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Summary Vision Screening Data: Moldova

Produced as part of Work Package 3

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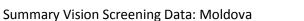|	
Abnormal test result	A test result where a normal "pass" response could not be detected under good conditions. The result on screening equipment may indicate "no response," "fail," or "refer."
Attendance rate	The proportion of all those invited for screening that are tested and receive a result: • 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 Moldova is 3,549,750 (World Bank, 2018a) and the birth rate is estimated at 10.3 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.

Moldova has a reported population density of 124 people per square kilometre in 2017 and this has risen from 91 people per square kilometre in 1961 (World Bank, 2018c). In terms of healthcare facilities, the total density of hospitals in 2013 was 2.12 per 100,000 population (WHO, 2016a). Infant mortality in 2017 is estimated at 13.3 deaths/1,000 live births in total (World Bank, 2018d).

The average life expectancy in Moldova is estimated at 71.6 years (World Bank, 2018e), with a death rate of 11.48 deaths/1,000 population in 2016 (World Bank, 2018f). Moldova has a gross national income per capita (PPP int. $, 2013) of $5,000 (WHO, 2016b). The estimated total expenditure on health per capita in 2014 was $514 (Intl $) and the total expenditure on health in 2014 as percentage of GDP was 10.3% (WHO, 2016b).

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

Graph A: Total Population Moldova

Population (millions) vs Year
- 1960: 2.54
- 1980: 3.40
- 2000: 3.64
- 2017: 3.55

Graph B: Birth Rate Moldova

Birth Rate per 1000 people vs Year
- 1960: 27.697
- 1980: 21.062
- 2000: 11.298
- 2016: 10.323

Source: Information sourced from World Bank (2018)

4 Vision Screening Commissioning and Guidance

Vision screening is organised nationally, there are no regional differences. It is funded by the state and is embedded into a general preventative child healthcare screening system. There is no specific standardised vision screening programme, but there is a national protocol on paediatric strabismus, paediatric cataract and paediatric eye trauma. The content of this protocol is decided upon by the Ministry of Health. There are no guidelines concerning vision screening and no methods for quality monitoring imposed by the government. Any information is collected voluntarily by the ophthalmologist and/or general practitioner (GP) and sent to the statistical centre; therefore very little data is collected. There has been no research conducted regarding vision screening in Moldova.

Vision screening is conducted by ophthalmologists, of which there are 214 in the entire country. Nurses and optometrists have been identified as general healthcare professionals that do not screen, but could do so with additional training. In 2017, the State University of Medicine and Pharmacy of Moldova set-up a 4-year course to train optometrists at Bachelor level. Therefore, it will be three more years until they can be involved in vision screening. Otherwise there is no specific training available to train professionals to perform vision screening.

5 Screening programme

In Moldova, the target conditions screened for by vision screening are retinopathy of prematurity (ROP), congenital eye disorders and refractive error. 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 by an ophthalmologist at the Centre for Mother and Child in the capital city of Chisinau, either within the ophthalmology department or the department for preterm babies. Tests are conducted at 3 to 4 weeks after birth; the tests conducted include eye inspection, fixation, red reflex testing, eye motility, retinal examination, pursuit movements and pupillary reflexes. Referral at this age includes fixation problems, strabismus, white pupil and ROP.

5.2 Vision screening - Birth to 3 months

Well, healthy babies up to the age of 3 months are screened by an ophthalmologist at a family centre. The tests conducted at this age include eye inspection, red reflex testing and pupillary reflexes. There is no specific sequence or age at which these are conducted, but they are conducted by the age of 3 months. It is not known how many abnormal or inconclusive test results determine referral for further diagnostic examination. Referral at this age includes fixation problems, strabismus and white pupil.

5.3 Vision screening - 3 months to 36 months

Children aged 3 to 36 months of age are screened by an ophthalmologist, paediatrician, or GP at 3 months of age. Screening is also repeated at 12 months, and between 24 and 36 months. The paediatrician or GP will only look for eye deviation (strabismus) or fixation problems, they do not perform any other tests. If any eye deviation or fixation problem is noted they refer children on to an ophthalmologist. Vision screening takes place in family centres, or parents can opt to take their children to private clinics. The tests conducted include eye inspection, fixation, red reflex testing, eye motility, Hirschberg test, retinal examination, pursuit movements, pupillary reflexes, cover test, alternating cover test, visual acuity measurement, automated screening (private clinics only) and retinoscopy. Referral at this age includes fixation problems, strabismus, white pupil, visual acuity of less than 0.8 decimal (0.1 logMAR, 6/7.5 Snellen). There are no specific rules regarding referral for further diagnostic examination due to an abnormal or inconclusive result, but children are usually referred after one abnormal or inconclusive test result.

