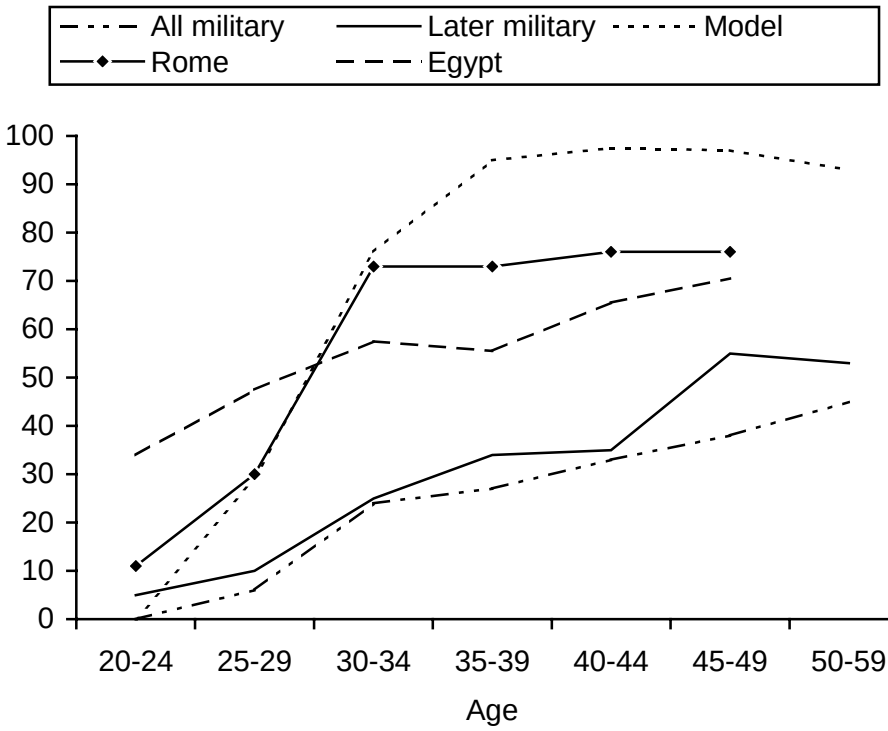

Figure 1 Percentage of men currently married ('Model', 'Egypt') or commemorated by their wives ('All/later military', 'Rome')

Key and sources: 'All military' = all military epitaphs from all regions and periods in Phang (2001) 169; 'Later military' = all military epitaphs from African and Danube legions and Danube auxilia (2nd/3rd centuries AD) and from Praetorian Guards (3rd century AD) in Phang (2001) 409; 'Model' = simulation of Roman kinship structure in Saller (1994) 52; 'Rome' = all epitaphs from the city of Rome in Saller (1994) 28; 'Egypt' = incidence of male marriage according to the census returns from Roman Egypt (1st-3rd centuries AD) in Bagnall and Frier (1994) 117.

Unfortunately, the paucity of civilian funerary commemorations from the main frontier provinces forestalls meaningful comparisons with local marriage customs outside the military sphere. Even so, levels of male marriage as low those as implied by the military epitaphs are inherently unlikely to be representative of any civilian population. It deserves notice that the increase in spousal dedications in the third century AD is merely the continuation of an earlier trend (table 2), and that marital commemoration remained relatively rare even after discharge: for both reasons, the 'marriage ban' cannot have been a crucial determinant of military cohabitation practices. It appears instead that the general circumstances of military life accounted for low rates of spousal commemoration and, by implication, of stable de facto or formal marriage during and after military service.

A narrow focus on those soldiers who were in fact commemorated by their kin reveals striking regional differences: naval crews at Ravenna and Misenum mostly married in their late twenties; legionaries on the Danube in their thirties; and those in North Africa in their forties. This distribution may be causally related to the fact that in the first two groups, soldiers' freedwomen frequently became the wives of their former owners. This practice was rare in North Africa where marriage with free women appears to have been the norm but was frequently

deferred until discharge. These complexities underscore the point that we are dealing with several intersecting variables – space, time, the soldiers' status, and their wives' status – within the confines of small data samples that do not normally permit detailed breakdowns without drowning us in statistical noise.

