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Summary Vision Screening Data: Kosovo

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Contents

1 Glossary of Terms: Vision Screening

Abnormal test result	A test result where a normal "pass" response could not be detected under good conditions. The result on screening equipment may indicate "no response," "fail," or "refer."
Attendance rate	The proportion of all those invited for screening that are tested and receive a result: • Invited for screening includes all those that are offered the screening test. • Tested and receive a result could be a "pass" or "referral to diagnostic assessment". Attendance rate provides information on the willingness of families to participate in screening.
Compliance with referral (percentage)	The percentage of those who are referred from screening to a diagnostic assessment that actually attend the diagnostic assessment. Percentage of compliance provides information on the willingness of families to attend the diagnostic assessment after referral from screening.
Coverage	The proportion of those eligible for screening that are tested and receive a result: • Eligible for screening includes those within the population that are covered under the screening or health care programme. • Tested and receive a result could be a "pass" or "refer to diagnostic assessment". Factors such as being offered screening, willingness to participate, missed screening, ability to complete the screen, and ability to document the screening results will influence the coverage.
False negatives	The percentage of children with a visual deficit (defined by the target condition) that receive a result of "pass" during screening. Example: If 100 children with visual deficit are screened, and 1 child passes the screening, the percentage of false negatives is 1%.

False positives	The percentage of children with normal vision that are referred from screening to a diagnostic assessment.
Guidelines	Recommendations or instructions provided by an authoritative body on the practice of screening in the country or region.
Vision screening professional	A person qualified to perform vision screening, according to the practice in the country or region.
Inconclusive test result	A test result where a normal "pass" response could not be detected due to poor test conditions or poor cooperation of the child.
Invited for screening	Infants/children and their families who are offered screening.
Outcome of vision screening	An indication of the effectiveness or performance of screening, such as a measurement of coverage rate, referral rate, number of children detected, etc.
Untreated amblyopia	Those children who have not received treatment for amblyopia due to missed screening or missed follow-up appointment.
Persistent amblyopia	Amblyopia that is missed by screening, or present after the child has received treatment.
Positive predictive value	The percentage of children referred from screening who have a confirmed vision loss. For example, if 100 babies are referred from screening for diagnostic assessment and 10 have normal vision and 90 have a confirmed visual defect, the positive predictive value would be 90%.
Prevalence	The percentage or number of individuals with a specific disease or condition. Prevalence can either be expressed as a percentage or as a number out of 1000 individuals within the same demographic.
Programme	An organised system for screening, which could be based nationally, regionally or locally.
Protocol	Documented procedure or sequence for screening, which could include which tests are performed, when tests are performed, procedures for passing and referring, and so forth.
Quality assurance	A method for checking and ensuring that screening is functioning adequately and meeting set goals and benchmarks.
Referral criteria	A pre-determined cut-off boundary for when a child should be re-tested or seen for a diagnostic assessment.

Risk babies / Babies at-risk	All infants that are considered to be at-risk or have risk-factors for vision defects/ophthalmic pathology according to the screening programme. Two common risk factors are admission to the neonatal-intensive care unit (NICU) or born prematurely. However, other risk factors for visual defects may also be indicated in the screening programme.
Sensitivity	The percentage of children with visual defects that are identified via the screening programme. For example, if 100 babies with visual defects are tested, and 98 of these babies are referred for diagnostic assessment and 2 pass the screening, the sensitivity is 98%.
Specificity	The percentage of children with normal vision that pass the screening. For example, if 100 babies with normal vision are tested, and 10 of these babies are referred for diagnostic assessment and 90 pass the screening, the specificity is 90%.
Target condition	The visual defect you are aiming to detect via the screening programme.
Well, healthy babies	Infants who are *not* admitted into the NICU or born prematurely (born after a gestation period of less than 37 weeks).

