

**EXPANDED PROGRAMME ON IMMUNIZATION**

**Bosnia & Herzegovina**

**UNICEF / WHO**

**Assessment Mission**

**REPORT**

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## List of Acronyms

A-Ds	Auto-Disable syringes
AEFI	Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
BCG	Bacillus Calmette-Guerin (tuberculosis vaccine)
CRS	Congenital Rubella Syndrome
DPT	Diphtheria, Pertussis, Tetanus vaccine
DT	Diphtheria, Tetanus toxoid vaccine
EPI	Expanded Programme on Immunization
FBiH	Federation of Bosnia and Herzegovina
FD	Family Doctor
GAVI	Global Alliance for Vaccines and Immunization
HBV	Hepatitis B Virus
HC	Health Center
Hib infection	Haemophilus Influenzae type b infection
ICC	Interagency Coordinating Committee
IDP	Internally Displaced Person
IFRC	International Federation of Red Cross
IMC	International Medical Corp
MICS	Multiple Indicators Cluster based Survey
MMR	Measles, Mumps and Rubella vaccine
NGO	Non Governmental Organization
OPV	Oral Polio Vaccine
PHC	Primary Health Care
PHI	Public Health Institute
RS	Republica Srpska
TB	Tuberculosis
Td	Tetanus and Diphtheria toxoid vaccine for adults
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VHA	Viral Hepatitis A
VHB	Viral Hepatitis B
VPDs	Vaccines Preventable Diseases
VVMs	Vaccine Vial Monitors
WHO	World Health Organization

## 1. Introduction

Bosnia and Herzegovina (BiH) was one of the six autonomous republics of the former Yugoslavia. It became independent in early 1992. Pre-war BiH, according to all indicators, was a country with a well-developed infrastructure and good public health services capacity.

The four year long war (1992-1995) ended with the signing of the Dayton Peace Agreement. This agreement divided the country into two "Entities", the Federation of Bosnia and Herzegovina (FBiH) and Republica Srpska (RS), each with its own government, constitution and administrative divisions. The State level of BiH (Council of Ministers) has no practical influence in areas of immediate administrative concern – health, education etc. There are no sectoral ministries at the State level, but each entity has its own Ministry of Health. In 1992, the two ministries initiated the Expanded Programme of Immunization (EPI) in 1992 in their respective territories, and UNICEF supplied the basic vaccines and equipment. Since the end of the war, UNICEF and WHO have been working in close collaboration with the two Health Ministries (HMs) to strengthen EPI throughout the country and have funded all EPI antigens and immunization supplies, upgraded the cold-chain system, and provided , training and technical assistance.

A comprehensive assessment of the BiH EPI was needed at this point of time as none had been carried out since the restarting of the programme. In addition, BiH has expressed interest in applying to the Global Alliance for Vaccines and Immunization (GAVI) fund in order to introduce universal immunization of children against hepatitis B and Hib infection. In preparation for this application, the 2 ministries requested UNICEF and WHO to organize an assessment mission in November/December 2000. It was agreed that the mission team would include three medical epidemiologists and two specialists on cold chain and logistics.

## 2. Mission objectives

### *General objectives:*

- To provide the ministries of health in each entity with an external evaluation on the performance of the EPI, and progress towards disease prevention through fully immunizing eligible children in a safe and timely manner.
- To make recommendations for further improvement of the EPI.

### *Specific objectives:*

- To review the present epidemiological situation of Vaccines Preventable Diseases (VPDs)
- To review major EPI components and provide recommendations on:
  1. Management, co-ordination and implementation of the EPI
  2. Policies and standards in the field of:
    - 2.1. Immunization service delivery
    - 2.2. VPDs surveillance
    - 2.3. Cold chain, logistics and safety of immunization
    - 2.4. Advocacy and communications
- To assess feasibility of introduction of universal immunization against

### **3. Assessment methodology**

- a. Data review of legislation, official reporting and surveillance forms, stock inventories and other relevant documents concerning immunization activities
- b. Personal interviews with EPI management staff and immunization providers
- c. Field visits to various public health institutes (PHI) and health facilities
- d. Data collection using a preset questionnaire about immunization services, vaccine coverage and VPDs surveillance

Sites visited and persons met are presented in Annex 1.

### **4. Environment**

The four-year war created massive destruction, widespread population movements and wholesale social disruption throughout the entire territory of BiH. The former health system was virtually destroyed, and many health facilities were reduced to rubble. At the time of this report, 5 years after the signing of the Dayton peace agreement, many of these effects were still plainly evident, and much re-organization and rebuilding was still in progress. It was against this background that the present assessment was conducted.

#### **4.1. Administration**

Government and public administration of RS follows a unitary state model that subdivides the Entity to 63 administrative municipalities. There are 20 government ministries and each ministry can issue statues and regulations to implement its programmes. Law establishes the principle of local self-government. The Entity Prime Minister and its cabinet govern through local level ministerial offices. Municipal level branches of Entity ministries are responsible directly to their Minister.

The two main bodies of municipal government in the RS are the Municipal Assembly and its Executive Board.

The FBiH Constitution endorses decentralization through a cantonal system and the 10 cantons are in turn subdivided in municipalities. Cantons and municipalities have high degree of autonomy and broad powers. Each canton has its own constitution and municipal Mayors have great authorities, e.g. to nominate their own Mayor' Council (Cabinet) without the approval of the Municipal Council. The FBiH has 12 federal ministries, each of which is represented at the cantonal level.

Within this infrastructure, the donor and implementing agencies develop projects separately for each Entity, and strive to achieve some level of inter-Entity harmonization and collaboration. .

#### **4.2. Demographic consequences of the war**

It is estimated that approximately 70% of the population changed their place of residence during the war, and in some municipalities only about 10% of the people

still live in their pre-war places of residence. The present estimated numbers of the internally displaced persons (IDPs) and refugees are over 800, 000 and 600, 000 respectively.

A recent survey showed that more than 60% of IDPs and refugees are potential “returnees”. The first “majority return” phase was relatively successful, while the “minorities’ return” has been more problematic. Constraints to this return are associated with returnees’ difficulties to reclaim their properties, fear of discrimination and maltreatment, lack of employment etc.

A new law on property came into force at the end of 1999 and since then return of minority groups has been rising.

Basic demographic indicators clearly show the negative impact of the war.

The population of BiH has been reduced by 2.2% as compared to 1990. At that time , it was on the borderline of a stationary-regressive type (0.9) and is presently regressive. The annual growth rate of the population in the last decade is (-1.3). The total fertility rate decreased from 1.7 in 1991 to 1.4 in 1999 and the birth rate from 16.9 per 1000 population to 12.9 per 1000 (FBiH 15.0 and RS 9.6).

### **4.3. Health Care**

The health system in BiH dates from the pre-war era, when there was a network of numerous facilities and the whole population enjoyed reasonable access to clinics, hospitals and public health facilities. Since the end of the conflict, healthcare has been the responsibility of governments of the two Entities. Within RS, the system has remained relatively centralized, while in FBiH healthcare responsibilities have been further devolved down to the cantonal level.

Health care in FBiH and RS is organized at three levels: primary, secondary and tertiary.

