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The True Risks of Measles in the Developed and Developing World

ABSTRACT

Recent Epidemics of measles in Europe, and the U.S. indicate that the public and many health care workers are not aware of the true risks of measles. The specific risks are: (1) diarrhea, otitis media, pneumonia, encephalitis, seizures, death; (2) SSPE, (3) and post measles immune amnesia. Our extended group has studied SSPE in California, and post measles immune amnesia in the DRG and in Switzerland. In this communication, I will present these overlooked data.

In the prevaccine era measles was thought to be a “rite of spring.” Newspaper cartoons presented measles as if it was no big deal. “She’s mature. She already had the measles.” In a poem by A.A. Milne around 100 years ago (“... if you teazle a sneeze or wheeze a measles may easily grow ...”) it would appear that measles was of no great concern. ^[1]

In antiquity measles was confused with smallpox. In 1629 in London, smallpox and measles were listed separately. In 1846 (before the germ theory) Peter Panum a Danish medical student studied a measles epidemic on the Faroe Islands. ^[2] He noted respiratory spread, a 14 day incubation period and lifelong immunity.

In 1848 in Hawaii, 10% to 33% of the population died from measles and in 1875, 20% of all Fiji Islands residents died from measles.^[3,4] In this communication I will present data from our extended group of the true risks of measles in the developed and developing world; specifically I will cover (1) usually recognized complications; (2) subacute sclerosing panencephalitis (SSPE); and (3) post measles immune amnesia.

Table 1. Measles Complications

Diarrhea	8%
Otitis Media	7%
Pneumonia	6%
Encephalitis	0.1%
Seizures	0.6-0.7%
Death	0.2%

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CDC Pink Book. Based on 1985-1992 surveillance data

Common Complications

Common complications include: diarrhea, otitis media, pneumonia, encephalitis, seizures and death. Recent United States data are present in Table 1. The rate of encephalitis was 1:1000 and the rate of death was 1:500. Recent European data notes a measles death rate of around 1:1000.

Subacute Sclerosing Panencephalitis (SSPE)

The risk of SSPE following measles in the older literature was thought to be rare; 1-8.5 cases per 1,000,000 cases of measles.^[5] More recently Schönberger et al studied SSPE in Germany between 2003 and 2009.^[6] There were 31 children with SSPE treated at German

hospitals. The calculated risk rate for children who had measles was 1:1700 to 1:3300. Most recently our group in California identified 17 SSPE cases. Of this group 5 did not have a history of measles. In the remaining 12 the incidence was 1:1367 for children who had measles in the first 5 years of life and 1:609 for children who were <12 months at the time of measles.^[7] Males outnumbered females 2.4:1 and the risk was greater in Asians compared with Hispanics, whites or blacks.

Post Measles Immune Amnesia

Peter Aaby a Danish epidemiologist who did studies in West Africa noted the non-specific beneficial effect of measles immunization in mortality studies in West African countries.^[8, 9] Specifically, in 1999 he and associates noted that measles vaccine efficacy against death was much greater than the proportion of deaths attributed to acute measles disease. In contrast, DTP and polio vaccinations were not associated with reduction in mortality.

The end point in all of Aaby and colleagues studies was death.^[8, 9] In 2015 Mina et al proposed that long-term measles-induced immunomodulation increases overall childhood infectious diseases mortality.^[10] In their analysis they compared the slopes of non-measles deaths in the prevaccine and post vaccine eras with measles cases in England and Wales, USA and Denmark. In all 3 regions the slope of measles cases mirrored the slope of non-measles deaths. This suggested that measles vaccination reduced non-measles deaths as well as measles deaths.

Our group has been studying measles and measles vaccination in Democratic Republic of Congo (DRG) in a defined population for a number of years. In the DRG 23% of the children <5 years of age are acutely malnourished and 43% are chronically malnourished.^[11] In all previously published studies of post measles immune amnesia the end point has been death. We decided to look at the frequencies of markers of infectious diseases (fever, cough and diarrhea) in children who had measles and those who had not had measles. Of these 3 variables only the frequency of fever reached statistical significance.

Most recently Gadroen et al studied the impact and longevity of measles associated immune suppression in a matched cohort study in a general practice database in the UK.^[12] They found

that in children who had had measles the incidence rate for non-measles infectious diseases was significantly increased over a 5 year period compared with the controls who had not had measles.

Recent 2 groups have determined the mechanisms of post measles immune amnesia.^[13, 14] Specifically measles infection eliminates much of the antibody repertoire that a child had before the measles infection. Recovery of antibodies occurred after natural exposure.

Summary and Conclusions

Although not discussed in the data presented above, it is important to note the importance of vitamin A in measles.^[15, 16] It is likely that the high measles death rates noted in Fiji and Hawaii in the 1800's was due to vitamin A deficiency. This is clearly a problem in the DRG and other developing countries.

Contrary to the beliefs of anti-vaccine people, measles is bad. An overlooked fact is that in the U.S. today these are >800,000 measles susceptible children between 1 and 5 years of age. This is because one dose of measles vaccine is only about 95% effective and the second dose of MMR is given at 4-6 years of age. Therefore, it is my opinion that the second dose of MMR be given around 15 months of age. Finally, it is my opinion that children who don't have antibody to measles should not travel to risk areas such as Europe, Africa, and Asia.

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