2 Abbreviations

ACT Alternating Cover Test

AS Automated Screening

BT Bagolini Test

CT Cover Test

CV Colour Vision

EI Eye Inspection

EM Eye Motility

Fix Fixation

GDP Gross Domestic Product

GP General Practitioner

Hir Hirschberg test

NICU Neonatal-intensive care unit

PCT Prism Cover Test

PM Pursuit Movements

PPP Purchasing Power Parity

PR Pupillary Reflexes

RE Retinal Examination

Ret Retinoscopy

ROP Retinopathy of Prematurity

RR Red Reflex Testing

VA Visual Acuity

WHO World Health Organisation

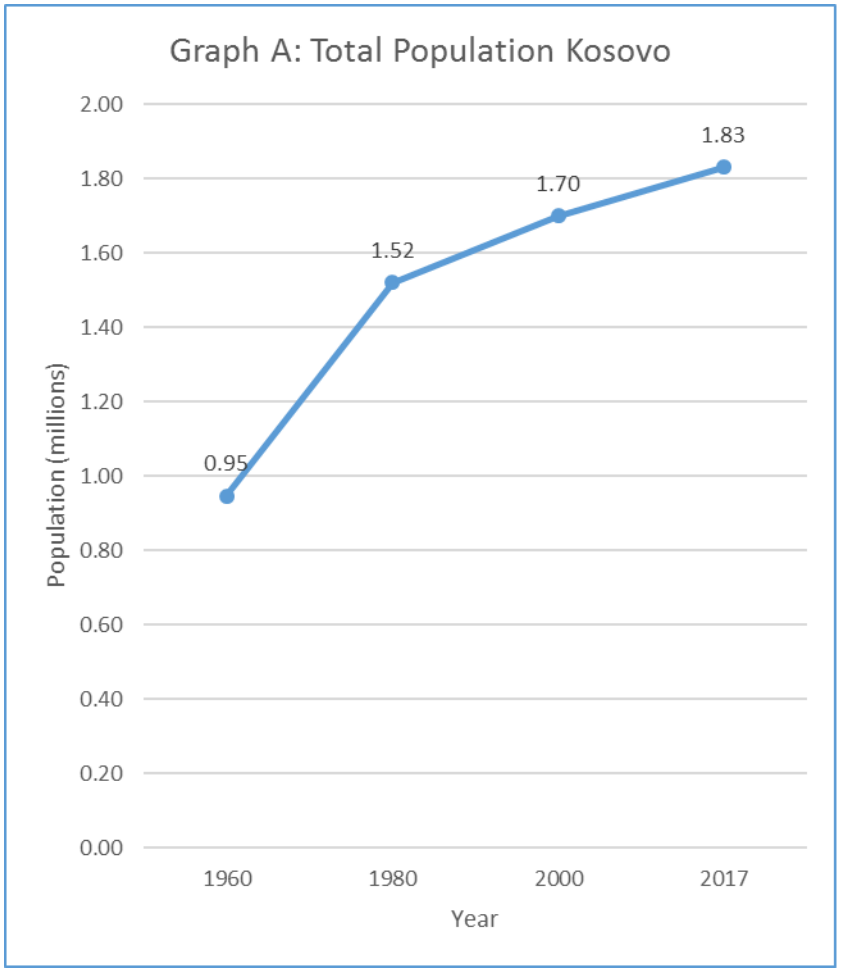
WT Worth Test

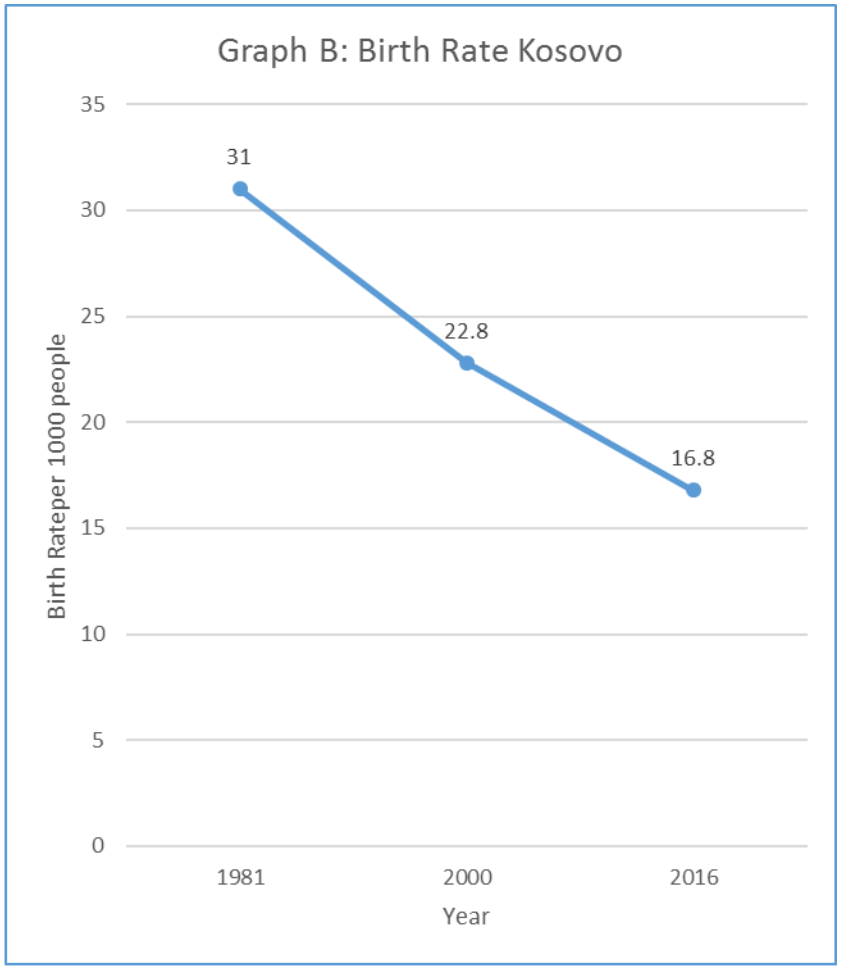
3 Population and Healthcare Overview

The population of Kosovo is 1,830,700 (World Bank, 2018a) and a birth rate estimated at 16.8 births/1,000 population in 2016 (World Bank, 2018b). The change in population and birth rate from 1960 to 2017 is shown in Figure 1, graphs A and B respectively.

Kosovo has a reported population density of 168 people per square kilometre in 2017 and this has risen from 89 people per square kilometre in 1961 (World Bank, 2018c). The average life expectancy in Kosovo is estimated at 71.7 years (World Bank, 2018d), with a death rate of 7 deaths/1,000 population in 2016 (World Bank, 2018e).

Figure 1: Change in the Total Population and Birth Rate in Kosovo between 1960-2017





Source: Information sourced from World Bank (2018)

4 Vision Screening Commissioning and Guidance

In Kosovo, vision screening is organised nationally, with no regional variation. Vision screening is funded through municipalities and is free of charge when it is conducted as part of general screening, however, parents can opt to pay for a private clinic. The content of the vision screening programme is decided upon by the local government health department. It is not known when the vision screening programme began or when it was implemented nationally, however, it is believed not to have changed since its implementation. There are no guidelines for vision screening and no defined process for review of the provision. There are no methods for quality monitoring imposed by the government. There has been no research carried out concerning the vision screening programme in Kosovo and there has been no clinical or cost-effectiveness analysis conducted.