5.4 Vision screening - 36 months to 7 years

Children aged 36 months up to 7 years are screened twice by an ophthalmologist at a family centre, although parents can opt to take their children to a private clinic. The children are examined at 3 years of age and then at 7 years of age. The tests performed at this age include eye inspection, fixation, red reflex testing, eye motility, Hirschberg test, retinal examination, pursuit movements, pupillary reflexes, cover test, alternating cover test, visual acuity measurement, colour vision (Ishihara or Rabkin), automated screening (private only), retinoscopy. Prism cover test, Bagolini test and Worth's Lights test are only performed in tertiary hospitals or some private clinics.

Referral at this age includes fixation problems, strabismus, white pupil, visual acuity of less than 0.8 decimal (0.1 logMAR, 6/7.5 Snellen). There are no specific rules regarding referral for further diagnostic examination due to an abnormal or inconclusive result, but children are usually referred after one abnormal or one inconclusive test result.

The optotype charts used include Lea symbols, Numbers, Snellen and most commonly Orlova charts (crowded). It is not known if these are logMAR scale, or linear or single optotypes. The charts are not used according to the preferences by the ophthalmologists in the polyclinics, but according to what they have available. Tertiary level hospitals and the private clinics have more choice.

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

Table 1	Paediatrician	GP	Ophthalmologist
Preterm babies	✕	✕	✓
0 to 3 months	✕	✕	✓
3 to 36 months	✓ Eye deviation and fixation problems only	✓ Eye deviation and fixation problems only	✓
3 to 7 years	✕	✕	✓

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

Table 2	EI	Fix	RR	EM	Hir	RE	PM	PR	CT	ACT	VA	CV	AS	Ret	PCT	BT	WT
Preterm babies	✓	✓	✓	✓	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
0 to 3 months	✓	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
3 to 36 months	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
3 to 7 years	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Key: Highlighted tests are conducted only in tertiary or private clinics.

EI: Eye Inspection; Fix: Fixation; RR: Red Reflex Testing; EM: Eye Motility; Hir: Hirschberg; RE: Retinal Examination; PM: Pursuit Movements; PR: Pupillary Reflexes; CT: Cover Test; ACT: Alternating Cover Test; VA: Visual Acuity Measurement; CV: Colour Vision; AS: Automated Screening; Ret: Retinoscopy; PCT: Prism Cover Test; BT: Bagolini Test; WT: Worth Test.

Table 3: Location of vision screening for each age group

Table 3	Centre for Mother and Child	Family Centre	Private Clinic
Preterm babies	✓	✗	✗
0 to 3 months	✗	✓	✗
3 to 36 months	✗	✓	✓ Optional extra
3 to 7 years	✗	✓	✓ Optional extra

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. It is not currently clear what automated screening is performed in tertiary clinics and private clinics in Moldova.

7   Provision for Visually Impaired

There are two schools for blind or severely visually impaired children; one in Chisinau and one in Balti. The costs per child for these schools is not known. There is special support for visually impaired children who attend regular mainstream primary school, this is provided from the Low Vision Centre in Chisinau.

8 Knowledge of existing screening programme

8.1 Prevalence/Diagnosis

No data available.

8.2 Coverage

Infants are invited for vision screening by family centres with a phone call. Ophthalmologists work only in the municipal and regional (districts) family centres. Some districts do not have access to any ophthalmologists.

The general examinations are conducted by GPs. The children are invited by a nurse (usually by phone) according to the child general screening examination established by the Ministry of Health. It is estimated that there are up to- 5 cases of retinoblastoma, -14 cases of congenital cataract and 4 cases of congenital glaucoma diagnosed per year in Moldova. There is no further data available.

8.3 Screening evaluation

No data available.

8.4 Treatment success

Ophthalmologists are the only professionals that prescribe glasses for children under the age of 7 years. Other treatment options include patching and cataract surgery (if appropriate). Not all children are treated due to problems with capacity and payment. All children benefit from state medical insurance, however, in some cases, there is late referral to the ophthalmologist or in prescribed treatment (glasses, etc.). This is stated as being due to the financial problems involved that affect the parent's ability to pay for transport fees or to buy the glasses. Glasses are not covered by the insurance.

9   Costs of vision screening in children

9.1   Cost of vision screening

The salary of an ophthalmologist is approximately 160-200 Euros per month. There is no further data available.

9.2   Cost of treatment for amblyopia

No data available.

9.3   Cost of Treatment for strabismus

No data available.

9.4   Cost of treatment for cataract

No data available.

Vision screening is funded by the state and is therefore free of charge for parents, however they can opt to take their children to a private clinic. There is no financial reward for attending vision screening and no penalty for non-attendance.

10 References

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