Traditionally, little attention was paid to disease prevention and health promotion. Primary health care (PHC) focused on curative medicine, provided by Health Centers (HCs) in urban areas and ambulantas in rural areas. A significant proportion of patients were referred to higher levels of care.

The planned Health Care Reform envisages a shift of PHC to “family medicine” with the Family Doctor (FD) being the entry point for the delivery of all primary health care activities. As the development of this new health care system based on Family Medicine is a long-term process, Health Centers will keep some of their functions in the transitional period. It is expected that many specialists now working in these centers will be motivated to work in Family Medicine. A considerable number of specialists at HCs will continue working in hospitals, but will also provide consultative services in support of FDs.

### **4.4. Health Status of the Population**

Health indicators of pre-war BiH were similar to those of other Eastern European countries. At present however, the collection of data is less systematic and far from complete, which makes the current health status of the population difficult to assess. Data supplied by the Public Health Institutes in each entity suggests that there is no dramatic increase of diseases incidence rate of major public health concern with the

exception of stress-related disorders and tuberculosis. However, It could not be determined how accurate this data was.

The reported Infant mortality rate in 1999 of 15 per 1000 live birth did not differ significantly from pre-war figures, but again, the accuracy of this figure was unknown. The under-five mortality rate, considered as a critical indicator of the well being of children, and reported as 18 per 1000 live births, is similar to that of most other Eastern European countries, but is also of unknown reliability.

## **5. Main findings and observations**

Due to the existence of two Entities with separate governments, administrations and legislations, EPI in BiH is not one but two programmes, which mainly collaborate in the field of training. There is no state level body to co-ordinate the two parallel systems for immunization services. The situation is further complicated by Brčko, district established by the decision of the High Representative after the international arbitration in March 2000. The District has its own administration existing under the sovereignty of the state Bosnia and Herzegovina.

As a result of the large number of refugees and IDPs in many parts of the country, much of the basic data needed to plan immunization services, set targets and measure performance are either unknown or uncertain.

The country's UNICEF and WHO offices are major partners in the development of immunization services, and are heavily involved in strengthening collaboration between the two entities, and in assisting them to devise common policies on immunization.

An Interagency Coordinating Committee (ICC) has been formed to coordinate partner support for immunization services, but this is not yet fully functioning and a number of important partner agencies working in BiH (e.g. the World Bank, the USAID etc.) are not yet participating in the work of the committee. Evidence of an effective and functional ICC will be essential when making any application for support to the GAVI partnership.

### **5.1. Management and coordination of the Immunization Programmes**

The responsibility of the two parallel immunization programmes rests with senior staff in the 2 entities.

EPI managers are involved in policy-making, planning, annual analysis of immunization coverage and disease burden of VPDs at the Entity level. However, little effective operational management or guidance is provided in either case, and most functional control is devolved to the cantonal/regional level. As a result, wide variations occur in service provided, procedures followed and operational performances at different administrative levels and locations, and there is no standardization of immunization activities, keeping of records, or compiling and reporting of data.

There were apparently no long-term plans for immunization in either entity, and although 5-year plans were said to be under development, no documents detailing objectives, strategies and targets were seen.

The Epidemiological Departments of the cantonal/regional PHIs coordinate the EPI at that administrative level. Every Health Center has an epidemiologist who deals with communicable diseases issues, including guidance and supervision on immunization practices, reporting of immunization coverage to the canton/regional PHI, epidemiological investigation of cases and disease surveillance. However, it seems that coordination of EPI at the cantonal/regional level consists mainly of planning of immunization activities, periodical analyzing of health facilities immunization reports, and annual reporting of immunization coverage to the central level. The PHIs do not have the possibility to enforce the “State Sanitary Control”, i.e. to take measures against malpractice.

## **5.2 Financing and Partner Support**

Immunization services in the 2 entities continue to receive strong financial, material and operational support from partner agencies, particularly UNICEF, which still funds almost all vaccines and consumables. UNICEF has also provided much of the capital equipment used for immunization purposes. Services in both entities are highly dependant on such assistance, but funding levels may not be sustained indefinitely, and some scaling-down by the agencies could occur in the near or mid-term. At present, Government funding for immunization services remains at a very low level.

## **5.3. Legislation**

The health ministry in the 2 entities issue annual decrees on “Obligatory Immunization of the Population against Infectious Diseases”, which form the legal basis for immunization, and are published in the Official Gazette of each entity.

These decrees are considered equal to annual plans on immunization and regulate the following issues: (1) Immunization Schedule, (2) Age groups subject to obligatory immunization, (3) immunization of community groups, (4) Contraindications, (5) Responsibilities of health institutions and administrative authorities.

In addition, the Public Health Institutes at the central level (Federal – FPHI and Republic – RPHI) periodically develop and distribute guidelines on Immunization to the cantonal/regional PHIs, the health centers and the ambulantas. However, although the latest edition of the guidelines were only issued very recently, few copies were available in the health facilities visited.

### **5.3.1. Immunization schedules**

The pre-war immunization schedule of BiH was changed significantly in 1997 with the aim of meeting WHO recommendations. Since then, the two Health Ministries have introduced various changes and at present the immunization schedules of RS and FBiH are similar but not identical (Annex 2, Table 1).

Annual issue of a decree on vaccination was considered as a practical way to tackle the problem of low vaccination coverage of eligible age-cohorts during the war years, and has continued because of the constant migration of population.

Similarly, detailed recommendations on immunization and re-immunization with DPT, DT and Td of older children in decrees issued by each ministry reflected the problem of delayed immunization of a significant number of children countrywide. However, these annual decrees do not emphasize the importance of timeliness of immunization and re-immunization as priorities for EPI.

Both schedules call for numerous re-vaccinations spread over many years and extend routine childhood immunization far into adolescence. This inevitably requires additional resources, and may affect coverage with primary immunizations when sufficient supplies are not ensured. There is little epidemiological evidence to justify such an extensive and expensive schedule.

The newly introduced schedule of FBiH requires BCG only at birth and revaccination of infants lacking a scar. The RS schedule calls for vaccination at birth, vaccination of infants lacking a scar and revaccination of schoolchildren in the first and the final grade of elementary school.

WHO does not recommend repeat BCG vaccinations for children at any age however, so neither schedule complies with WHO policy in this respect.

Both schedules require rubella vaccination of the 14-year old girls who were not vaccinated previously. However, universal immunization of infants with MMR will shift rubella incidence to older age groups and increase the risk of Congenital Rubella Syndrome (CRS). WHO recommendation for countries using MMR for immunization of infants is to give a booster of a rubella antigen containing vaccine to adolescent females. The FBiH Health Ministry is considering introduction of a second dose of MMR for the 7-year-olds.

Immunization against hepatitis B (VHB) was introduced in the year 2000 in the FBiH immunization schedule at 7 years of age with boosters at 5-year intervals thereafter.

The guidelines issued by RS in 1998 call for universal infant immunization starting at birth and boosters at 5-year intervals. There is no evidence of the usefulness of such a re-vaccination against VHB however, and again, this does not conform with the WHO recommendations.