Vision screening is carried out by general practitioners (GP), paediatricians, and ophthalmologists within kindergartens, child healthcare centres, hospitals, private clinics and schools. It is not known how many vision screening professionals there are per million population. There are GPs who do not screen, but could do so with additional training. No other healthcare professionals have been identified that could deliver vision screening with the appropriate training. However, there is currently no specific training available to perform vision screening.

5 Screening programme

The target conditions screened for by vision screening are retinopathy of prematurity (ROP), reduced visual acuity or any other eye abnormality. The health care professionals delivering vision screening, venue for screening and tests used vary depending on the age of the child as shown in Tables 1, 2 and 3 respectively. Specific details of the screening offered within each age group are described more fully in sections 5.1 to 5.4 below.

5.1 Vision screening - Preterm babies

Preterm babies up to the age of 3 months are screened for ROP by an ophthalmologist within a hospital neonatology clinic. The vision screening tests utilised at this age include eye inspection, red reflex testing and a retinal examination. Retinal changes in opthalmoscopy are criteria for referral. Premature babies under the ages of 32 weeks and low body weight (less then 1200g) are screened at least once.

5.2 Vision screening - Birth to 3 months

Well, healthy babies up to the age of 3 months are screened once by an ophthalmologist at either a hospital, child healthcare centre or a private clinic. The vision screening tests used at this age include eye inspection, fixation, red reflex testing, eye motility and pupillary reflexes. The exact age that these tests are carried out between birth and 3 months is not known. Babies are referred for further diagnostic examination after one abnormal or inconclusive test result. Referral is based on the absence of red reflex.

