

Mortality and other medico-social aspects in the first Australian settlement at Sydney, 1788-1792

BRYAN GANDEVIA (Sydney)

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History describes man's everlasting struggle to adapt to his physiological and social environment. The history of medicine (using this term to include health as well as disease, both psychological and physical) is seen as an index of the success or otherwise of man's adaptation to the environment. The history of medicine in Australia offers a profitable field of study in that it reflects what is almost a biological experiment; the new settlers in 1788 were European in origin, with a relatively uniform European cultural, social and religious background¹. They brought with them European diseases and European methods of medical practice; there were no indigenous or endemic diseases in the Sydney area to complicate the picture. The physical environment was both harsh and strange to the European; the factor of isolation alone was of profound significance, especially when no further ship arrived from England for two years.

The first five years of the settlement at what is now Sydney were a desperate struggle for existence. Crops and gardens failed, the limited livestock died or strayed, and the stores and provisions arriving from England at infrequent intervals were deficient in quality and quantity. Starvation was a constant threat because indigenous foods (plants, fish or kangaroo) were limited. The colony's nutritional status, basically dependent on salt meat and flour, was constantly impaired and its daily caloric intake ranged from about 1400 per person at worst to a maximum of about 3200 on the full ration.

We have made a detailed study of mortality during the first critical five years^{2,3}. *Figure 1* shows the monthly mortality, the arrows at the top referring to arriving ships (which increased the population), whilst below is shown the available rations throughout this period. It can be seen immediately that the peaks of mortality cannot be explained solely on a basis of malnutrition; the inter-epidemic periods included the periods when the ration scales were worst. *Table 1* shows population estimates and mortality rates for the adult convicts, the military and civil personnel, and the children of both groups. It is apparent from *Figure 1* and *Table 1* that the deaths occurred in three epidemics and chiefly affected adult male convicts. The six months' voyage of the First Fleet to Australia was accomplished without serious disease; the mortality

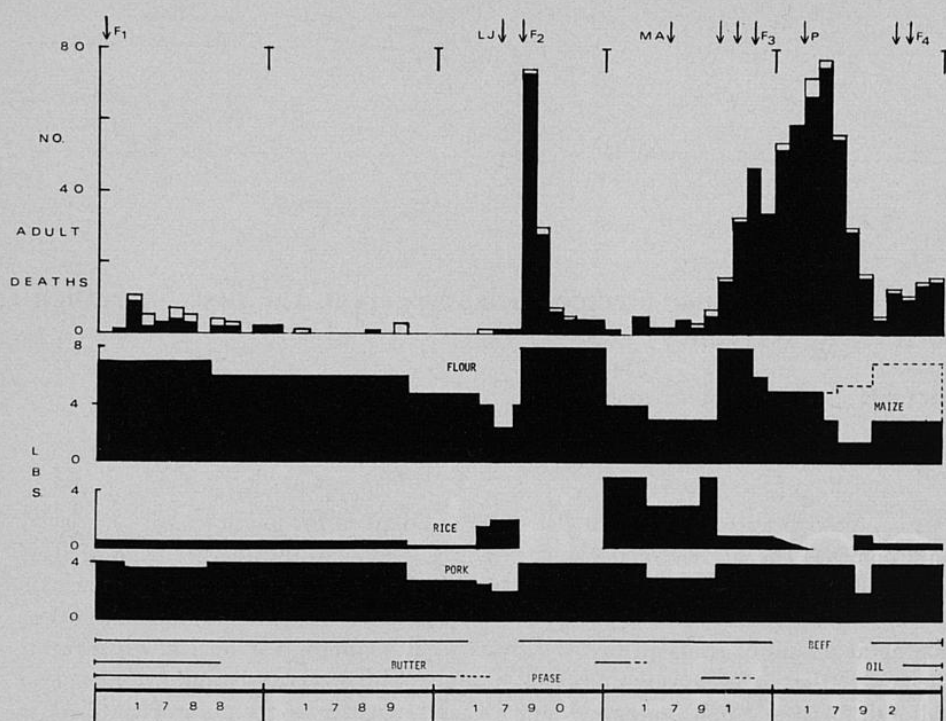


Figure 1: Explanation of graphs and symbols from above down. Arrows indicate ship arrivals – F₁, First Fleet; LJ, LADY JULIANA; MA, MARY ANN; F₂, Second Fleet; F₃, Third Fleet; P, PITT; F₄, Fourth Fleet. Vertical bars indicate end of year as shown on horizontal scale. Adult deaths by month, the number being shown on the vertical axis and the male deaths in black (filled in). Rations are indicated in the remaining graphs. Flour, rice and pork are shown in lbs. Horizontal lines indicate periods of availability of beef (issued in place of part or all of a pork ration), butter, oil and peas. Reproduced by courtesy of the Editor "Australian and New Zealand Journal of Medicine".

was only 6% amongst the convicts and 1% amongst other personnel. Contrary to the expectations of the new settlers, scurvy broke out on their arrival and was accompanied by dysentery; these diseases were undoubtedly responsible for the first epidemic (early 1788) and its mortality. It was some months before adaptation to the environment occurred; the camp became better organised, the limited range of indigenous anti-scorbutics were identified, and the winter passed. Thereafter, in spite of the poor ration levels, the health of the settlement was remarkably good and the subject of favourable comment.

