

BCG IN FINLAND: CHANGING FROM A UNIVERSAL TO A SELECTED PROGRAMME

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In Finland, all newborns are currently offered BCG vaccination, and the national coverage is over 98%. The annual incidence of tuberculosis is low, at 6.6/100 000 in 2004 and has been steadily declining in recent years. Finland differs from the other Nordic countries in that the majority of cases are detected in people aged 65 and over in the indigenous population and only a smaller proportion (12%) detected in immigrants. The high incidence of TB and MDR-TB in neighbouring countries has raised concern, but no increase in TB detected in Finnish-born citizens has been seen. A decision has been made to change from mass BCG vaccination to targeting risk groups.

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Finland is one of the few European countries where neonatal BCG (Bacille Calmette-Guérin) vaccination is still universally implemented. Sweden, which is culturally and geographically our nearest neighbour, moved to a selective programme in the 1970s [1]. Finland has a low incidence of tuberculosis (TB), and has met the International Union Against Tuberculosis and Lung Disease (IATLD) criteria for discontinuing a universal BCG programme in countries with a low prevalence of TB [2]. Following a change in vaccine strain, an increase of vaccination complications has been seen. The National Vaccination Advisory Board has recently recommended changing the policy to targeting risk groups, and it is planned that the new programme will begin in January 2008. New official recommendations are being prepared but are not yet available.

Background

The newborn BCG vaccination programme was begun in Finland in the 1940s. It is administered by physicians (mostly paediatricians) in maternity hospitals and uptake of the vaccine is high, with over 98% of newborns being vaccinated. Tuberculin testing and revaccination of tuberculin-negative schoolchildren was practised until 1990. In 2001, the newborn vaccination programme was evaluated by Tala-Heikkilä et al [3]. This evaluation concluded that a selective BCG vaccination strategy would be a safe and cost-effective approach in preventing tuberculosis in Finland, if the identification of high-risk groups were successful. A transition period was recommended to identify the risk groups and to prepare for the change.

From 1971 to 1978, when Finland used the Gothenburg BCG strain, the frequency of BCG osteitis was very high, at 36.9/100 000 vaccinated. It decreased to 6.4/100 000 after changing the vaccine to the Glaxo-Evans strain and decreasing the dose to 0.05 ml [4]. In August 2002 the vaccine strain had to be changed at short notice. Due to concerns about reduced potency of the Evans vaccine, it was

withdrawn by the manufacturer. Since August 2002, the vaccine produced by Denmark's Statens Serum Institut (SSI) has been used in Finland.

Following the change of the vaccine strain to BCG SSI, a sharp rise in the incidence of inguinal lymphadenitis was noted, from about 8/100 000 with the Evans strain to 285/100 000 in the months immediately following the change [5]. An increase in the rate of BCG lymphadenitis was also noted in London (Royal London Hospital) after the same change in vaccine strain, although the application method was also changed at the same time from percutaneous to intradermal route [6]. The initial increase of reported lymphadenitis has settled in Finland to 140/100 000 (Marko Luhtala, National Public Health Institute, KTL, personal communication). Milstein et al noted clusters of increased reported adverse reactions to BCG vaccine following a change in the vaccine strain in different populations or settings [7]. Until 2002, only one to two cases of BCG osteitis per year were notified in Finland [5]. Six cases of BCG osteitis have been notified in children vaccinated in 2003, [8, Marko Luhtala, KTL, personal communication]. The increase in adverse reactions to BCG SSI is also a factor influencing the view of both the medical faculty and the public about universal neonatal BCG vaccination. As the incidence of TB has decreased, the complications are no longer considered acceptable.

Factors considered during the preparation of the new programme

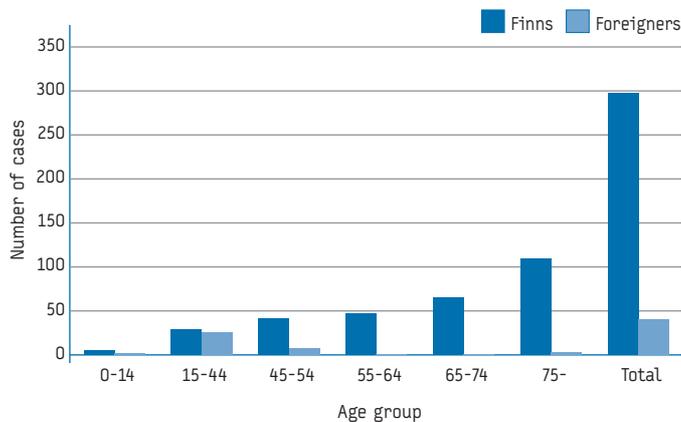
Demographics of TB patients

In the Finnish BCG debate, Finland has been repeatedly compared with Sweden, where mass BCG vaccination was stopped in 1975, when TB incidence in Sweden was 18/100 000 [3]. In comparison, the annual incidence of TB in Finland is currently lower at 6.6/100 000 in 2004, and has continued to decline steadily [9].