Under these circumstances, an overly schematic model is the best we can hope for. Compared to the civilian population, active soldiers were less likely to establish relationships with (free) women that were sufficiently stable to ensure funerary dedications in the event of these soldiers' death. Access to women of servile background could mitigate these constraints, and veterans married more frequently than active soldiers but nevertheless lagged behind coeval civilians. We may conclude that military service imposed a 'marriage penalty' on the military population both during and after service.[5]

The demographic consequences of this situation are largely a matter of speculation. The one thing that is clear is that in this regime, the 'marriage ban' would only rarely interfere with existing unions since men at the typical age of enlistment (mostly in the late teens, see below) would not normally be married (at least outside Egypt). In as much as reproductive success was predicated upon durable unions, soldiers may on average have fathered fewer (surviving) children than male civilians. Delayed marriage and resultant higher paternal age may have produced more orphans who required tutelage, a cost that may have been internalized by the military given that soldiers, whilst exempt from the duty to act as tutors for civilian relatives, could be required to perform this function for the offspring of fellow soldiers.

The soldiers' wives

Who were the (legal or de facto) spouses of Roman soldiers and veterans? In terms of age structure, they conformed to the standard convention that matched brides with significantly older grooms: soldiers' wives recorded in epitaphs are often in their twenties and thirties. The question of their status and background raises more serious problems and has been much discussed in recent scholarship, especially in connection with the broader question of how well the imperial army was integrated into provincial society. Sporadic literary allusions to soldiers' intermarriage with local women (as far apart as Syria and Germany) are vague and do not elucidate the civic status of these wives (Tac. *Hist.* 2.80; 4.65). In the epigraphic record, about 90% of all recorded wives of soldiers and veterans bear 'Roman' names (*duo nomina* with a Latin *nomen gentile* and a Latin or Greek *cognomen*), leaving little room for indigenous single names or 'Roman' names with an indigenous *cognomen*, commonly indicating recent enfranchisement. Taken at face value, this would seem to suggest that soldiers overwhelmingly formed unions with women who were either 'Roman' (in the narrow sense of citizens who were of Italian origin or descended from other citizen soldiers or enfranchised auxiliary veterans, or women who were 'Iunian Latins', that is, informally manumitted ex-slaves who had belonged to Roman citizens), or (both legally and culturally) 'Romanized' in the sense that they descended from (long?) enfranchised locals. Given that troops were deployed in areas where Roman citizenship long remained relatively rare outside military and civilian elite circles, either one of these variants suggests a strong dissociation of military society from that of the surrounding communities and consequently only limited interaction between (citizen) soldier and (non-citizen) civilian.[6]

This pattern assumes a particularly extreme form in the frontier zone of North Africa, where 185 of 186 epigraphically attested citizen soldiers or veterans are linked to Roman(ized) wives, alongside 507 (out of 514) civilian citizen husbands who had Roman(ized) wives. Thus, no fewer than 99% of all married 'Roman' men who appear on tombstones seem to have shunned

[5] R.P. Saller, *Patriarchy, property and death in the Roman family*, Cambridge 1994, 25-41; R.S. Bagnall and B.W. Frier, *The demography of Roman Egypt*, Cambridge 1994, 116-117; Phang (2001) 164-176, 193-194.

[6] Phang (2001) 190-195.

non-Roman(ized) marriage prospects. This raises two problems. First of all, non-Roman(ized) husbands are almost completely absent from this sample, as 99% of all documented married men have Roman names, and only a single non-citizen soldier appears together with his wife. This means that we know absolutely nothing about the marriage customs of non-citizen auxiliary soldiers, who were given the right to marry non-citizen women after their own enfranchisement upon discharge. (Most de facto wives recorded in auxiliary veterans' diplomas do in fact bear non-Roman names.) Second, as far as legionaries and other citizen soldiers are concerned, it strains credulity to accept that only 1% of long-term military personnel would consider unions with non-Roman(ized) local women, or that such couples consistently shunned epigraphic conventions. Usurpation of citizen status may be the only plausible explanation, in that women of local origin who established stable relationships with Roman soldiers assumed Roman-style names to 'fit in'. While we cannot even begin to guess at the scale of this maneuver, it is certainly interesting that a law from Roman Egypt addresses the case of non-citizen wives of veterans who unlawfully 'style themselves Romans' (*Gnomon of the Idioslogos* §53). This is an issue where the nature of the evidence prevents even the crudest estimates of actual practice. All we can claim with some confidence is that in this environment, non-assimilation was not an option for citizen soldiers' wives, an observation that continues to support the notion that the citizen army kept its distance from non-citizen locals (and/or vice versa).