The second epidemic in the middle of 1790 was directly associated with the arrival of the notorious Second Fleet, with a mortality of 25% on the voyage out. The death in the settlement were confined to Second Fleet arrivals, most of whom arrived in a deplorable state of health. Contemporary evidence suggests that again scurvy and dysentery were the major diseases but fevers, probably including typhus and typhoid,

Table 1: Mortality rates, 1788–1792*

	Convicts		Other Personnel**	Children
	M	F	M	M & F
1788				
Population	520	175	225	40
Mortality Rate	5.4	7.4	1.8	30.0
1789				
Population	430	150	210	61
Mortality Rate	0.7	2.7	2.4	13.1
1790: January–June				
Population	355	103	173	71
Mortality Rate	1.1	1.9	1.2	14.1
1790: July–December				
Population	878	328	246	106
Mortality Rate	27.8	3.0	2.4	5.7
1791: January–June				
Population	789	203	250	109
Mortality Rate	3.5	–	1.6	7.3
1791: July–December				
Population	1500	340	295	150
Mortality Rate	18.0	2.9	1.4	16.0
1792***				
Population	2100	390	320	200
Mortality Rate	19.4	4.4	2.2	15.5

* Mortality rates are calculated as annual mortality rates per 100 persons living in each category.

** Relates to civil, military and free males only, sailors and females being excluded; mortality was low amongst the latter.

*** Most of the mortality in 1792 occurred between January and June. Population figures are estimates at mid-point of period under review.

were also present. The mortality diminished progressively week by week from an initial peak, in itself a pattern suggesting the “tail” or righthand limb of an epidemic curve which began on board ship. There is no evidence to suggest any epidemic disease amongst the First Fleet inhabitants over this period.

The third epidemic, after the arrival of the Third Fleet towards the end of 1791, is of special interest. Again we have been able to trace most of the deaths by name and by ship of arrival, and we can be confident that again the vast majority of about 500 deaths occurred amongst the new arrivals. There is no evidence of any epidemic disease, and certainly no undue mortality, amongst those already living in the colony. Contemporary accounts, which are clinically inadequate for retrospective diagnosis, indicate the presence of flux, fevers and scurvy, with also some sudden and apparently unexpected deaths. It was observed that those who were weakened by the unsatisfactory conditions during the voyage (there was a mortality of 10% prior to arrival) unexpectedly failed to improve in health and strength after landing.

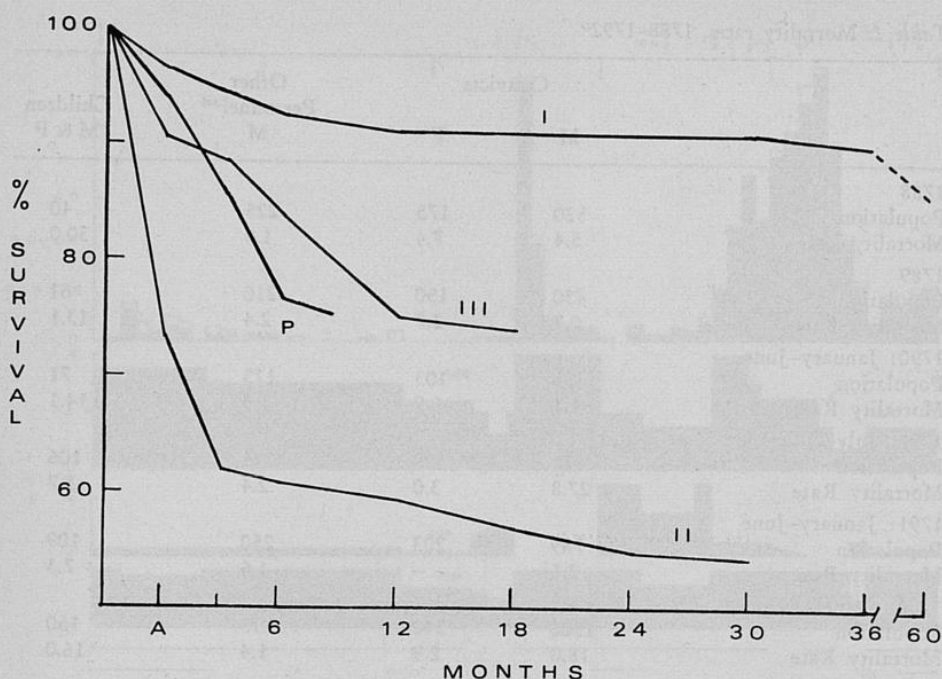


Figure 2: Survival rates for the First, Second and Third Fleets and the PITT. 100 % represents the number embarked in Britain; A, percentage surviving on arrival at Port Jackson; thereafter percentage survival at six-monthly intervals from time of arrival. Reproduced by courtesy of the Editor "Australian and New Zealand Journal of Medicine".

