Hepatitis B vaccination in the Royal Australian Navy

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The Naval Health Services are responsible for the health care of all RAN personnel. The Naval Health Services' mandate includes the provision of preventive as well as curative health services with a primary aim of ensuring that a high percentage of Naval personnel are fit for operational duties, especially for seagoing duties.

Australia, apart from some high risk groups, has a low incidence of hepatitis B infection. The prevalence of HBV markers is 3 to 6 percent in the Australian population[1]. Naval ships, however, operate constantly throughout South East Asia and the South West Pacific where the prevalence of HBV markers may be over 80 percent in some populations[2] and there is a high prevalence of carriers. Additionally, other countries' military personnel have been shown to have an increased prevalence of hepatitis B markers. Although this increased prevalence has not been shown in Pavli's study of serological markers in RAN personnel[1], naval personnel have been involved in tattooing, accidents and unsafe sex in these areas, despite educational campaigns, with a consequential increase in risk.

History

Given these factors, the RAN has been developing policy in this area for nearly 20 years. Navy first issued policy in 1975 when routine screening of personnel was not recommended[3].

In April 1983, hepatitis B vaccine was released in Australia. Navy issued policy in August 1983 stating that the vaccine was not to be given without specific approval from Navy Office. Following the National Health and Medical Research Council recommendations on screening and immunisation of high risk groups in August 1983, and various supportive articles in late 1983 and 1984, the RAN policy was reconsidered. In June 1985, a Naval Health Circular[4] was issued requiring the screening of dental and laboratory personnel for hepatitis B and the offer of H-B-Vax to these personnel.

In November 1987, the NH and MRC recommended that Australians residing in endemic areas should be vaccinated against hepatitis B[5]. The Surgeon General, Australian Defence Force (SGADF) recommended that all Defence Department personnel with postings of three months or more in endemic areas be immunised.

With the introduction of Engerix B vaccine by Smith, Kline and Beecham in late 1987, SGADF introduced a Technical Policy Directive[6] requiring:

- HBsAg testing of all entrants
- HBsAg testing of at risk populations, including medical staff

- immunisation of at-risk populations.

By August 1988, the Director General, Naval Health Services (DGNHS) had questioned the rationale, on cost-effective grounds, of testing entrants and RAN policy throughout 1988 and 1989 was not to test entrants but to carry out the other requirements of the Directive. In addition, by May 1989, there were increasing operational requests from ships and patrol boats for the vaccination of their crews. The ensuing discussions considering operational demand, cost-effectiveness (based on Pavli et al's paper[1]), the requirement to maintain the integrity of the 'floating' blood bank, and the decreasing cost of the vaccine, led to a review. On 30 January 1990, SGADF notified his intention of introducing phased vaccination for all personnel, starting with entrants and health service personnel[7].

A Naval Health Circular was issued in March 1990 requiring the screening and vaccination of all new entrants and the vaccination of at risk groups. This was followed in August 1990 by the issue of an SGADF Technical Policy Directive[8] requiring:

- the screening for HBsAg of entrants and those personnel clinically suspected of having or carrying hepatitis B
- the immunisation of entrants
- the continued screening of HBsAg with routine HIV screening
- immunisation of the remainder of the Defence Forces progressively, without either pre- or post-vaccination screening.

The use of condoms and infection control procedures was also reinforced.

In 1991, a census was carried out to identify the effectiveness of the programme. Ships and establishments were directed again to have all vaccinations complete by 1 March. The SGADF policy was updated and refined[9] and in January 1993, the RAN carried out a further census of the vaccination programme.

Censuses

The census in 1991 showed different pictures between the fleet and the establishments.

In fleet, three quarters were vaccinated or in the process of being vaccinated (Figure 1). This was still of considerable concern because of fleet operations in South East Asia and the South West Pacific.

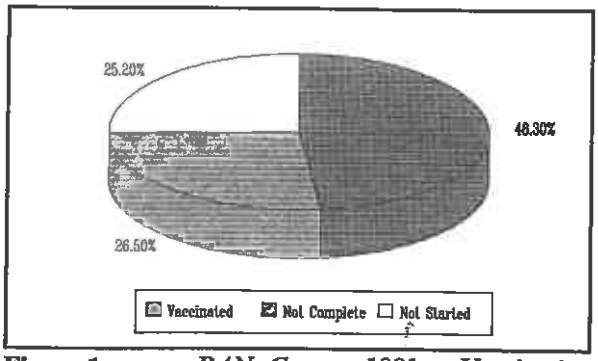

Figure 1 *RAN Census 1991 - Vaccination Status: Fleet*

The establishments, however, were of more concern, with 45 percent not yet commenced on the vaccination programme (Figure 2).

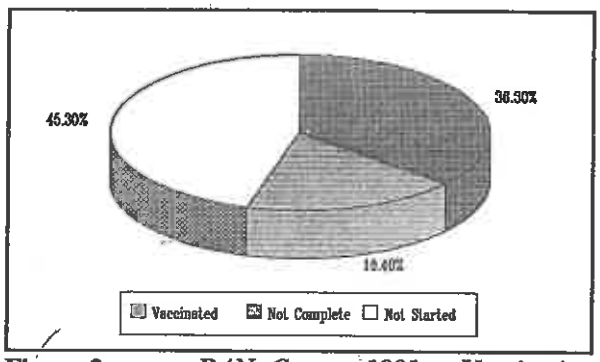

Figure 2 *RAN Census 1991 - Vaccination Status: Establishments*

The picture at the census in February 1993 was considerably different (Figure 3). Ninety-two point five percent of Fleet was now vaccinated with only 0.5 percent not yet started.