Corresponding records from the European frontiers are less extravagantly biased in favor of Roman(ized) wives but nevertheless exhibit the same underlying pattern. The eastern garrisons have left little pertinent evidence. A recent study of the Roman army in Syria found only a single clear case of intermarriage with a local woman, as opposed to a number of unions within the military sphere. However, the evidence is far too thin to sustain quantitative analysis. Papyrus documents from Roman Egypt report unions among Romans and between Romans (including recently enfranchised veterans) and Egyptians in small numbers but fairly equal measure. At the same time, other sources indicate that soldiers were relatively well integrated in Egyptian society, although legal distinctions between citizens and non-citizens may well have maintained some barriers.[7]

Sex and the army

The apparent limitations of the military marriage market may seem hard to reconcile with the fact that soldiers were reasonably well remunerated and ought to have represented acceptable marriage prospects. The imperial tradition also jars with the report that by 171 BC, Roman soldiers on duty in Spain had fathered some 4,000 children with local women (Liv. 43.3). More generally, access to nubile women had traditionally been a reward of military service and imperial success in early conquest states. In principle, high concentrations of Roman soldiers in relatively thinly populated frontier regions could have put considerable strain on the local marriage market: in what is perhaps the most extreme case, the Roman garrison of Britain of some 40,000 men resided among a mere 200-300,000 women aged fifteen to thirty-five, and habitual marriage with indigenes might have created tensions with the local male population. In this connection, it is worth noting that Rome was one of very few early states that enjoined strict (serial) monogamy on its citizenry. Sexual coercion and exploitation appear to have been channelled into the sphere of chattel slavery that provided a functional equivalent to other forms of resource polygyny pursued in more overtly stratified systems. This hypothesis receives some measure of support from high rates of soldiers' commemoration by their own (certain or possible) freedwomen in some segments of the Roman military: 25-59% in the Italian fleets, 42-50% in the legions of first-century AD Germany, and between 3% and 35% in various other samples.

[7] D. Cherry, *Frontier and society in Roman North Africa*, Oxford 1998, 101-140; N. Pollard, *Soldiers, cities, and civilians in Roman Syria*, Ann Arbor 2000, 151-159; R. Alston, *Soldier and society in Roman Egypt: a social history*, London 1995, 117-142.

Focariae, kitchenmaids, were regarded as customary sex partners of Roman soldiers. The famous will of the veteran C. Longinus Castor in the late second century AD not only freed two of his slavewomen and made them heirs but also named as substitute heirs four males who are commonly assumed to be his children by those women. Finally, in addition to stable relationships, we must allow for the contribution of prostitution (of uncertain extent) and homosexual relationships with male slaves and military subordinates, which attracted a fair amount of attention in Roman literature. A deficit in spousal commemorations does not denote a sexually inactive Roman army, all the more so as the reproductive consequences of casual relationships necessarily remain unknown.[8]

Survival

The demography of the Roman imperial army: mission impossible?

The odds of surviving Roman military service are empirically unknown. While detailed reports of battle casualties for certain parts of the Republican period can be used as a basis for more ambitious – if highly conjectural – estimates of overall attrition rates, the nature of the evidence rules out similar attempts for the Principate. Scattered epigraphic records barely begin to fill the void. Information about the average age of enlistment and the length of service allows us to predict probable levels of baseline military mortality. Annual discharge rates for troop formations of known size are required to relate actual attrition rates to idealized projections, and to distinguish conditions in different units. In addition to quantifiable data, we also need to consider qualitative evidence for factors that can be expected to have had an impact on life expectancy, above all the quality of the water supply, sanitation and hygiene (which helped determine the prevalence of infectious disease), and possibly the range of medical services. At best, this eclectic approach sheds some light on broad trends, while firm conclusions will forever remain beyond our reach.