5.3 Vision screening - 3 months to 36 months

Babies aged 3 to 36 months are screened by an ophthalmologist at least once, in either a hospital, private clinic, kindergarten (1 to 3 years) or child healthcare centre. Financial status is key, services provided in public hospitals are free of charge. Families with higher incomes tend to willingly and independently send their children for screening in private clinics because of shorter waiting times and greater specialist access.

The vision screening tests utilised at this age include eye inspection, fixation, red reflex testing, eye motility, pursuit movements, cover test, alternating cover test and stereopsis using the Titmus test. Private screening also includes automated screening using various devices (dependent on where screening is conducted) which can include the Welch Allyn Spot Screen Vision device, Topcon, Huvitz, Tomey etc. in children aged 0-3 years and auto-refraction measurements. The age that each of these tests is carried out between 3 and 36 months is not specified. One abnormal or inconclusive test result necessitate referral for further diagnostic examination. Manifest strabismus, or no red reflex are the referral criteria for each category.

5.4 Vision screening - 36 months to 7 years

Children aged 36 months to 7 years are screened by a GP, paediatrician, or ophthalmologist in either a hospital, private clinic, school, or child healthcare centre. The vision screening tests utilised at this age include eye inspection, fixation, red reflex testing, eye motility, pursuit movements, cover test, alternating cover test, visual acuity measurement, stereopsis and autorefraction (private screening).

The optotype chart used to measure visual acuity is Snellen (single Snellen sized letters), and this is conducted for the first time at the age of 3 years in a child healthcare centre as part of individual vision screening by ophthalmologists.

Visual acuity is measured for a second time between the ages of 6 to 7 years, this is conducted in schools as part of generalised screening. Visual acuity is measured again at the ages of 10 to 11 years and 14 to 15 years of age, in schools as part of generalised screening. After the age of 5 years, visual acuity is measured by a GP, paediatrician, or an ophthalmologist.

One abnormal or inconclusive test result necessitate referral for further diagnostic examination. Low visual acuity of 0.7 decimal (6/8 Snellen, 0.15 logMAR) in one eye, or strabismus are the referral criteria at each age category.

Table 1: Healthcare professionals who conduct vision screening in each age group

Table 1.	**GP**	**Paediatrician**	**Ophthalmologist**
Preterm babies	×	×	✓
0 to 3 months	×	×	✓
3 to 36 months	×	×	✓
3 to 7 years	✓	✓	✓

Table 2: Vision screening tests used in vision screening for each age group

Table 2.	**EI**	**RR**	**RE**	**Fix**	**EM**	**PR**	**PM**	**CT**	**ACT**	**Stereo**	**AR**	**VA**
Preterm babies	✓	✓	✓	×	×	×	×	×	×	×	×	×
0 to 3 months	✓	✓	×	✓	✓	✓	×	×	×	×	×	×
3 to 36 months	✓	✓	×	✓	✓	×	✓	✓	✓	✓	✓	×
3 to 7 years	✓	✓	×	✓	✓	×	✓	✓	✓	✓	✓	✓

***Key**: EI: Eye Inspection; Fix: Fixation; RRT: Red Reflex Testing; EM: Eye Motility; RE: Retinal Examination; PM: Pursuit Movements; PR: Pupillary Reflexes; CT: Cover Test; ACT: Alternating Cover Test; VA: Visual Acuity Measurement; SV: Stereoscopic Vision; AR: Autorefraction*

Table 3: Location of vision screening for each age group

Table 3.	Hospital	Private Clinic	Child Healthcare Centre	Kindergarten	School
Preterm babies	✓	×	×	×	×
0 to 3 months	✓	✓	✓	×	×
3 to 36 months	✓	✓	✓	✓	
3 to 7 years	✓	✓	✓	×	✓

6 Automated Screening

Automated vision screening is achieved using handheld, portable devices designed to detect presence of refractive error from 6 months of age. It provides objective results and is used to detect amblyopic risk factors. This differs from other methods used to screen children for amblyopia which focus on detection of the actual condition and the resulting visual loss.

