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## Why we need to continue to immunize against Mumps

### Summary

*Since the introduction of the mumps vaccine in the U. S. A., the number of cases and those of associated complications of mumps have decreased, but the rates of complications have remained unchanged. The average age of those falling ill to mumps has increased because of the high degree of immunity among younger, immunized children. Rates of severe complications (encephalitis, death) are higher when the illness takes place at any age beyond the first decade of life, but increase particularly sharply in adulthood. Though an upward shift in age of those getting mumps has not yet been recorded in Switzerland, the relatively high rate of immunization among young children and a large group of susceptible older individuals means that similar conditions to those in the U. S. are present. We should continue to immunize susceptibles with the most effective available mumps vaccine because of this anticipated shift and the higher rates complications in older patients. The cost-benefit ratio of immunization compared to illness also speaks favorably for immunization.*

Of the vaccines most widely used against childhood illnesses, those against diphtheria, tetanus, pertussis, polio, measles and *Haemophilus influenzae*, type B prevent serious diseases which can spread rapidly in populations. The rubella vaccine, usually administered with those against measles and mumps, is justified because of the severity of the illness for the unborn. Immunizing against mumps seems less important because the normal course of the disease of the disease is mild (see article on complica-

tions) and because it usually does not spread particularly rapidly in populations. In Switzerland the immunization also fails to prevent a significant number of cases (see article on epidemiology). Why then continue to attempt to prevent mumps through immunization? Three points justify continuing immunization against mumps:

- An increase in age of those afflicted by the illness
- An increase in mumps complications for older patients

- The economic advantage of immunization over illness in the population

### The increase in age of those afflicted

Based on the observation that mumps was a significant cause of morbidity for U.S. soldiers in World War (WW) I, though not in WW II, the average age of mumps victims may have been higher before the extensive urbanization which took place in the middle 20th century<sup>1</sup>.

Immediately prior to the introduction of immunization in 1967 symptomatic mumps in the United States was reported most commonly among children in the first years of school (5–9 years age)<sup>2</sup>. Since the beginning of widespread immunization against mumps in the U.S., the average age of those reported with the illness has gradually increased. The vaccine was introduced and applied more widely to infants and young children, interrupting mumps virus transmission and leaving older unimmunized individuals susceptible<sup>1</sup>. This has not yet been observed in Switzerland (see article on epidemiology). In the U.S., outbreaks in high schools, universities and the workplace have occurred showing

that mumps has become a problem to the adult population since the introduction of the immunization<sup>3–6</sup>.

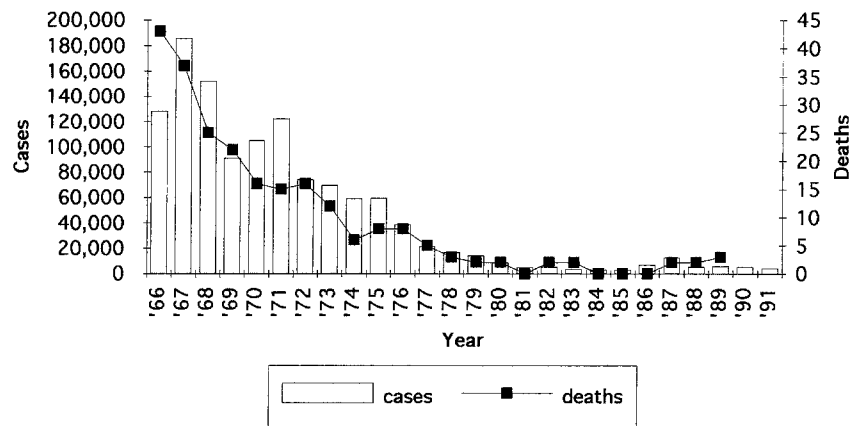
**Complications of mumps and the age of afflicted**

Serious sequelae of mumps are rare, but increase strongly with the age of the patient.

Reportable consequences of mumps in the U.S. are encephalitis and death<sup>2</sup>. From 1966 to 1991 deaths from mumps decreased with the numbers of cases while the overall case fatality rate stayed at an average of just below two per 10,000 reported cases<sup>1,2</sup> (Fig. 1). Death from mumps is much more common in adults than children. Between 1977 and 1980, 8 of the 12 mumps deaths reported in the U.S. occurred in individuals over 20 years age, making the per case fatality rate 30 times as high for adults than for children and adolescents<sup>7</sup> (Fig. 2). This trend has continued since 1980<sup>1</sup>.

Mumps central nervous system diseases are mostly on the milder end of a spectrum ranging from no symptoms to encephalitis with seizures, coma and/or death. The frequency of encephalitis increases with age from one per 1,000 reported cases in children under ten years, to two per 1,000 between the ages of 10 and 20, and to over 5 per 1,000 cases in adults 20 or above (Fig. 3). It is the main reason for the observed increase in death with age from mumps<sup>7</sup>. Mumps meningitis (often combined with encephalitis as meningoencephalitis because the conditions cannot be separated when mild) is almost always benign but can pose problems in the differential diagnosis of meningitis when it occurs without parotitis.