Enlistment

At what age did Roman soldiers join up? Epitaphs of soldiers who died during active service are our main source of information. In those cases in which both the age of the deceased and the length of his service are recorded on the tombstone, the age of enlistment is usually determined by subtracting the number of years of service from the number of years the soldier had lived. As I have shown elsewhere, this method needs to be refined to take account of the widespread custom of age-rounding: the practice of rounding someone's (often imperfectly known) age at death to the nearest multiple of five. Once we control for this distortion, the epigraphic evidence produces a clear picture. Approximately two-thirds of all legionaries enlisted between ages seventeen and twenty. Most of the others signed on between ages twenty-one and twenty-five, whereas recruitment at lower ages was negligible. The mean, median and modal age of enlistment is twenty years, and this figure can therefore be used for computational purposes. More radical but less dependable adjustments for age-rounding suggest an earlier peak around age eighteen, and a gradual decline in enlistment rates thereafter. Recruitment for the Praetorian Guards, the Urban Cohorts, and the imperial Horse Guards (*equites singulares Augusti*) in the capital is strongly concentrated in the age group from eighteen to twenty, with resultant means, medians and modes of around nineteen years. Thus, during the Principate, most citizen soldiers

[8] Phang (2001) 193-194, 240-243 (freedwomen), 204-207 (*focariae*), 231-240 (slave women), 244-251 (prostitution), 262-295 (homosexual relationships). For a general theory of sexual exploitation in early empires and the nexus between Roman chattel slavery and polygyny, see W. Scheidel, 'Sex and empire: a Darwinian perspective', in I. Morris and W. Scheidel (eds.), *The dynamics of ancient empires*, forthcoming. For the latter, cf. also S.E. Phang, 'Intimate conquests: Roman soldiers' slave women and freedwomen'.

enlisted within a few years of attaining legal maturity. This suggests considerable continuity between Republican and imperial practice.[9]

Life expectancy

The average life expectancy of Roman soldiers is much more difficult to ascertain. We know that in antiquity many lives were short. Occasional quantifiable data and comparative evidence suggest that mean life at birth expectancy normally fluctuated within a band from twenty to thirty years. In the near-absence of reliable primary data, ancient historians have begun to fall back on model life tables, which are modern extrapolations from known to unknown mortality regimes that project probable age distributions for different levels of life expectancy at birth. These models predict that in high-mortality regimes, a large percentage of all fatalities are concentrated in the first few years of life. Thus, we may assume that between one-third and one-half of all newborns were dead by age five. Adult mortality rates were less extreme but nonetheless very high by modern standards. For instance, a simple model life table for adult males suggests that of 100 soldiers who enlisted at age twenty, seventy-eight would have survived to age thirty-five, sixty-nine to age forty, and sixty to age forty-five.[10] For legionaries, this implies a baseline rate of attrition of roughly one-third for twenty to twenty-five years of service. In reality, violent death, camp-related disease, and early discharge would have raised overall attrition by a potentially significant margin.

Empirical information that would permit us to improve on this generic assumption is rare. In an earlier study, I made use of epigraphic rosters that list the number of soldiers who were discharged from a particular legion in a given year.[11] In three out of seven surviving documents from the second century AD, anomalies caused by military events forestall further analysis. The other four rosters (from the lower Danube, North Africa and Egypt) all point to annual rates of between 100+ and *c.*125 discharges, and in fact mostly to 120-125 cases per year. The underlying median of 120 annual discharges per legion needs to be related to the typical size of a legion and the length of service in order to calculate the rate of attrition during active service. Reckoning with an effective troop strength of slightly under 5,000, twenty-five years of service, and an average enlistment age of twenty, we may project an annual intake of 250-260 recruits and an annual discharge of 120 veterans per legion. In this scenario, slightly more than one-half of all recruits would not complete a full term of active duty. If correct, this estimate suggests that even in peacetime, the imperial legions lost approximately one-and-a-third times as many soldiers as predicted by mortality models alone (say, 50-55% instead of 40% over twenty-five years). Due to the probable margins of error, it is impossible to be more precise. Even so, this apparent discrepancy between predicted and observed attrition rates may readily be explained with reference to early discharge – either dishonorable (*missio ignominiosa*) or, perhaps more often, for medical reasons (*missio causaria*). Desertion and transfers to elite units would have added to the drain. Hence, in the absence of major combat operations, actual mortality in the legions need not have been dramatically (or at all) higher than in the civilian population. This notion is easy to reconcile with what we know about the ancient disease environment in general, and more specifically with the range of amenities provided in permanent legionary camps that I discuss in the penultimate section of this chapter.