In Kosovo, the automated screening devices are used in private screening. There are more than one device being used in vision screening and they differ between specific private healthcare centres (brands used include: Welch Allyn, Topcon, Huvitz, Tomey). These auto-refractors cost approximately 7500 Euros. The maintenance costs and the number of years before the device is scheduled for replacement are not known.

Refraction is usually conducted with these devices in 3 year old children. These are not stand alone tests; they are used in combination with the Snellen chart. There is no comparative data concerning phoscreening and visual acuity screening between areas.

7 Provision for Visually Impaired

In Kosovo, there is one school for blind or severely visually impaired children. The school is called “Dr. Xhevdet Doda” and is located in the city of Peja in Kosovo. It has 50 students of all levels beginning with preschool, primary school and high school. This is provided free of charge. Visually impaired children who attend mainstream primary school are provided special support through magnifying glasses and texts with bigger letters, these are free of charge to parents and financed by the state.

8 Knowledge of existing screening programme

8.1 Prevalence/Diagnosis

There is no data available in Kosovo concerning the prevalence of treated, untreated or persistent amblyopia by the age of 7 years. There is also no data regarding the prevalence of persistent amblyopia at the age of 7 years. Percentages for the whole of Kosovo are not available, but the prevalence of strabismus in the capital city of Pristina are reported as 0.4% at the age of 6-7 years and 0.3% at the age of 10-11 years (Hoxha and Hoti, 2018). There is no data available in Kosovo pertaining to the incidence of the four types of amblyopia (strabismic, refractive, combined mechanism and deprivation).

8.2 Coverage

Within the capital city of Pristina 100% of children are invited for vision screening at age 6 to 7 years and 10-11 years. There is no national data available. At these ages it is conducted in schools, therefore parents are notified and invited verbally by staff. There is no generalised screening before these ages. Coverage and attendance rates of vision screening, before the age of 7 years is not available. The percentage of compliance with a referral, after an abnormal screening test result is not known as there is no registration or documentation of noncompliance with referrals after an abnormal screening test result.

8.3 Screening evaluation

The percentage of false negative referrals after screening is estimated by the country representative (as seen in clinical practice) as 10 to 15% within Pristina and the percentage of false positive referrals is estimated by the country representative (as seen in clinical practice) as 10 to 15%. The positive predictive value of a refer result, after vision screening is estimated at 80%. The sensitivity and specificity of vision screening is not known.

8.4 Treatment success

The percentage of infants treated for congenital eye disorders in the total population is not known. The percentage of children treated for strabismus or amblyopia after screening, before the age of 7 years is not known. There is not data available concerning the number of patients treated for congenital cataract, amblyopia, and strabismus each year by an orthoptist/ophthalmologist. Only an ophthalmologist can prescribe glasses for children under the age of 7 years. Other treatment options include patching and penalisation with glasses. All eligible children are offered treatment.

9 Costs of vision screening in children

9.1 Cost of vision screening

No data available.

9.2 Cost of treatment for amblyopia

The estimated costs for treatment of typical patients with refractive amblyopia and strabismic amblyopia, including follow-up:

- Ophthalmologists visit: in primary care and general public hospitals this is free of charge for the patient. The cost to the government is not known. In a private clinic this is 20 Euros, with 3 visits needed, per year
- Cost of patches: 10 Euros per packet
- Cost of glasses: 30 Euros for lens without the frame.

9.3 Cost of Treatment for strabismus

The estimated costs for strabismus surgery, including follow-up:

- Surgery in public general hospitals is free of charge for the patient. The cost to the government is not known.
- Surgery in private clinics cost around 800 Euros. Subsequent to surgery, 5 visits are needed, if in a public general hospital: Free of charge; private clinic: 20 Euros per visit.

9.4 Cost of treatment for cataract

The estimated costs for congenital cataract surgery, including follow-up of deprivation amblyopia:

- Public general hospital: Free of charge for the patient. The cost to the government is not known, but the patient/parent must buy the intraocular themselves, which would cost around 150 Euros.
- Private clinic: Approximately 1000 Euros. After the surgery 10 visits are needed (Public general hospital: Free of charge; Private clinic: 20 Euros per visit)

There is no financial reward for parents when children attend vision screening, no penalty for parents when children do not attend vision screening and vision screening is not obligatory for parents and children.

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