The decision to routinely immunize 7-year old children in FBiH against viral hepatitis B (VHB) is based on reported higher incidence rates of acute VHB among school children, experience of other countries (eg, Slovenia) and hopes of reducing future health expenditures. However, no age-specific sero-surveys were carried out to determine the Hepatitis B prevalence. Furthermore, the observed higher incidence rate in school-age children compared to younger children reflects clinical features of hepatitis B infection which is known to be higher at a younger age, rather than real risk of infection.

Republica Srpska is also hoping to start universal infant immunization against hepatitis B, but no introduction plan has yet been developed.

Immunization schedules do not detail the recommended age for each antigen and intervals between doses of immunization series. Different standards (4 and 6 weeks) are applied for minimal intervals between doses of DPT and OPV immunization series, although concomitant administration of the 2 antigens is recommended. The minimal

interval between dose is stated as 6 weeks for live viral vaccines and 4 weeks for other vaccines, but WHO recommends a 4 week interval for all immunizations (Ref).

Instruction on simultaneous use of vaccines is made by disease but not based on the available combined vaccines, creating a dilemma for health workers, and in RS, the Ministry of Health does not recommend the simultaneous administration of DPT and MMR.

All of these inconsistencies allow for differences in the age of immunization, confuses health workers and increases the chances of missed opportunities and immunization dropouts.

The number of vaccination visits to health facilities is higher than necessary due to the excessive numbers of EPI antigen doses, the imprecise policy on simultaneous use of vaccines and the non-uniform intervals between doses. This overloads health care services and contributes to increasing dropout rates for subsequent vaccinations. The problem is further complicated by : (1) anticipated reductions of health care funding, (2) the planned shift from specialized medicine to family medicine, and (3) the difficulties of providing regular services to hard to reach populations.

### **5.3.2. Contraindications to immunization**

The lengthy list of contraindications to immunization of the pre-war schedule was considerably reduced in 1997. The list currently approved by the ministry in RS fully meets WHO recommendations.

Timeliness and completeness of children immunization in the FBiH is probably still hampered by various contraindications such as acute diseases, febrile conditions, epidemics of infectious diseases and for measles, rubella and mumps vaccines, — allergies, yimmunosupression, etc.

### **5.4. Immunization service delivery**

Health facilities keep individual vaccination records, and usually a record is created on the first visit of the child.. Vaccination records are stored in a card index by year of birth and name in alphabetical order. Vaccination records of several different designs were observed in different HCs, all of which if properly filled would contain valuable information on the immunization status of the child, contraindications and some of them, on Adverse Events Following Immunization (AEFI). However, the vaccine lot numbers was missing in most immunization records, BCG vaccination had only a plus sign (+), indicating the presence of a scar or totally missing any information on BCG at birth. The reason given for this latter finding was, that information from maternities is irregular and that migrant children lack documentation on their immunization status. Some health facilities use a UNICEF produced record card, which contains additional information, such as history of VPDs, VHB, VHA, TB, Rheumatic fever, allergic conditions and non-EPI antigens given to the child. A daily workload registry is also in use aiming at estimating staff performance. In some places nurses stated that they use the registry to also follow up completion of the immunization series of DPT and OPV. However, in many health facilities non-resident children (refugees or IDPs) were only registered in this book but no individual immunization record was created.

Immunization cards of different design were found in most immunization offices visited. The cards are issued after the first vaccination given to the child and are to be kept by parents. In some places cards are only given to non-resident children while the immunization data of resident children are solely recorded on the health insurance booklet. As for vaccination providers records, mentioned above, none of the cards observed in the field included vaccines lot numbers and or names/signature of the physician. These cards are therefore an unreliable source of information for other vaccination-providers. Immunization data on the insurance booklet entered in a stamped table could not be considered as an adequate source of information for parents either.

## **5.5. Vaccination coverage**

Reported vaccination coverage in pre-war BiH was high. In 1990, coverage rates were reported as over 91% for all EPI antigens (BCG 91.1, DPT3 92.7, OPV3 93.8, and MMR 93.6).

During the war, immunization was conducted mainly in vaccination centers while for security reason, lack of vehicles, fuel, staff etc., outreach activities were rarely conducted and vaccination coverage of children dropped to an estimated 30%. Post-war, coverage returned to pre-war levels except for measles. Reported figures for coverage of 1-year-old children with basic EPI antigens in 1997-1999 are : BCG 100%, DPT3 and OPV3 90% and measles 83% (Source: The State of the World's Children 2001, UNICEF).

Immunization coverage rates reported by Entities and the cantons/regions are not age-specific, but are calculated for children up to 2 years of age instead of from 0 - 1 and from 1 -to 2 years. Reported rates are thus very high, and lead to complacency at all levels of the health system, while delayed immunization puts many children at unnecessary risk of contracting VPDs.

The design of the monthly and annual reporting forms on immunization does not permit calculation of timely immunization coverage. Health facilities report monthly to the cantonal/regional PHIs, who in turn, send semi-annual and annual Immunization Coverage Reports to the FPHI/RPHI.

The annual coverage report is designed to comply with the "Annual Immunization Plan", but the layout of both the "Annual Immunization Plan" and "Immunization Coverage Report" is too complicated. Both are designed mainly to measure the overall achievement of the programme, but not to identify problems such as timeliness, dropouts, or vaccinations to non-targeted children, especially returnees or refugees. Consequently, overall vaccination numbers are artificially boosted, while in reality, some children included in the plan are missed and other not planned are included. Coverage reporting becomes a real dilemma for health staff when the number of vaccinated children exceeds 100%.

In addition, the number of children targeted for BCG, OPV, and DPT, although concerning the same birth cohort, was found different in most of the health centers visited. According to MICS findings, one birth cohort is 1.6% of the total population in FBiH and 1.1% in RS, and does not differ for children up to 2 years of age. This also suggests that immunization coverage is over-estimated.

One other finding of the MICS was that over 98% of BiH children are recorded in the state registration offices before their first birthday. The FBiH decree on immunization advises using this source of data to update child registers and to define the size of birth cohorts. However, it seems that health providers do not have easy access to the state registry information, and thus do not use it.

Another way to define the target population is to use the number of children vaccinated in the previous year, including all refugees and returnees. This method may result in overestimating the target population, but is obviously safer in terms of prevention of diseases and provision of sufficient supplies. However, this methodology is not currently used.

Problems of proper calculation of timely immunization coverage are recognized by the 2 health ministries and EPI managers, who attempt to find appropriate solutions. With the support of UNICEF, the FPPI organized recently a training course for this purpose.. Health facilities and cantonal PHIs were to provide revised Monthly Immunization Coverage Reports to their respective higher levels. This new reporting form was found in some of the health centers visited, and was well appreciated both by vaccine providers and epidemiologists. The form includes age and antigen - specific data, monitors the number of doses used and available, as well as vaccine wastage rates. However, the form is not adapted to the new immunization schedule and contains the following weak points:

- The design is too complicated: The age breakdown of vaccinated children by each antigen in three categories may require more time to prepare than the old report. In addition, it may result in mistakes because of the complexity of filling the form which could affect the accuracy of reported figures.
- The reporting form does not allow the monitoring of measles immunization timeliness when given after the first birthday in accordance with the schedule.

Discussions with health workers confirmed the mission's impression that many vaccine providers do not fully realize the importance of correct coverage calculation and the major role of immunization coverage monitoring.