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[9] W. Scheidel, *Measuring sex, age and death in the Roman empire: explorations in ancient demography*, Ann Arbor 1996, 97-116.

[10] Coale and Demeny (1983) 43 (Model West Level 4 Males). Standard model life tables may well underestimate adult mortality rates in archaic mortality regimes: cf. W. Scheidel, 'Roman age structure: evidence and models', *Journal of Roman Studies* 91 (2001), 1-26.

[11] Scheidel (1996) 117-124.

Records pertaining to the military units stationed in the capital itself create a very different impression.[12] Discharge rosters for the Praetorian Guards suggest much more rapid attrition than in the legions, of some 58% during seventeen years of service (in the second century AD) and of 45% during thirteen years (in the early third century AD). These rates are similar to those among legionaries who served for much longer periods of time, and therefore imply bigger losses overall. Much the same is true for the *equites singulares Augusti*, who appear to have suffered 60% attrition within twenty years of service. Various factors may account for this imbalance, including elevated levels of combat mortality in the emperors' campaigns of the Antonine and Severan periods, a greater degree of outward mobility in the form of promotions into the officer corps, and the notoriously severe disease environment of the city of Rome (see below).

Combat mortality

The demographic impact of campaigning is impossible to quantify. For the period from 200 to 168 BC, Nathan Rosenstein calculated an average combat mortality rate of 8.8% for Roman troops that were actively involved in – documented – battles (ranging from 4.2% for victories to 16% for defeats). If troops that did not see battle are included in the tally, the mean annual combat fatality risk for those years drops to 2.6% even when we allow for some unreported deaths in minor engagements.[13] These estimates are tenuous and in any case cannot be applied to later periods: for the standing army of the Principate, annual combat mortality of the order of 2.6% of total troop strength would translate to some 8,000-10,000 battle fatalities per year. Given what we know about the scale and frequency of large-scale military activity in this period, this notion is wildly implausible. We may conclude that relative to total manpower, combat mortality in the Principate was much lower than it had been in the Mid-Republic.

How much lower? In the absence of hard data, this issue is best approached by way of a thought experiment. In the first two centuries AD, war deaths must have been strongly concentrated in particular episodes of intense warfare: the Illyrian and German uprisings under Augustus, the civil wars after Nero and under Septimius Severus, the three Jewish Wars, the Dacian Wars under Domitian and Trajan, the Parthian Wars under Trajan, Verus and Septimius Severus, and the Marcomannic Wars under Marcus Aurelius. Together, these events covered approximately fifty years. If we generously assume that one-third of the Roman army, or at least 100,000 men, were actively involved in these conflicts (i.e., on average, every fourth year), this translates to a mean annual risk of serious combat of one in twelve in any given year, or a notional total of two years for each soldier surviving to discharge. If soldiers had faced a 10% chance of being killed in combat in each year of intense campaigning, the average risk of violent death would have amounted to 0.8% per year (or 2,400 fatalities in an army of 300,000), which equals one-half of the regular annual mortality rate predicted by model life tables. Yet again, this figure seems too high, implying as it does the death of 10,000 soldiers in each year of large-scale campaigning. Actual battle deaths need not have raised overall military morality rates by more than 10 or 20%. It seems impossible to assign more than a purely notional magnitude to this factor.

All we can say is that on average and in the long term, battle mortality was by no means negligible. At the same time, it was very unevenly distributed: while some units, at certain times, would have suffered disproportionately heavy losses, others would have remained largely untouched for extended periods. For instance, for all we can tell, the 239 veterans (representing two year's worth of releases) who were discharged from *legio VII Claudia* around AD 160 had not experienced substantial combat operations during their twenty-five or twenty-six years of

[12] Scheidel (1996) 124-129.

[13] N. Rosenstein, *Rome at war: farms, families, and death in the Middle Republic*, Chapel Hill 2004, 107-140.

service (*CIL* 3.8110). By contrast, the ranks of the 230+ veterans who left the same unit in AD 195 (as a single-year cohort) appear to have been swollen by numerous replacements for heavy losses incurred in war and epidemics at the end of the 160s AD (*CIL* 3.14507). Much like today, military mortality risks varied hugely depending on unpredictable changes in strategic conditions.