The difference between Finland and the other Nordic countries is the population in which new cases are detected. In Denmark, Norway and Sweden the majority (60 to 80%) of TB cases are detected in individuals born abroad [10], whereas in Finland the proportion of TB cases in foreign-born people was only 12% in 2004, although this proportion has been increasing on an annual basis, (5.6% in 1995 and 8.4% in 2000) [9].

In 1960 the incidence of TB in Finland was high at 172/100 000 [3]. As a consequence, many of those aged 65 years and older had contracted TB infection in their youth. The incidence of TB is highest in the oldest age group, those over 75 years [9] [FIGURE]. However, the most significant decline in the number of cases has also been seen in this group, possibly due to a reduction of the exposed people in the age group. Childhood TB is very rare in Finland, with an annual average of four cases registered in children in the whole country [9].

FIGURE

TB Infections in Finns and persons of foreign origin by age group in 2004

Source: [9]

Geography

Finland shares a large border with Russia, where the notification rate for TB was 106/100 000 in 2003, and the proportion of multidrug resistant (MDR) TB is high, 6.7% in new cases in 1999 [9], compared with Finland where no MDR cases were notified in 2004. In addition, the Russian Federation has one of the highest rates of HIV infection in all of Europe, with St. Petersburg and the Leningrad Oblast being heavily affected [11]. In recent years, there has been an increase in migration from Russia to Finland. Communication across the border is frequent, and trade and commercial cooperation is increasing. Despite this, no increase in the incidence of TB among Finnish-born people living near the Russian border has been noted to date, but the situation will continue to be monitored.

Finland has also frequent interactions with Estonia, with several boats making the journey between Helsinki and Tallinn daily. In Estonia, the proportion of MDR-TB is high, 12% [10]. The HIV epidemic in Estonia also continues to expand. The possibility that MDR-TB may spread to Finland has been a cause of concern, although one which has so far not been realised. There have been a few separate cases but no outbreaks detected.

Inoculation site

BCG in Finland is administered intradermally in the left thigh, as originally described by Wallgren [12]. Among active parent groups in particular, concern has been raised about the possible contribution of the vaccine site to the frequency of complications. In Sweden, the thigh was also used until the 1970s. However, when the mass BCG vaccination changed to a selective immunisation programme, it was decided that the inoculation site should be changed from the thigh to the left upper arm (Victoria Romanus, personal communication). The manufacturer of the current vaccine, SSI, recommends the left thigh as the inoculation site. The only article found comparing these two sites was published by Gaisford and Giffiths in 1954 [13]. The study is not randomised but observational and describes the decreasing frequency of regional lymphadenitis as the authors decreased the dose and changed the site to the upper arm. The authors recommend inoculation in the arm, but their results may have been influenced by the different dosages of the vaccine, different strains used and the growing skill of the vaccinators.

When asked about their BCG scars, English children found them unsightly and showed a preference for other sites than the outer arm [14]. These children were vaccinated at age 11 to 13, and their

reaction might have been different if they had grown up with an old scar acquired as infants. WHO recommends vaccinations in the upper arm, and by convention BCG scars are looked for over the left arm everywhere else in the world but Finland. As it is better to have an internationally recognised token of a successful vaccination, it is recommended that the vaccination site be changed to the upper arm when the vaccination programme changes in 2008.