Reliability of reported immunization coverage is of great concern for the 2 ministries because of inaccuracy of demographic data. UNICEF and IMC supported the implementation of vaccination coverage cluster surveys in 1996, 1998, 1999 and 2000. Evidence of good sampling methodology and clear indicators appear in the 1996 and 2000 reports. (Annex 3).

An upward trend in percentage of fully immunized children has been observed in FBiH (from 58 in 1996 to 79% in 2000) while in RS progress has been slower.

According to the MICS findings, only 93% of BiH children under 5 had access to the immunization programme in 2000, and for these, dropout rates were high, especially in RS. Many children received their vaccinations late, more particularly measles or MMR vaccines, and only 69% of BiH children completed primary vaccination by 18 months of age. Even in the 18-29 month cohort, 25% are still not protected against all EPI diseases. Thus, many children remain susceptible to vaccine-preventable diseases far longer than necessary. Progress achieved in the last 4 years in increasing vaccination

coverage is still insufficient to ensure effective prevention and control of those diseases.

## **5.6. Logistics & Cold Chain**

UNICEF has donated much new cold chain equipment in recent years, and vaccine storage facilities at central and regional/cantonal levels in each entity appear to be generally adequate. Health centers are somewhat less well provided for, and some may require additional equipment or replacement of older items to ensure secure vaccine storage. No detailed central inventory of cold chain equipment at health facilities is available however, and actual needs were not quantified.

Staff is aware of the need to monitor vaccine storage temperatures, and at regional/cantonal level, this task is generally performed regularly, although less so at health facility level. Thermometers and temperature measuring devices are in short supply in many places, and the types available are often inaccurate and unsuitable. Perhaps as a result of these shortages, cold chain temperature monitoring was limited and vaccine quality at point of use could not be determined or assured with confidence.

At most facilities visited, staff did not maintain the vaccine cold chain during immunization sessions, and opened vials were mostly kept on the vaccination table without either a vaccine carrier or the use of ice packs. The necessary vaccine carriers and ice packs were generally available at health facilities, but were simply not used.

Many health staff had incorrect or insufficient understanding of the use and interpretation of Vaccine Vial Monitors (VVMs) for assessing vaccine quality, and vials with serious heat exposure were observed in several places visited. At the time of this mission, VVMs were used only on OPV vials but will be attached to all vaccines supplied through UNICEF and GAVI as from January 2001. Date-expired vials were also found in some facilities, and in general, staff paid insufficient attention to vaccine quality (e.g. VVM status, expiry date, shake tests, etc). An urgent need for training of health staff on vaccine handling procedures and maintaining vaccine quality was thus identified.

In spite of instructions in the immunization guidelines issued by the 2 PHIs, there was widespread doubt and confusion among health staff over the policy for keeping opened vials of vaccines at the end of an immunization session (i.e., the WHO 'multi-dose vial policy'). Guidelines were not followed in most of the health facilities visited, which undoubtedly contributed to vaccine wastage, and may also compromise the safety of vaccines administered.

Some basic vaccine stock management was undertaken at the FBiH store in Zenica, but there were no schedules for supplies to cantonal/ regional stores, no annual summaries of receipts and deliveries, no use of maximum/minimum stock indicators and no monitoring or projections of central vaccine needs. Vaccine wastage rates were not known or monitored, and due to the limited records, rates could not be determined.

Each Entity sends an annual request to UNICEF for supplies of vaccines, injection equipment and other immunization needs. These show great year-to-year variations

however, which undoubtedly reflects the poor stock management and absence of proper records and projections noted above. The absence of data on wastage rates also contributes to such variations.

Vaccine stock management at cantonal/regional level was also limited, with few records or systems of any kind, and a widespread reliance on ad hoc collection of supplies as and when required. In many facilities, stocks of Influenza vaccine in single-dose vials caused crowding and overloading of refrigerators, and occupied much of the available cold chain space.

There was confusion over the policy for keeping some vaccines frozen at cantonal/regional or health center level, and again, there were apparently no clear instructions from the PHIs on the issue. Individual institutions adopted different practices; some kept OPV frozen, but others incorrectly believed that thawed OPV could not be re-frozen. Some believed (again, incorrectly) that OPV may be kept at + 4 degrees C for periods up to 1 year, and most were unaware of the function of VVMs for monitoring quality of vaccines in storage.

### **5.7. Safety of Injections**

Different policies were also followed in the 2 Entities on the use of auto-disable syringes (A-Ds) for immunization; the Republic of Srpska received A-Ds from UNICEF for all immunizations and used them without problems. The Federation of Bosnia Herzegovina however, claimed that pediatricians refused to accept A-Ds due to lack of an aspiration function, and used regular disposable syringes for all immunization services.

Neither of the entities used safety disposal boxes for containing used syringes and needles from immunization services, and there were apparently no specific guidelines from either PHI on how to deal with used injection equipment. A few safety boxes remaining from previous immunization campaigns were seen, but neither Entity has requested UNICEF to provide these items on a regular basis, and in practice, many different methods are used for to collection and disposal of used injection equipment .

Waste incinerators were not available at any of the health facilities visited, so final disposal of used syringes and needles (and most other medical waste) were usually by discarding into the regular public waste system. Health staff reported that used syringes and needles may sometimes be collected from waste containers or rubbish areas for re-use or re-sale, but no direct evidence of this practice was seen. Reportedly, the public waste system also lacks incinerators for final disposal, and dumping on open ground or in landfill sites is the common practice.

Updated policies on injection practices were not yet adopted and observations showed a number of procedures, which are now considered as unnecessary and potentially damaging for vaccine as well as harmful for the child. These included:

- Needles left permanently inserted in the vaccine vial
- Recapping needles of used syringes
- Use of 90% Alcohol to clean the skin before injection

A wide variety of syringes and needles, evidently obtained from many different sources were used for administering vaccines. Not all injection equipment seen was from a

known supplier with recognized standards of production. In such cases, quality of the item was unknown. Most facilities use generally appropriate syringes and needles for each injection. Some use equipment, which was clearly very unsuitable for the purpose, with consequent risks and discomfort to the child (e.g. 1.0-ml disposable insulin syringes used for giving BCG, 2.0ml syringes with 24G x 1inch needle used for giving other antigens etc.).

Recapping of used syringes was commonly practiced after an injection, and most staff incorrectly believed that this dangerous procedure was actually required. Recapping was usually done using both hands (as opposed to the slightly safer 1-handed technique), and many staff admitted they often suffer needle stick injuries during this process, thus exposing themselves to risk of infection from blood-borne pathogens.

Instructions on the management and use of vaccine diluents were not clear especially that for BCG vaccine.

### **5.8. Disease Surveillance**

The surveillance systems of FBiH and RS cover a list of up to 85 notifiable infectious and parasitic diseases, and reporting of both cases and fatalities is required. The lists are based on the International Classification of Diseases, 10<sup>th</sup> release and all health professionals are required to report upon discovery.

The surveillance systems have a number of functional levels as follows:

Level 1: Reporting of an event starts at the PHC level (ambulantas and HCs) with registration in the daily activities log book and filling of an individual reporting form about the suspected case. These forms are sent to the epidemiologist at the health center.