Health

Infectious disease was the single most important determinant of life expectancy in the ancient world. Direct information about Roman soldiers' exposure to pathogens is scarce. The annalistic record contains sporadic references to epidemic outbreaks during military campaigns of the Republican era, and plausibly suggests that sieges were particularly conducive to fatal infections. Unfortunately, the lack of comparably detailed reports for the Principate forestalls straightforward comparisons. The fevers that decimated Vitellius' Rhine legions in Rome in AD 69 (Tac. *Hist.* 2.93) and the dramatic military fatalities caused by the so-called Antonine Plague (probably smallpox) in the late 160s AD (Gal. 19.17-18; Oros. 7.15.5-6) are probably the most noteworthy instances. However, it is doubtful whether the overall paucity of references to disease in army camps or during campaigns can be taken as evidence of its relative insignificance. After all, in the more recent past, infections usually carried off more soldiers than did actual combat: in the American Civil War and the Boer War, deaths from disease outnumbered battle fatalities by about two to one, and earlier rates may have been higher still.[14]

Even so, a number of factors may have helped to lessen the impact of disease in the Principate. Prolonged sieges, traditionally a major risk factor, were comparatively rare in this period, and even Josephus' detailed account of the sieges of the Jewish War of AD 66-73 contains no reports of epidemics among the Roman forces. More importantly, several of the greatest scourges of early modern armies appear to have been rare or unknown in the ancient Mediterranean, above all louse-borne typhus but also cholera, smallpox and plague. Conversely, tuberculosis may have been an issue in cramped living quarters that facilitated transmission. Malaria is arguably the most important unknown quantity. It is hard to determine to what extent periodic fevers were common near the major camps outside the capital itself. The coast near Alexandria was said to be relatively safe from that disease, and while we know too little about the suburban camps of the eastern provinces to draw any conclusions, a dry climate may well have curtailed seasonal fevers. Then again, the legionary fortress of Carnuntum on the Danube (at the eastern border of Austria) was situated in close proximity to extensive wetlands that remained malarious well into the nineteenth century, while in nearby Hungary (formerly heavily-garrisoned Roman Pannonia), widespread malaria infections persisted into the 1940s. The Rhineland, which came to house up to one-third of the Roman legionary forces in the early first century AD, experienced high levels of endemic malaria until massive regulations of the river were finally completed in 1879. As a consequence, many Roman army camps may have been exposed to seasonal infection. Although Roman manuals recommended the construction of military (as well as civilian) sites away from infested marshes, the logistical constraints of riverine supply lines appear to have superceded such precautions.

We cannot be sure if the observation that in AD 208, Septimius Severus' army in Scotland was 'badly affected by the waters' (Dio Cass. 77.13.2) refers to malaria (subsequently common in other parts of Britain), or whether a lost inscription from a fort north of Hadrian's Wall had actually been dedicated to Dea Tertiana, the goddess of tertian fever (*CIL* 7.999). We have moreover no reason to assume that frontier troops routinely faced hazards as severe as those that ravaged the city of Rome, with its deadly mix of hyperendemic quotidian and malign tertian fevers (caused by the most potent malaria parasite, *P. falciparum*) and numerous other density-dependent diseases which were capable of inflicting massive fatalities on troops used to less hostile surroundings and may arguably have contributed to the high attrition rates observed

[14] E.g., F. Prinzing, *Epidemics resulting from wars*, Oxford 1916; Rosenstein (2004) 130-131.

among various urban guard units. Nonetheless, the relatively warm climate of the early imperial period and the army's dependence on unregulated waterways raises the very real possibility that malaria took a significant toll on stationary garrisons. It deserves notice, however, that the characteristic variants of the European interior, benign tertian (*P. vivax*) and quartan fever (*P. malariae*), were insufficiently pernicious to kill many adults on their own: rather, they would have boosted mortality by exacerbating unrelated but concurrent illnesses.[15]

In this environment of synergistic superinfection, the prevalence of other diseases acquires especial significance. Given the deployment and routines of the frontier armies, living conditions in the permanent camps of the legions and auxiliary units must have been the principal determinant of military health. The standing army of the Principate was concentrated in hundreds of camps with 500 to 1,000 residents each, and in two dozen or more legionary camps with adjacent *canabae* (and sometimes regular cities) whose combined population commonly exceeded 10,000 each. In such high-density clusters, contaminated food and water and resultant gastro-enteric diseases such as dysentery and typhoid fever posed the most serious health risks. In a world without antibiotics, infrastructural provisions for uncontaminated water supply, efficacious waste disposal and general cleanliness represented the only credible line of defence against such threats.