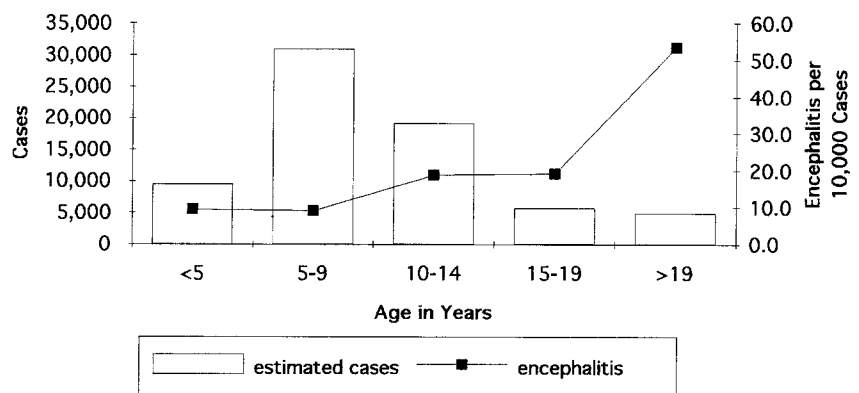
Orchitis occurs in up to one third of adolescent males who have mumps<sup>1,8</sup>. Being mostly unilateral with a high chance of recovery it



**Figure 1.** Mumps: Reported Cases and Deaths USA 1966–1991.



**Figure 2.** Mumps Estimated Cases and Death Rates USA 1973–1979.



**Figure 3.** Mumps Estimated Cases and Encephalitis by Age USA 1973–1979.

only rarely leads to sterility. It is much less frequent before puberty.

### Cost of immunization compared to cost of illness

Studies from Austria<sup>9</sup>, Switzerland<sup>10</sup> and the U. S.<sup>11,12</sup> all indicate cost-benefit ratios ranging from 2 to 14 in favor of immunization over allowing the illness to take its course in populations. For mumps alone this amounts to an estimated saving of over 2.9 million SFr. per year and of over 10 million for the combined vaccine against mumps and measles<sup>10</sup>. The mumps vaccine is usually given together with that of measles and rubella for a price which is no greater than for the single antigen vaccines (currently negotiated public price, Bundesamt für Gesundheitswesen), although the list prices are higher<sup>13</sup>. By combining the mumps vaccine with those against the two more severe illnesses, measles and rubella, the positive cost-benefit ratio of immunization is greater, as should be the acceptance (fewer required shots).

With the current state of partial immunity in Switzerland there is little choice but to continue to immunize against mumps because the conditions are such that a shift of disease to older ages, where most of the complications occur, is very likely. The chance of exposure to the mumps virus has decreased in all countries where the vaccine has been used. The option remains in Switzerland for individuals who are opposed to the mumps vaccine to refuse having themselves or their children immunized, but they run the risk of not acquiring natural immunity at the optimal age and then suffering more severe mumps later.

### Zusammenfassung

#### Warum wir weiter gegen Mumps impfen müssen

Seit der Einführung der Mumps-Impfung in den U. S. A. sind die Zahlen der gemeldeten Fälle sowie der Komplikationen dramatisch gesunken. Die Raten der Komplikationen sind in dieser Zeitspanne aber unverändert geblieben. Das Durchschnittsalter der Erkrankten hat im gleichen Zeitraum zugenommen wegen des hohen Grades von Immunität unter jüngeren, geimpften Kindern. Die Raten von schweren Mumps-Komplikationen nehmen mit zunehmendem Alter zu, besonders über 20 Jahre. Obwohl noch keine Verschiebung des Alters der Mumps-Erkrankten nach oben in der Schweiz stattgefunden hat, sind die Bedingungen mit einer relativ hohen Durchimpfung junger Kinder und einer Gruppe suszeptibler älterer Personen ähnlich wie diejenigen in den U. S. A. Aus diesen Gründen sollte die Impfung gegen Mumps von Suszeptiblen weiterhin mit dem wirksamsten erhältlichen Impfstoff durchgeführt werden. Die Impfung weist auch ein sehr günstiges Kosten-Nutzen-Verhältnis gegenüber Erkrankung auf.

### Résumé

#### Nous devons continuer la vaccination anti-ourlienne

Depuis l'introduction de la vaccination anti-ourlienne aux Etats-Unis la chiffre des cas annoncés et des complications d'oreillons ont diminué massivement mais les taux de complications sont restés les mêmes. L'âge moyenne des cas s'est augmenté à cause d'un haut niveau d'immunité chez les jeunes enfants vaccinés. Le taux des complications sévères s'augmentent avec l'âge, particulièrement après 20 ans. Jusqu'à présent on a pas encore observé une élévation d'âge des cas d'oreillons en Suisse, mais les conditions sont semblables à ceux aux Etats-Unis avec un haut taux d'immunisation chez les jeunes enfants et une groupe de personnes plus âgées qui sont susceptibles. Pour les raisons mentionnées il vaut la peine de continuer la vaccination anti-ourlienne avec le vaccin plus efficace que possible. En plus, la vaccination montre une proportion coute-bénéfice très favorable comparé avec la maladie.

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