Level 2: The epidemiologist aggregates reporting forms from all ambulantas and the HC into a weekly report form, and this is sent to the cantonal/regional PHI. He/she may also initiate an investigation of a reported case if considered necessary.

Level 3: The epidemiologist at cantonal/regional PHI compiles a weekly/monthly aggregate form and sends it to the FPHI or RPHI as appropriate. The cantonal/regional PHIs also publish a monthly/yearly bulletin with statistics on reported cases in their catchment area. Some PHIs in FBiH (e.g. Sarajevo and Zenica) also issue weekly bulletins. Regional/cantonal PHIs distribute the bulletins to health facilities in their catchment area.

Level 4: Epidemiologists in FPHI or RPHI aggregate all canton/regional forms, and develop monthly/yearly reports for all notifiable diseases. These reports show cases by canton/region and monthly reports also contain cumulative figures for the current and preceding year.

Since January 2000 the cantonal PHIs and FPHI have also analyzed notifiable diseases by age group on a monthly basis.

In general, it seems that the disease surveillance system in the two Entities follows the pre-war system. However, at present there are significant differences in content and design of the 2 bulletins at both central and cantonal/regional level. As a rule, bulletins

contain a table and a few informative sentences, but make no comments on reliability of reporting, disease trends and activities needed for improvement of disease surveillance and control.

A notifiable disease (with the exclusion of AFP) will be entered into the bulletin only if a case was reported during the respective time-period of the current or previous year. This approach, together with enumerating notifiable diseases in alphabetical order, distracts the attention from VPDs.

There is no official information/communication mechanism between FBiH and RS regarding the communicable diseases surveillance systems.

The epidemiologist at HC makes a selective decision on which cases are epidemiologically relevant enough to initiate an investigation, while disregarding the rest. He/she may also act as a courier and carry the individual reporting forms, with or without aggregating them, to the cantonal/regional PHI.

Epidemiologists at cantonal/regional PHI will selectively initiate investigations and send aggregated data to FPHI or RPHI as appropriate. Specialists from these institutions will only investigate outbreaks, suspected cases of Polio, diphtheria and other communicable diseases with great epidemic potential.

The two Entities use different disease investigation forms and these are not even uniform at canton level. Furthermore, some even have different forms for different communicable diseases (e.g. scarlet fever, mumps, dysentery, rubella, food poisoning etc.).

The FPHI has developed a specific investigation form for measles and intends to introduce it throughout the Federation in due course.

### **5.9. Epidemiological situation of VPDs**

The discontinuation of disease surveillance during the war and the lack of reliable population data due to large migrations mean that valid conclusions cannot be drawn on VPDs trends. Data supplied by the two EPI managers are presented in Annex 2, but it will be noted that age specific incidence rates are not available at state or Entity levels.

No cases of diphtheria have been reported in BiH during the last 5 years and according to RPHI no diphtheria cases have been observed on the present territory of RS since 1981.

Single cases of tetanus are reported almost yearly in both FBiH and RS, most cases occurring in older people. However, one of 3 tetanus cases reported in FBiH in 1999 was a pre-school child.

During the last 7 years the pertussis incidence rate in RS varied from 1.1 per 100, 000 to 7.2 per 100,000 (in 1994). FBiH statistics show a greater fluctuation in pertussis incidence rate for that entity (Annex 2, Table 2).

Despite the problems in calculating incidence rates due to the uncertainty of population figures, it is clear that measles outbreaks occur in both FBiH and RS. The age distribution in FBiH shows that 2/3 of the 1999 cases were in children under 5 years of age and that most other cases were in children from 6 to 13 years. Introduction of the WHO measles case definition, mandatory investigation of measles cases, and analysis of cases by age group and immunization status will strengthen measles epidemiology in BiH. Both Entities are in the process of developing Measles elimination plans based on estimation of the population susceptibility to measles.

Rubella also shows cyclic fluctuations in the two Entities and a mumps epidemic was observed in 1999. Analyzing rubella age and gender specific incidence rates, small scale serosurveys and introduction of CRS reporting is needed to formulate a state-wide immunization policy for effective CRS/rubella control.

No Wild Polio case has been reported in BiH since 1974. During the past 4 years national and sub-national Immunization days and mopping up campaigns have been carried out in 52 refugees camps. In addition, routine vaccination has been restored, which has strengthened herd immunity against Polio and officials believe that Polio has been eliminated. AFP surveillance is not yet sufficiently sensitive to confirm absence of circulating wild virus however, and reported AFP rates were 0.9 per 100,000 children under 15 years in 1999 and 0.3 per 100,000 in 2000.

The disease surveillance systems of FBiH and RS have not yet the capability to reveal the real burden of HBV-infection. Hepatitis B consequences such as chronic hepatitis, liver cirrhosis, primary liver cancer, as well as its acute sub-clinical forms are all under-reported. In addition, due to shortage of diagnostic testing, only a few jaundice cases are laboratory confirmed. No serological-surveys have been carried out, and reported VHB incidence rates in FBiH of between 1.9 and 8.1/100,000 and around 40 reported cases per year in RS probably represent only a fraction of the actual numbers of cases.

#### **5.10. Laboratory support**

Pre-war PHIs were able to carry out laboratory confirmation of VPDs cases and to implement a few serological surveys. At present, they lack equipment, test systems and media necessary for up-to-date laboratory diagnosis of both viral and bacterial VPDs. Knowledgeable and skillful staff are still available in most PHIs however, including the central level.

There is no country policy on laboratory confirmation and laboratory surveillance of VPDs. Fecal samples from AFP cases are sent to the WHO Reference Laboratory in Rome.

#### **5.11. Advocacy and Communication**

Advocacy has not been closely studied during this mission, but there is evidence of some political support for EPI activities in country. This was noted especially at both entity and local levels during polio vaccination campaigns through participation of officials during preparation and implementation of activities. A special community mobilization plan targeting the general public was developed and implemented to raise awareness and inform them about the National and sub-national Immunization Days against Polio

A number of communication activities were carried out in 1996-1997 when the "Accelerated Immunization Programme" was initiated aiming at restoring routine immunization coverage and updating the immunization schedule. EPI managers and PHIs worked in close collaboration with UNICEF in carrying out the following main activities:

- issuing and distributing reference materials to vaccination providers in health facilities as well as posters to inform the general public on the new immunization schedule, normal physical reactions of children to vaccination, etc.
- mass media messages (local radio stations, national TV, press) informing parents of the need to immunize children

However, very few PHIs, HCs and ambulancias had posters, leaflets, or educational materials visibly available.

Specific populations, such as vulnerable community groups (those living in remote rural areas, Roma and other minorities, returnees, refugees, etc.) are still not effectively reached with communication messages. Outreach communication activities to these groups are limited. These populations do not use available health care services due to a lack of trust, and as a result, are ill informed about vaccination services and their benefits.

## **5.12. Training**

More than 500 health professionals in the FBiH and RS have been trained in immunization policy, cold chain management, and supervision and monitoring with UNICEF support. Training that has occurred can be considered as an initial step. There is little evidence that any follow-up of this training has taken place to establish its effectiveness and to identify outstanding training needs.