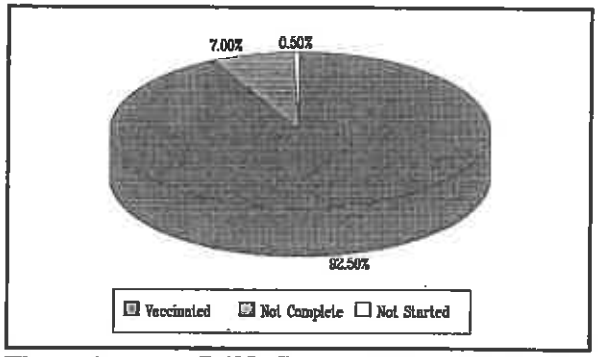

Figure 3 *RAN Census 1993 - Vaccination Status: Fleet*

Similarly, the majority of personnel at the establishments were now vaccinated (Figure 4).

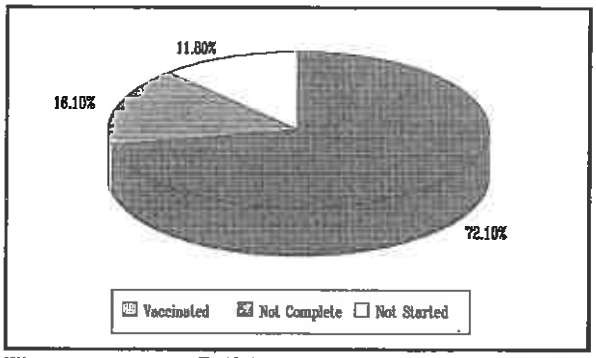

Figure 4 *RAN Census 1993 - Vaccination Status: Establishments*

The remaining high number of incompletely vaccinated personnel were primarily entrants undergoing their hepatitis B course. This percentage is unlikely to change markedly as new groups enter the RAN. Vaccinations are continuing, with the majority of personnel expected to be fully vaccinated by the end of 1993.

Discussion

Is the ADF doing the right thing? There is good evidence to support current policy.

Firstly, ADF methods. The ADF has elected to immunise all of its personnel, commencing with high risk groups. This is supported by Atler et al[10] who have found the percentage of hepatitis B due to heterosexual transfer is increasing and targeting only high risk groups may not be effective. Indeed, the rising incidence of hepatitis B has forced the US to reconsider its position and to broaden recommendations to include those with occupational and lifestyle risks[11].

The ADF also does not routinely do pre- or post-vaccination testing. Although advocated by some parties[12], such testing is not advocated by either Australian[13] or overseas authors, including the Immunisation Practices Advisory Committee (ACIP) of the Centre for Disease Control[14]. The ADF does, however, recommend the serological testing of those at high risk, a practice which is generally supported[14,15].

Secondly, we need to look at results. Pavli et al[1] estimated an attack rate in RAN personnel of less than one percent, which is similar in scale to the US military rate of 0.5 percent. Is vaccinating a population with such a low attack rate cost effective? Numerous studies have examined this question. Given the three to ten percent of adults who subsequently become carriers, and the reduced cost of vaccines, now only $21 for a Naval course, the literature would support this view. Indeed, Mauskopf et al[16] asserts that the vaccine programme would only have to avoid one or more cases per 6,517 low risk workers to be cost-effective.

Additional analysis, utilising vaccine at $7 a dose and strike rates of 0.35% to 2%, suggest that such a regime is both cost-effective and cost beneficial[17,18,19]. Even Pavli et al[1], who felt immunisation was not cost-effective in 1988, noted that it was likely to become cost effective as vaccine costs fell. With vaccine costs at one-third of their 1988 values, vaccination of populations with attack rates of less than one percent, using the Mulley model[20], is cost effective.

Effectiveness can be measured by calculating the effect of the programme on the incidence of new disease and of carriers. As between three and ten percent develop chronic carrier states, with the potential for chronic active hepatitis and hepatic cancer in the future, any regime ideally should prevent carrier states. Whittle et al[21] have found hepatitis B vaccination 97 percent effective in preventing chronic infections. The RAN's programme has already identified a number of chronic carriers and enabled their closer monitoring. Review in five years is anticipated to show a drop in carrier rates with associated long term benefits. Operationally, the integrity of the 'floating blood pool', now screened for hepatitis B, hepatitis C and HIV, will remain at a high standard.

Conclusion

Where to now? Research is continuing into the effectiveness of various immunisation strategies, and a combined hepatitis A - hepatitis B vaccination study has commenced at the Australian Defence Force Academy this year. Research into non-responders and the timing of booster shots is also planned.

Navy has implemented an effective hepatitis B immunisation programme that will stand it in good stead in the future. Mass programmes of this type can be useful in groups with occupational risks of HBV and should be considered as part of any overall vaccination strategy.

The Author:

Surgeon Lieutenant-Commander Andy Robertson RAN has contributed previously to AMM. He is about to proceed overseas for specialist training in NBC medicine in the United States and United Kingdom.

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