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Current status of Bacille Calmette Guérin (BCG) immunisation in Europe – A ptbnet survey and review of current guidelines

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ABSTRACT

Background: The incidence of tuberculosis (TB) and the use of Bacille Calmette-Guérin (BCG) vaccines differ significantly worldwide. Information regarding recent changes in BCG use and immunisation policies is difficult to access. Therefore, this study aimed to systematically collect up-to-date data on the use of BCG in Europe.
Methods: A web-based survey of members of the Paediatric Tuberculosis Network European Trials group (ptbnet) and Tuberculosis Network European Trials group (TBnet) was conducted between October 2012 and May 2013.
Results: A total of 89 individuals from 31 European countries participated. Participants from 27/31 (87%) countries reported to have a national BCG immunisation policy/guideline. Reported indications for BCG immunisation were: universally at birth (14/31; 45%), universally at older age (2/31; 6%), at birth for high-risk groups (12/31; 39%), at older age for high-risk groups (6/31; 19%), at older age for Mantoux-negative individuals (6/31;19%), for immigrants (4/31; 13%) and as a travel vaccine (10/31; 32%). Members from 11 (35%) countries reported changes in BCG policies in the previous 5 years: discontinuation of universal immunisation of infants/children (6/11), reintroduction of immunisation of high-risk children (3/11), and change in BCG vaccine strain (2/11). Members from 24/31 (77%) countries reported using BCG Denmark.
Conclusions: Immunisation policies regarding BCG vaccine exist in the majority of European countries. Indications for BCG immunisation varied considerably, likely reflecting national TB incidence rates, immigration and other factors influencing TB control strategies. Importantly, the considerable number of recent policy changes highlights the need for regular collection of up-to-date information to inform public health planning.

1. Introduction

The Bacille Calmette-Guérin (BCG) vaccine remains the only licenced vaccine against tuberculosis (TB). It is estimated that more than 100 million children receive BCG immunisation each year [1]. BCG efficacy is highest in infants and young children, who are prone to severe and disseminated forms of TB [2,3]. However, the settings in which BCG is recommended and administered vary considerably worldwide. The World Health Organization (WHO) regularly publishes information on BCG immunisation coverage and in the most recent report data from 151 of 194 countries worldwide were presented for 2013. It was estimated that in 111 countries (74%) an immunisation coverage of ≥90% of the national population was achieved, likely resulting from routine immunisation soon after birth [4,5]. In contrast, in the WHO European region only 16 of 42 countries (38%) have reached a BCG immunisation coverage ≥90% [6]. Significantly lower BCG immunisation coverage was recorded for two countries (Sweden and Greece; 27% and 33% respectively). For the remaining 24 European countries

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(57%) no information on BCG immunisation coverage was available, likely reflecting selective or no BCG immunisation being recommended in these countries.

These data suggest that a number of different recommendations exist for BCG immunisation across Europe. However, only limited current information on BCG immunisation policies in Europe is available [5,7], and the last survey on BCG immunisation policies in Europe was done almost a decade ago in 2005 [8]. In 2008 a website called the "BCG world atlas" was published online, containing data on BCG immunisation policies [9,10]. Unfortunately the website does not specify entry date of the information collected and it remains unclear if any updates have been made since its first publication. The aim of this survey was to update information on BCG immunisation polices, describe changes in the last five years and record observed adverse events.

2. Methods

A web-based questionnaire was designed to capture the demographics of participants, the use of BCG vaccine and BCG-related adverse events (the detailed questionnaire is available as supplementary data). An online survey software (SurveyMonkey, Palo Alto, CA, USA) was used and field-tested by five country representatives from the networks used for the survey. Between October 2012 and May 2013 all members of the paediatric tuberculosis network European trials group (ptbnet; $n = 97$) and tuberculosis network European trials group (TBNet; $n = 596$) were invited by email to participate in the survey. Both networks comprise clinicians, microbiologists, epidemiologists and researchers with a special interest in TB (for further details see: http://www.tb-net.org/index.php/about-us, http://www.tb-net.org/index.php/ptbnet [11–13]). One reminder to complete the survey was sent out to all members of both networks by email in April 2013 and the survey was closed 31 May 2013. The survey was conducted in an anonymous fashion. In order to successfully complete the survey, a participant did not need to answer all questions, rather, each participant had the choice to answer all or only some parts of the survey. The results of the survey were extracted and analysed using Excel (Version 2010; Microsoft, Redmond, WA, US). In instances where two (or more) participants from the same country provided conflicting answers (i.e., participants from the same country providing different answers to one question), all answers were included in the analysis. In addition all answers were cross-checked with available national immunisation guidelines and immunisation information available from the European Centre for Disease Prevention and Control (ECDC) and the WHO.