## **5.13. Monitoring, Evaluation, and Supervision**

Almost all Public Health Institutes and health centers responded positively when asked about the implementation of supervision, monitoring and evaluation activities at different levels. However, when questioned more specifically about reported findings, measures taken and future plans, most of them were unable to remember specific, weekly/monthly or even yearly visits to a given site. These answers highlighted the serious lack of effectiveness of such activities.

It seems that supervision is not seen as a learning process and a way to improve the programme achievements, but is still perceived as an activity for controlling staff that could lead to disciplinary measures. Supervision thus remains an 'administrative function's of senior public service employees over their subordinates.

The concept of monitoring is not clearly understood at either the Entity level or the cantonal/regional levels, and there was an obvious lack of defined monitoring indicators, objectives and targets.

## **5.14. Staff Performance**

The mission was impressed with the level of devotion and commitment of PHIs and HCs employees. This applied to both the older and younger staff, many of whom devised creative solutions to overcome the lack of directives, and to understand and improve their work. The use of so many recording formats is an illustration of this creativity. Unfortunately, such personal initiatives are mostly unregulated and possibly unnoticed by higher management.

Vaccination providers were found to be open to new concepts and practices, but in urgent need of better supervision and proper training to upgrade their knowledge.

The mission was unable to identify procedures or processes to discuss such initiatives, or any method to study, evaluate and possibly introduce them into the EPI programme.

## **5. Recommendations**

### **6.1. General recommendations**

- 6.1.1. A State-level Expanded Programme of Immunization (EPI) to be established with common disease reduction/elimination targets, vaccination coverage objectives, vaccine and injection supplies management, and a cold chain system serving all parts of BiH.. This programme to form the basis of immunization services in both entities and replace the 2 separate, non-coordinated services currently operating.
- 6.1.2. Provision to be made in State and Entity health budgets for progressively increased Government funding of immunization services as a matter of urgency. Specific line items to be established for each main category of EPI expenditure in annual health budgets, and a phased increase in allocation be made for each item of expenditure.
- 6.1.3. Functioning of the ICC to be strengthened by including as full members, all important partner agencies working in BiH, particularly those partners in the GAVI alliance, e.g., the World Bank and USAID. Other active partners also to be invited to attend, including ICRC, IFRC and NGOs. The first task of the expanded group will be to agree the Terms of Reference of the ICC.
- 6.1.4. The ICC to decide on the most appropriate methodology for estimating population, and to agree goals and targets for EPI that include all IDPs and returnees. If state registry information is to be used, urgent legislative amendments to be made allowing health providers easy access to this data.
- 6.1.5. Government to invite a follow-up mission for the first quarter of 2001 to assist in preparing the application to the GAVI partners for funding of new vaccines. Terms of reference for the mission to include assisting with compiling necessary data on the burden of disease relevant to the new vaccines, indicators of Government political and financial commitment to the EPI, the proposed 5-year plan for immunization, and the status and functioning of the ICC.

## **6.2. Management and coordination of the EPI**

- 6.2.1. A state-level inter-entity EPI management unit to be established, responsible for setting common policies, guidelines and schedules for immunization services in all parts of BiH. A working group to be formed within this management unit to implement the policies, coordinate operational activities, consolidate data and compile state-level reports on all immunization services. The aim must be to unify the present diverse service into a common, uniform EPI throughout the 2 Entities. Partner agencies supporting EPI activities and other advisers to be invited to join the working group as required.
- 6.2.2. A comprehensive review of policies and procedures for immunization services to be undertaken, and a national EPI seminar to be organized to which all key staff, i.e. the 2 EPI Managers, senior pediatricians, epidemiologists, immunologists, etc. , are invited. Objectives will be to agree on a revised and simplified immunization schedule, to review policies and procedures for all immunization services, and to identify ways of ensuring uniform application of these throughout BiH. International Organizations, especially UNICEF and WHO, to be requested to assist and support this seminar.
- 6.2.3. A detailed 5-year plan for immunization services to be developed in each entity which reflects the objectives, strategies, targets of the State plan, and includes activities and a detailed budget for all components.

## **6.3. Immunization schedule**

- 6.3.1. The national seminar proposed in 6.2.2 should aim to adopt a common, simplified immunization schedule for both entities which focuses on completing the basic course by the child's first birthday. The schedule to state exact ages of all immunizations and minimum intervals between doses of the same vaccine. The schedule to provide for introduction of Hepatitis B vaccination for all infants, with 3 doses administered at the same times as the 3 infant doses of DPT and OPV. A minimum interval of 4 weeks to be required between different doses of each antigen.
- 6.3.2. The policy on contraindications to be revised according to WHO recommendations to reduce missed opportunities and increase immunization coverage. This policy to be attached to, and form part of the common, simplified immunization schedule.
- 6.3.3. Simultaneous use of vaccines and reducing the number of visits for immunization to be emphasized in the simplified schedule. This will decrease dropout rates and missed opportunities. The management unit to consider introducing combined vaccines (e.g. DPT-HepB, DPT-HepB-Hib) when available as a means of decreasing the number of visits and improving the timeliness of immunization.

- 6.3.4. A plan for Measles elimination throughout BiH to be developed, and following international recommendations, this plan to include:
- Instituting or continuing national level statutory reporting of suspected measles;
  - Using a standardized case definition;
  - Providing laboratory resources to assist with measles surveillance;
  - Instituting regular analysis and feedback of surveillance and coverage data;
  - Estimating the age-specific proportions of susceptibles to measles;
  - Choosing the appropriate strategy to accelerate measles control, and;
  - Choosing an appropriate strategy to maintain measles elimination.

#### **6.4. Immunization targets & coverage**

- 6.4.1. Coverage targets for all EPI antigens to be established in accordance with population estimates for each area, and must specifically include all IDPs, refugees and other migrant populations. (see 6.1.4). Targets to be age-specific in all cases and for all levels of the programme. Separate categories may be included in reporting forms to simplify this task. Aggregating coverage data at Entity and state levels to be one of the tasks of the inter-entity EPI working group recommended in 6.2.1. above.
- 6.4.2. A monthly reporting system for immunization coverage to be introduced at all vaccination sites, and at cantonal/regional and at entity levels. Data supplied in monthly reports to be used for monitoring programme performance by health unit and administrative level. Supervisors and management should intervene in a timely manner wherever immunization targets are not met.
- 6.4.3. Reporting of performance indicators (timeliness and completeness of reporting) to be considered for further evaluation of the system, and a protocol developed for situations where low vaccination coverage is reported.
- 6.4.4. Capacity building through training to be provided in calculating immunization coverage, the inclusion of non-target populations, the proper calculation of wastage rates, the appropriate use of the forms, and the preparation of reports.
- 6.4.5. Further efforts to be made to provide services in hard-to-reach communities, restore trust between minorities and health providers and adapt communications to achieve this. Immunization of migrant children to be a priority for both entities through a collaborative and innovative approach.

#### **6.5. Logistics, cold chain & safety of immunization**

- 6.5.1. Clear and precise policies to be developed to integrate new knowledge and technologies including:
- Monitoring vaccine potency using VVMs;
  - Use of open vials in subsequent immunization sessions;
  - Use of A-D syringes for immunization injections, and;
  - Use of safety boxes for waste disposal

These policies to be applied to standardise immunization

practices and reporting procedures throughout the country.