Excavations in and around imperial army camps have unearthed an impressive range of pertinent amenities. Aqueducts are attested on a number of military sites: a mere auxiliary camp on Hadrian's Wall such as Great Chesters boasted an aqueduct that was six miles long. Other camps relied on draw-wells (no fewer than 99 of which have been located inside the auxiliary fort of Saalburg), used large filtration tanks with multiple chambers, and also drew on rivers. In the southern and eastern provinces, cisterns were used to collect rain water. Bathhouses, where available, offered the standard array of hot, warm and cold pools, and could be equipped with latrines. Water-flushed latrines have been found in Roman camps as far apart as Britain and North Africa, sometimes with hand basins that improved hygiene. The sophistication of these installations varied considerably, from stone-built latrines that were continually flushed and equipped with elaborate drains to simpler wooden structures with cesspits. The latter were common in auxiliary forts that lacked the dedicated drainage systems that were typical of the much larger legionary encampments. Egyptian papyri mention soldiers who were charged with clearing out such cesspits. According to one estimate, a legionary camp may have been equipped with five or six latrines that could accommodate up to twenty men each. In addition, there is some circumstantial evidence for the existence of separate smaller latrines for private use by officers. The absence of large centralized messes may have helped to curtail food poisoning: rations were prepared by each *contubernium* of eight soldiers on small hearths at the barracks.[16]

A substantial body of epigraphic and archaeological evidence sheds some light on the medical service of the imperial army. *Medici*, the most frequently documented category, were trained soldiers who performed medical functions both in the garrisons and during campaigns. Although it is often assumed that medical personnel could be common soldiers as well as officers,

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[15] Relative prevalence of diseases in antiquity: W. Scheidel, *Death on the Nile: disease and the demography of Roman Egypt*, Leiden 2001, 67-68, 94-101. For Alexandria, see ibid. 20-21, 78-79; for Britain, see R. Sallares, *Malaria and Rome: a history of malaria in ancient Italy*, Oxford 2002, 156-157. See W. Scheidel, 'Germs for Rome', in C. Edwards and G. Woolf (eds.), *Rome the cosmopolis*, Cambridge 2003, 158-176, for a reconstruction of the disease pool of the capital, and Scheidel (1996) 129 n.107 for military mortality there.

[16] Water supply: H.v. Petrikovits, *Die Innenbauten römischer Legionslager während der Prinzipatszeit*, Opladen 1975, 105-106; A. Johnson, *Roman forts of the 1st and 2nd centuries AD in Britain and the German provinces*, London 1983, 202-210; R.W. Davies, *Service in the Roman army*, Edinburgh 1989, 211. Latrines, drains and cesspits: Petrikovits (1975) 106; R. Jackson, *Doctors and diseases in the Roman empire*, Norman 1988, 131; D.P. Davidson, *The barracks of the Roman army from the 1st to 3rd centuries A.D.*, I, Oxford 1989, 233-236; Davies (1989) 211. Cooking: Jackson (1988) 133.

the question of rank continues to be much debated: our readings primarily hinge on the interpretation of the title *medicus ordinarius*, which may denote common soldiers or officers of the rank of *centurio*. *Capsarii* served as dressers, while specialists included the *medicus chirurgus* (surgeon), *m. clinicus* (internist), and *m. ocularius* (oculist), as well as the *marsus* (specialists for snake bites). A reference to trainee dressers (*discentes capsariorum*) points to the existence of on-site instruction.