It is not easy to explain this mortality. It is necessary to postulate a disease with a case fatality rate of the order of 25 %, and, since it did not spread to involve other members of the colony, it could not have been a disease spread through the agency of air, water, flies or milk. There is evidence that the new arrivals were separately housed on landing, although otherwise they must have mixed with the other convicts; person to person transmission, as may occur with dysentery, is thus feasible. It is remarkable that separate epidemic curves, with peaks at different times, can be plotted for the arrivals on each of the several ships composing the Third Fleet; this is consistent with direct spread if, as is logical, ship's "companies" were kept together. Any explanation based on an infectious disease must explain not only these problems but also the persistence of the epidemic for almost a year, as well as a mortality at its worst almost as high as in the Great Plague of London.

Although undoubtedly the convicts had organic disease, probably most commonly dysentery, accentuated by malnutrition, we believe that a full explanation requires a further factor, namely, a loss of the will to live. There is one contemporary statement by an astute observer that the new arrivals "appeared to be a people wholly regardless of the future; and not dreading any thing that was not immediately present to their own feelings". From these newcomers were also drawn the absconders from



Abb. 3: Die beiden australischen Wissenschaftler Professor Dr. GANDEVIA (Sydney) (3. von links) und Dr. FORSTER (Melbourne) (4. von links) zusammen mit Professor Dr. SCHADE-WALDT (2. von links) und Dr. PORZBERG von der Pharma-Abt. Bayer (ganz links) bei der Besichtigung des wissenschaftlichen Archives der Farbenfabriken Bayer in Leverkusen.

the settlement, the vagrant robbers operating on the outskirts of the small settlement and the garden depredators, all occupations leading to almost certain death or very severe punishment. There were good reasons for a lack of morale; they had arrived to find that after three years the settlement was still far from self-supporting, to suffer progressive reduction in effective rations at the months went by, and also to encounter the indifference, perhaps even the hostility, of their colleagues who had arrived before. The new arrivals would also have known some of the Second Fleet convicts, and they would have noticed the high mortality which they had suffered. It was the beginning of a psychological malaise which was to be enhanced, and indeed to become generalised, within a few months, as a result of the departure of Governor PHILLIP, who had succeeded up to this time in maintaining a viable colony in spite of considerable difficulties.

The situation is perhaps most clearly expressed in terms of survival rates (*Figure 2*). The First Fleet arrivals clearly became adapted to their environment, with a survival rate of approximately 90% some five years after they had left England. Their mortality became more or less stable after six months in the new country, whereas a stable mortality rate was not really achieved by later arrivals, at least up to the end of 1792.

The women suffered a much lower mortality than the men throughout. This may reflect their biological superiority in withstanding semi-starvation and epidemic disease, but it probably also reflects the fact that, being relatively few in number, they were much in demand and were therefore able to live a less arduous and more favoured existence. The epidemic mortality involved the children in the first epidemic but not in the second; the slightly increased mortality amongst children in the third epidemic is largely attributable to deaths amongst children of Third Fleet personnel. Our study of childhood mortality indicates that deaths of children aged 12 months or less comprised only about 20% of the births; deaths of children of all ages were less than a third of the births. There is also evidence to suggest that a disproportionate number of the childhood deaths occurred amongst the children of unstable liaisons; children of married personnel contributed least to childhood mortality. The good survival rate of children, as judged by contemporary English standards, led to an impression of enhanced fertility and fecundity amongst the women, but it can be shown that in fact the birth rate was less than might have been anticipated, possibly for reasons of impaired nutrition and venereal disease⁴.

In this review mortality has in effect been used as an index of adaptation to the environment by an isolated population in circumstance of physical and mental stress. A more detailed examination over a longer period of time suggests that the physical and psychological "health" of a community may have significant socio-political considerations. An examination of this broad question is beyond our present scope but elsewhere⁵ I have suggested that the decline in morale produced by a combination of ill-health and poor leadership was directly responsible for the complex situation which led to the famous rebellion against Governor BLIGH some two decades after the period examined in this paper.

Acknowledgements

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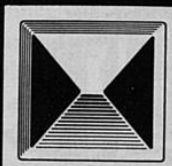
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