- 6.5.2. A detailed inventory of cold chain equipment available by health facility in each entity to be compiled as soon as possible. The inventory to show all existing equipment by location, include details of capacity, type and operational status, and to be used to plan future requirements including maintenance, replacement and expansion of cold chain facilities.
- 6.5.3. Following the national EPI seminar recommended in 6.2.2. above, refresher and upgrading training of all health staff providing immunization to be planned in a phased manner. Training to include the revised immunization schedule and guidelines agreed during the seminar, vaccine stock management and handling, the cold chain, storage of vaccines, temperature monitoring, the use of VVMs, and the use of opened vaccine vials in subsequent immunization sessions. External specialists to be invited to assist with the training if required by Government.
- 6.5.4. A programme for refresher and upgrading training for all health staff on ensuring safety of injections to be planned as a matter of urgency. This may be combined with training on immunization practices recommended in 6.4.3. above if convenient. Content of safety training courses to include safe injection practices, correct selection of syringes and needles and use of A-Ds, ensuring safety of vaccines, and the safe collection and final disposal of used injection equipment. External specialists to be invited to assist with the training if required by Government.
- 6.5.5. Following the decisions reached at the national EPI seminar, policy documents and detailed operational guidelines to be prepared and issued by the FPHI and RPHI on requirements for ensuring safety of injections.

## **6.6. Surveillance**

- 6.6.1. Existing procedures of disease surveillance to be revised; time limits on reporting to be introduced, (eg, Acute Flaccid Paralysis (AFP), and Measles reported within 24 hours), and specific weekdays assigned for different levels of reporting. (eg, Mondays for ambulancias, Tuesdays for HCs and Wednesdays for cantonal/regional PHI reporting).
- 6.6.2. The list of notifiable diseases to be simplified and shortened. This may be modeled on lists already adopted in many countries, including the Balkans.
- 6.6.3. Simple, clear case definitions to be developed for all notifiable diseases, and a case definition handbook to be prepared and distributed to each level of the surveillance system.
- 6.6.4. Surveillance investigation teams to receive additional training and equipment and supplies to be made available to enable rapid and efficiently intervention in the field. A protocol for the level of service initiating the investigations to be

discussed individually for every canton/region. Case investigation forms to be standardized, and include age, place and detailed symptoms and signs of every case investigated.

- 6.6.5. A strategy based on a simplified and action-oriented reporting system to be developed, which this will necessitate integrating disease surveillance with health care reforms. Family doctors will be required to make the preliminary diagnosis, ensure case recording and reporting, and refer suspected cases based on symptoms, signs and clinical examination. Therefore, training on form completion and timeliness of reporting to be provided for FDs.
- 6.6.6. Regular feedback from higher levels downwards to be developed as an integral part of the disease surveillance system.

## **6.7. Advocacy and communication**

- 6.7.1. A nation-wide advocacy and communications plan to be developed with the cooperation and consensus of all stakeholders. This process to involve government, health education specialists, local and international agencies, and NGOs working in BiH. Necessary funding and technical expertise to develop and implement the plan to be provided.
- 6.7.2. The communications plan to include strategies for targeting health professionals, vaccination providers and child caretakers as well as other sectors such as education, communication/information, industry etc, and provide for the development of appropriate messages and educational materials for the targeted population.
- 6.7.3. Other channels of communication to be looked into, such as child to parent communication through the school system, the use of adult education sessions, and human rights lessons, etc.
- 6.7.4. Joint efforts by government and the international community to be strengthened to reach vulnerable community groups (those living in remote rural areas, Roma, minorities returnees, refugees etc.) with appropriate messages on vaccinations and other health services.

## **6.8. Training**

- 6.8.1. An investigation to be carried out to identify the reasons why knowledge and practices of health staff are not in accordance with efforts made through various training activities.
- 6.8.2. Further efforts to be made to develop managerial capacities at national and cantonal/regional level and to train family doctors. External assistance to be provided develop an EPI curricula and to train trainers. The WHO training

courses for EPI Mid level Managers and “Immunization in practice” could be used to facilitate this process.

- 6.8.3. Extensive training/workshops to update the knowledge of the vaccination providers and public health staff on planning, implementation, monitoring, supervision and evaluation to be planned. Existing training material to be reviewed to ensure compliance with the revised policies. All training to be followed up to ensure effectiveness and evaluate the need for further training.

## **6.9. Supervision, Monitoring and Evaluation**

- 6.9.1. Supervision, monitoring and evaluation to be included as an integral part of the 5-year Plan for Immunization. These 3 functions to be performed at each level to ensure improvement of the programme, and to be considered essential tools for measuring progress. Timely feed back should be a priority at every level of immunization services.
- 6.9.2. The supervision role of programme staff at each level of the structure to be re-defined to develop a new approach oriented towards behavior change and trust.
- 6.9.3. Policies and guidelines on monitoring and evaluation, including clear indicators, to be developed and training of programme staff carried out.

## **6.10. Staff performance**

Staff performance to be measured through creation of standard performance indicators within a preset protocol in the EPI programme. Benchmarks for performance can then be developed and compared within different regions and between the two entities.

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**PERSONS MET AND SITES VISITED**

**Federal Public Health Institute (FIPH)**

Sarajevo

- Prof.Dr.Zlatko Puvacic, EPI Manager of FBiH
- Dr Dragica Petrovic, epidemiologist, Fed.MOH
- Dr Sukria Celik, epidemiologist FPHI
- Dr Mirsada Mulaomerovic, epidemiologist FPHI

**Republica Srpska Public Health Institute (RPHI)**

Banja Luka

- Dr Milos Bajic, Deputy Minister of Health
- Dr Milorad Balaban, Director RPHI
- Dr Mitar Teshanovic, EPI Manager of RS

**Country Public Health Institutes**

**Sarajevo Cantonal PHI**

- Dr Fahrudin Kulenovic, Director
- Mr Alija Preljevc, Chief Sanitary Technician

**Mostar West Cantonal PHI**

- Tenilija Primosac - immunization assistant
- Slavka Mikulic - assistant

**Mostar East Cantonal PHI**

- Dr Arif Jeldyag - epidemiologist
- Balta Esad - immunization assistant

**Tuzla Cantonal PHI**

- Dr Adem Hodzic
- Dr Ademir Ahmetovic

**Zenica Cantonal PHI**

- Dr Jasminka Uzunovic, epidemiologist

**Brčko District PHI**

- Dr Fatima Dedic, chief epidemiologist

**Doboj Regional PHI**

## **Health Facilities**

### Sarajevo cantonal health center (HC)

- Dr Berislav Stanesic, chief physician
- Mubera Begovic, nurse

### Pre-school Immunization Center in Sarajevo

- Dr Hilola Cosic

### Mostar East Cantonal HC

- Dr Tipura Omer, immunization officer
- Dr Vele Hasan

### Zenica Cantonal HC

- Mirsada Mujikic, sanitary technician

### Banja Luka HC

- Jovanka Kruduc, senior nurse on immunization

### Banja Luka Infectious Clinic

- Dr Gordana Marceta, admission department

### Brčko District HC

## **UNICEF, BiH**

- David Baker - Head UNICEF Sarajevo, assistant of the UNICEF Representative, BiH
- Dr Mery Black - Head of the Office
- Dr Selena Bajractarevic, medical officer
- Nina Cerimagic, assistant medical officer

