



Figure: Survival curves for boys (from age 10 months) who had received EZ-HT at 5 months, SW-HT at 5 months, or SW-STD measles vaccine at 10 months

Children born between February, 1987, and January, 1989, and followed until February, 1994. Comparison made with 10 months of age when children in control group received SW-STD measles vaccine.

From data in the thesis and using a different cut-off of -2 z-scores Garenne concludes that EZ-HT measles vaccine is deleterious for boys, the difference being especially striking for wasting (weight-for-height). It should be noted that with a prevalence of 6.3% and 2.0% for EZ-HT and SW-STD boys, respectively (table), wasting was uncommon in both groups, being actually lower than expected (2.5%) in the SW-STD groups.

The most relevant criteria for malnutrition may be debatable. However, mortality is the critical issue. We have followed the trial cohort until the annual census in February, 1994. As shown in the figure, there was no difference in mortality between boys who had received EZ-HT, SW-HT, or SW-STD. In the subgroup of children participating in the nutritional survey, there was significantly lower survival for EZ-HT girls than in recipients of standard vaccine (mortality ratio [MR] 2.55 [95% CI 1.13-5.71]). Although

	Deaths/number of children			
	Female		Male	
	EZ-HT	SW-STD	EZ-HT	SW-STD
Number	19/251	8/269	10/238	12/251
MR (EZ/SW)	2.55 (1.13-5.71)		0.88 (0.39-2.00)	
Weight-for-age				
<=-3 z-score	3/14	0/6	1/13	3/15
-3 to -2 z-score	6/54	1/50	3/63	4/42
> -2 z-score	10/181	7/213	6/162	5/194
MR (EZ/SW)	2.46 (1.06-5.72)		0.82 (0.37-1.84)	
Height-for-age				
<=-3 z-score	6/34	0/21	2/27	5/35
-3 to -2 z-score	3/55	5/70	2/65	4/61
> -2 z-score	10/162	3/178	5/146	3/156
MR (EZ/SW)	2.40 (1.01-5.69)		0.82 (0.35-1.91)	
Weight-for-height				
<=-3 z-score	0/1	-	0/2	-
-3 to -2 z-score	1/8	0/4	2/13	2/5
> -2 z-score	18/240	8/265	8/223	10/246
MR (EZ/SW)	2.57 (1.14-5.81)		0.77 (0.34-1.70)	
Arm-circumference				
<=-11.0	1/3	-	0/2	-
11.1-12.5	1/6	1/11	3/12	3/10
>12.5	17/240	7/258	7/222	9/241
MR (EZ/SW)	2.54 (1.12-5.75)		0.84 (0.38-1.87)	

252 children who had received SW-HT vaccine not included.

Table: Mortality (1990-94) in relation to nutritional status (z-scores) in November-December, 1990 for recipients of EZ-HT and SW-STD measles vaccine.

High-titre measles vaccines for boys

SIR—Garenne (July 25, p 261) analyses data from a trial of high-titre measles vaccines in Niakhar, Senegal. The findings of the trial were reported^{1,2} and in detail more recently.³ Briefly, 1579 children born between February, 1987, and January, 1989, were randomised to receive Edmonston-Zagreb high-titre (EZ-HT), Schwarz high-titre (SW-HT), or placebo at 5 months of age. Recipients of placebo were offered Schwarz standard (SW-STD) measles vaccine at 10 months.

In autumn, 1990, when we suspected that EZ-HT measles vaccine could be associated with reduced survival,^{2,4} we conducted a follow-up study and a nutritional survey of all participants still residing in the study area. Weight, height, and arm-circumference were measured in 1261 of 1323 eligible children who were seen at home. At the time, the children were aged 22-45 months. As is being reported elsewhere⁵ there were significantly more EZ-HT girls than females in the standard group who had z-scores of -3 or lower for weight-for-age (14/249 vs 6/269; p=0.045) and height-for-age (34/251 vs 21/269; p=0.033), but no difference for the boys.

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EZ-HT girls were more malnourished, the difference in mortality was not explained by differences in nutritional status, and the MR remained unchanged when adjustment was made for nutritional status (table). For boys, there was no indication of increased risk for recipients of EZ-HT compared with standard vaccine (MR 0.88 [0.39-2.00]).

Hence, in contrast to Garenne and colleagues' earlier conclusion,¹ there is no indication that high-titre vaccine was deleterious for boys from (a) the complete set of nutritional data (table),³ (b) the currently available follow-up data on mortality from the trial (figure), (c) routine use of EZ-HT in Senegal following the trial (unpublished data), or (d) other trials.^{4,5}

Although unexplained, the conclusion remains that EZ-HT and Schwarz-HT vaccines are only associated with reduced survival among female recipients compared with girls receiving standard vaccine, and this difference is not explained by nutritional status. Most importantly, there is no increase in mortality for female recipients of EZ-HT compared with unvaccinated girls.^{3,4} We caution readers to withhold judgment about the findings in these studies until complete data sets are available for scrutiny.

We thank the Expanded Programme on Immunization, World Health Organization, the Task Force for Child Survival and Development, Atlanta, USA; and Science and Technology for Development Programme of the European Community, Bruxelles (TS3*-CT91-0002) for financial support.

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