3. Results

A total of 108 individuals responded to the survey, of which 19 (18%) were based outside Europe. Data from those respondents were excluded from further analyses.

3.1. Demographics of the participants

A total of 89 individuals from 31 European countries participated in the survey. Between one and 11 (median 2) individuals responded per country. From 19 countries more than one person responded: 11 responders from Italy; 8 responders from Spain; 7 responders from Germany; 6 responders each from Switzerland and the UK; 4 responders each from Austria, Sweden and Romania; 3 responders each from Bulgaria, Denmark, Republic of Moldova, Slovak Republic and Russia; 2 responders each from Croatia, Finland, Lithuania, Portugal, Serbia and Ukraine. The majority were senior physicians (consultants and above) and were working in tertiary/quaternary care (Table 1). The largest group of responders were adult pulmonologists, followed by paediatric pulmonologists and paediatric infectious diseases specialists. There were equal numbers of adult and paediatric physicians responding.

Table 1
Demographics of survey participants.

Continent where the participant is based	*n*	%
Total	108	100
Europe	89	82
Asia	8	7
Americas	7	7
Africa	4	4
Professional characteristics (European respondents)	**86**[a]	**100**
Grade		
Senior doctor (consultant and above)	70	81
Junior/middle grade doctors	13	15
Other	3	4
Main area of work		
Adult pulmonologist	28	32
Paediatric pulmonologist	16	19
Paediatric infectious diseases specialist	16	19
Adult infectious diseases specialist	8	9
General paediatrics	4	5
Other	14	16
Place of work		
Tertiary/quarternary care	61	71
Secondary care	10	12
Primary level	4	5
Other	11	13

[a] No answers regarding professional characteristics provided by three participants.

3.2. The use of the BCG vaccine

Participants from 27/31 (87%) countries reported to have a national BCG immunisation policy/guideline. Conflicting results (i.e., participants from the same country providing different answers) occured in four countries: Germany, Italy, Slovak Republic and Spain.

Participants from 7/31 (23%) countries reported that the BCG vaccine was not used/licenced in their country. With more than one indication possible for any given country, reported indications for BCG immunisation in the remaining countries were: universally at birth (14/24; 58%), universally at older age (2/24; 8%), at birth for high-risk groups (12/24; 50%), at older age for high-risk groups (6/24; 25%), at older age for Mantoux-negative children (6/24;25%), for immigrants (4/24; 17%) and as a travel vaccine (10/24; 42%). In 10/31 (32%) countries repeat BCG immunisation (more than dose of one routine BCG immunisation recommended) was reported to be recommended - in four countries (Bulgaria at age 7,11,17, Republic of Moldova at age 7, Russia at age 7 or 14, Ukraine at age 7) for all children and in the remaining six countries in the following instances: (i) no BCG scar noted in the first 3 months of life (Serbia), (ii) no BCG scar noted in the first year of life (Croatia and Romania), (iii) for children at different ages with a negative routine tuberculin skin test (TST) (Belarus and Bulgaria), (iv) in individual cases and if requested by parents (Slovak Republic). Conflicting answers to this question occurred in five countries (Bulgaria, Romania, Russia, Serbia, Slovak Republic). Participants from two countries (Ireland and France) reported that repeat BCG immunisation is recommended but this could not be verified by written national immunisation recommendations (see below).

Participants from 11/31 (35%) countries reported one or more changes in national BCG policies in the previous 5 years. The changes comprised: discontinuation of universal immunisation of infants/children (6/11), reintroduction of immunisation of high-risk children (3/11), change in BCG vaccine strain (5/11) and reintroduction of the BCG immunisation as a result of increasing local regional TB incidence (2/11).