## **WHO, BiH**

- Dr Nezahat Ruzdic - Liaison Officer (LO)
- Haris Hajruulahovic - Assistant LO
- Ms Dubravka Tivic - Assistant LO

## ANNEX 2

**Table 1. THE YEAR 2000 IMMUNIZATION SCHEDULES OF FBiH (F) AND RS (R)**

Age	BCG	DPT	DT	Td	TT	OPV	MMR	M	R*	HB
0	F R									
3 months		F R				F R				
4 months		F R				F R				
5 months		F R				F R				
2 <sup>nd</sup> year		F R				F R	F R			
4 years		F R				F R				
7 years	R		F R			F R	R	F		F
14 years	R			F R					F R	
18 years					F R					

\* All girls not immunized or not suffered rubella

**Table 2. INCIDENCE/INCIDENCE RATE ( cases per 100 000 pop) OF VPDs  
IN REPUBLICA SRPSKA**

	1995	1996	1997	1998	1999	2000 9 months
<b>Diphtheria</b>	0	0	0	0	0	0
<b>Tetanus</b>	3 <b>0.2</b>	1 <b>0.1</b>	0 <b>0</b>	5 <b>0.3</b>	2 <b>0.1</b>	0
<b>Poliomyelitis</b>	0	0	0	0	0	0
<b>Pertussis</b>	22 <b>1.6</b>	26 <b>1.9</b>	16 <b>1.1</b>	21 <b>1.5</b>	24 <b>1.7</b>	9
<b>Measles</b>	32 <b>2.3</b>	385 <b>27.5</b>	37 <b>2.6</b>	330 <b>23.5</b>	64 <b>4.6</b>	7
<b>Rubella</b>	148 <b>10.6</b>	32 <b>2.3</b>	43 <b>3.1</b>	67 <b>4.8</b>	308 <b>22.0</b>	67
<b>Mumps</b>	39 <b>2.8</b>	46 <b>3.3</b>	69 <b>4.9</b>	50 <b>3.5</b>	101 <b>7.2</b>	40

**Table 3. INCIDENCE/INCIDENCE RATE (cases per 100 000 population) OF VPDs  
IN THE FEDERATION OF BOSNIA AND HERZEGOVINA**

	1995	1996	1997	1998	1999	2000 9 months
<b>Diphtheria</b>	0	0	0	0	0	
<b>Tetanus</b>	0	2	0	3	3	
<b>Poliomyelitis</b>	0	0	0	0	0	
<b>Pertussis</b>	158 <b>6.3</b>	100 <b>3.9</b>	33 <b>1.4</b>	109 <b>4.9</b>	47 <b>2.1</b>	
<b>Measles</b>	132 <b>5.3</b>	134 <b>5.2</b>	4060 <b>173.0</b>	2811 <b>127.3</b>	69 <b>3.1</b>	
<b>Rubella</b>	203 <b>8.1</b>	82 <b>3.2</b>	1092 <b>46.5</b>	167 <b>7.6</b>	61 <b>2.7</b>	
<b>Mumps</b>	81 <b>3.2</b>	113 <b>4.4</b>	159 <b>6.8</b>	113 <b>5.1</b>	1136 <b>51.0</b>	

**Table 1. MULTIPLE INDICATOR CLUSTER BASED SURVEY, BOSNIA AND HERZEGOVINA, 2000**

<b>Main Immunization programme indicators in children 18-29 months of age</b>				
	<b>Indicators</b>	<b>FBiH</b>	<b>RS</b>	<b>Total BiH</b>
1.	Access of children to the immunization programme (%)	92%	95%	93%
2.	Proportion of fully immunized children (%)	79%	66%	75%
3.	Proportion of fully immunized children before 18 months of age (%)	-	-	69%
4.	Drop-out rate DPT1-DPT3 (%)	3%	7%	6%
5.	Drop-out rate OPV1-OPV3 (%)	6%	12%	7%
6.	Drop-out rate DPT1-Measles (%)	6%	25%	12%

**Table 2. MULTIPLE INDICATOR CLUSTER BASED SURVEY , BOSNIA AND HERZEGOVINA, 2000**

<b>Percentage of children 12-23 months immunized before the survey and before the first birthday</b>								
<b>Antigens</b>	<b>BCG</b>	<b>DPT1</b>	<b>DPT2</b>	<b>DPT3</b>	<b>OPV1</b>	<b>OPV2</b>	<b>OPV3</b>	<b>Measles * (MMR)</b>
Vaccination card	78	78	77	75	78	77	76	70
Mother's report	17	15	14	13	16	14	10	12
Either	95	93	91	88	94	92	85	82
By 12 months of age	95	91	89	85	93	90	82	79

\* Measles coverage was estimated in birth cohort 18-29 months before children achieve 18 months of age

**Table 3. VACCINATION COVERAGE CLUSTER SURVEYS IN REPUBLICA SRPSKA  
BRUTE COVERAGE RATES**

<i>PROPORTION OF FULLY VACCINATED CHILDREN (%)</i>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	66%	NA	61%	66%
26 – 59 months	67%	NA	65%	-
Total	67%	53% (86?)	63%	-

<b>BCG COVERAGE / SCAR RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	91/77	NA	99/88	96
26 – 59 months	88/77	NA	99/85	-
Total	90/77	92/87	95/	-

<b>DPT3 COVERAGE RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	91	NA	83%	89
26 – 59 months	82	NA	82%	-
Total	84	86	NA	-

<b>OPV3 COVERAGE RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	85	NA	82%	84
26 – 59 months	83	NA	81%	-
Total	84	85	81%	-

<b>MEASLES/MMR COVERAGE RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	73	NA	64 / 87 ?	72
26 – 59 months	79	NA	26 / 60 ?	-
Total	76	83	-	-

\* MICS vaccination coverage in birth cohort 18-29 months of age

**Table 4. VACCINATION COVERAGE CLUSTER SURVEYS IN FEDERATION OF BOSNIA AND HERZEGOVINA, BRUTE COVERAGE RATES**

<b>PROPORTION OF FULLY VACCINATED CHILDREN (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	58	-	-	79
26 – 59 months	70	-	-	-
Total	65	-	-	-

<b>BCG COVERAGE / SCAR RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	95/80	98	97	92
26 – 59 months	96/82	95	98	-
Total	96	-	-	-

<b>DPT3 COVERAGE RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	76	80	95	89
26 – 59 months	80	80	94	-
Total	78	-	-	-

<b>OPV3 COVERAGE RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	76	81	92	87
26 – 59 months	79	79	94	-
Total	78	-	-	-

<b>MEASLES/MMR COVERAGE RATES (%)</b>				
Age-group	1996	1998	1999	2000 –MICS*
13 – 25 months	62	73	84	86
26 – 59 months	77	81	89	-
Total	70	-	-	-

\* MICS vaccination coverage in birth cohort 18-29 months of age