Age at vaccination

In Finland, there has been public discussion about the age of BCG administration, with parents expressing their concern for the young age of the vaccinees, and demanding the vaccination to be postponed to several weeks or months of age. BCG is most effective in preventing cases of severe TB, such as meningitis and miliary TB, in small children [15]. For maximum benefit children should be vaccinated soon after birth. On the other hand, severe immune deficiencies such as severe combined immune deficiency (SCID) may not be evident at birth, exposing the children to severe complications of BCG, a reason why Sweden defers BCG vaccine until six months of age. Although the incidence of SCID is unknown, a recent review estimated that it is at least 1/100 000 [16]. If this figure is correct, with targeted BCG vaccination a newborn child with SCID would receive BCG in Finland once in 30 years. HIV screening is offered to all pregnant mothers in Finland, with coverage of over 99%. Children of HIV positive mothers are offered BCG only after they have been found not to have contracted the virus, so the risk of vaccinating an HIV positive child is low.

Vaccination centres

The rate of BCG complications has been observed to be influenced by the training and skills of the vaccinator [7].

With fewer children being vaccinated, vaccinating expertise will gradually decline. To ensure adequate skills the number of vaccinating centres needs to be limited. Almost all children in Finland are born in hospitals and it is recommended that the paediatricians will continue the vaccination of newborns. However, there is controversy about who should vaccinate older children, and the discussion is ongoing.

Recommendations**Target groups**

Newborns to be vaccinated are those corresponding to the following definitions:

1. Children of immigrant families, with parents or grandparents originating from countries with a high incidence of TB, or with a member of the household from a high incidence country
2. Children of Finnish-born parents with a first or second-degree relative (parent, grandparent, sibling or parent's sibling) who has or has had TB
3. Children of families planning to stay for a prolonged period in a high-incidence country
4. Children of families requesting BCG for their child.

Using these target groups, the estimated annual number of newborns eligible for BCG is between around 3000 and 3500, or 5%-6% of this age cohort.

Older children

Older immigrant children from high-incidence countries who have not yet started school should be offered BCG if they have not been previously vaccinated and are tuberculin negative. Another group of older children to be vaccinated is unvaccinated contacts of detected cases of infectious TB who are healthy and tuberculin negative. The annual number of these children needing vaccination is calculated to be between 200 and 500.

Identifying newborns who need to be vaccinated

The need for BCG in a newborn should be ascertained before delivery. Finland has a well-functioning system of public maternity clinics with almost universal attendance by pregnant mothers. A questionnaire to be used by midwives at maternity clinics is currently being tested with the guidance of the National Public Health Institute (Kansanterveyslaitos, KTL). When the questionnaire has been evaluated, training will take place to prepare for its implementation in all maternity clinics.

Training and education

As childhood TB is very rare in Finland [9], physicians' ability to suspect and diagnose it has declined. Very few paediatricians have ever seen a child with miliary TB or tuberculous meningitis. During the last 10 years, there has been only one case of paediatric tuberculous meningitis in Finland detected in an immigrant child [17]. With universal BCG, the risk of an infected child developing serious disease has been small. The medical community must be alerted to the real risk of TB in exposed unvaccinated children and the need for vigorous contact tracing.

Implementation of the new programme

The Ministry of Social Affairs and Health (Sosiaali- ja terveysministeriö) and KTL have agreed that KTL will take the lead in the preparation for the change to the targeted BCG programme. New official recommendations are being prepared but are not yet available.

A committee organised by the Finnish Lung Health Association (Filha ry), cooperating with the KTL and supported by the Ministry for Social Affairs and Health, has been preparing a new tuberculosis control programme for Finland. Several parts of the guideline have already been published in the national medical journal Suomen Lääkärilehti and are also available online [18]. The guidelines will be completed in 2006. While enhancing awareness and knowledge of TB the guidelines will support the preparation for the change to the new BCG programme.

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ORIGINAL ARTICLES

Euro roundup

TUBERCULOSIS OUTCOME MONITORING – IS IT TIME TO UPDATE EUROPEAN RECOMMENDATIONS?

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We discuss tuberculosis treatment outcome monitoring and the adherence of countries in the WHO European Region to modifications introduced in 2001 to enhance inter-country comparability. Outcomes for definite pulmonary tuberculosis cases were compared for cases reported in 2001 and 2000. Reporting was considered

complete if 98% or more of cases originally notified had outcome reported. In both years, maximal period of observation was 12 months from start of treatment. In 2000, countries reported outcome as 'cured', 'completed', 'died', 'failed', 'defaulted', 'transferred' and 'other, not evaluated' for cohorts of new and retreated cases. In 2001, following changes, countries were also requested to monitor cases with unknown treatment history and two outcome categories were added – 'still on treatment' and 'unknown'. Of 42 countries reporting outcomes in 2001, 74% (31) had

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