The strength of military medical personnel is unclear. We only know for certain that each of the *cohortes vigilum* in Rome was endowed with four *medici* (i.e., one per 250 men), while large warships with a crew of 200 to 250 appear to have carried one doctor each. *Medici* are repeatedly attested for auxiliary formations (and even in irregular *numeri*), but there is currently no evidence for the presence of more than one such person in any one unit. Thus, if we conservatively reckon with one *medicus* per 500 men in most units, a legion may have had at least ten (although we may have to allow for the presence of additional specialists in large units), and the armed forces as a whole might have employed up to 1,000 medical staff.[17]

Permanent legionary camps were equipped with sizeable military hospitals (*valetudinaria*) located in quiet areas and run by an *optio valetudinarii*. The best-known examples are those at Vetera (Xanten) and Novaesium (Neuss) on the Rhine. The latter boasted a *valetudinarium* that measured fifty by ninety meters (or more than an acre) and contained a large number of small cubicles that may have accommodated some 260 patients, or 5% of the total unit. Substantial collections of medical instruments and assorted remains of medicinal plants have been found at these and comparable sites. Correspondingly smaller establishments are attested in some auxiliary camps in Britain, the Rhineland, and on the Upper Danube. It is unclear to what extent this reflects genuine geographical limitations or merely the relative thoroughness of excavations in different parts of the former empire. However, we know that even in these regions, not every camp contained dedicated medical facilities. Papyrological records from Roman Egypt demonstrate that the army kept track of illness: sick soldiers could be listed on a daily basis, and we even hear of arrangements that allowed convalescents to recover away from their camps.[18]

Army surgeons in particular were famed for their skills and practical experience, and we have osteological evidence of demanding surgical procedures. Even so, the demographic benefits of military health care remain doubtful. Due to the lack of sterile operating theaters, even seasoned surgeons must have faced serious constraints, and their services would have been useful in the first instance during campaigns.[19] In peacetime, infectious diseases must have been a far greater threat to the soldiers' health. As in all pre-modern societies, the lack of vital medical knowledge gravely limited both prevention and intervention: inoculation, vaccination and antibiotics – the only effective means of combatting serious infections – were as unavailable to Roman army doctors as to any other early medical practitioners. In this context, non-medical prevention necessarily assumed a much greater importance than medical services. Thus, in as much as clean drinking water, proper toilets and bathhouses were not only set up but routinely used and maintained, Roman garrisons may well have enjoyed basic protection against infection and premature death far beyond the primitive standards of most other pre-modern armies. This notion is consistent with my thesis that peacetime mortality rates in the frontier garrisons need not have been significantly higher than in the general population.

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[17] Medical staff: Davies (1989) 212-215 (functions); J.C. Wilmanns, *Der Sanitätsdienst im Römischen Reich*, Hildesheim 1995, 68-70 (numbers); 75-86 (rank), 117-124 (functions).

[18] Military hospitals: R. Watermann, *Valetudinarium. Das römische Legionskrankenhaus*, Neuss 1978; Jackson (1988) 134-136; Davies (1989) 218-225; Wilmanns (1995) 103-116.

[19] Jackson (1988) 112-129. Cf. also C.F. Salazar, *The treatment of war wounds in Graeco-Roman antiquity*, Leiden 2000.

General implications

If we accept an annual baseline rate of 120 discharges per legion, twenty-five to thirty legions would have produced some 3,000 to 3,600 new veterans each year, as would the various auxiliary formations. The annual creation of 6,000-7,000 forty-five-year old veterans would have sustained a total veteran population of about 100,000-120,000 men, equivalent to between one-third and one-quarter of the active army. Every year, somewhere around 15,000 fresh recruits were required to staff the legionary, auxiliary and naval units, or – assuming a total population of sixty to seventy million – about 2½% of all twenty-year old men in the Roman empire. Needless to say, this overall mean may conceal potentially massive regional variation in actual recruitment rates.[20]

The question to what extent the imperial army was capable of reproducing itself (via the enlistment of the sons of soldiers) is impossible to answer. Suffice it to note that several factors would have militated against high levels of internal replacement. They include excess mortality casued by combat and other professional risks, attrition due to early discharge or other departures, and the relatively late age of male de facto marriage indicated in many of the soldier's epitaphs. In purely demographic terms, it is unlikely that the imperial army could ever become a 'closed institution'.

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[20] Cf. Scheidel (1996) 93-97 for conjectures about regional enlistment rates.