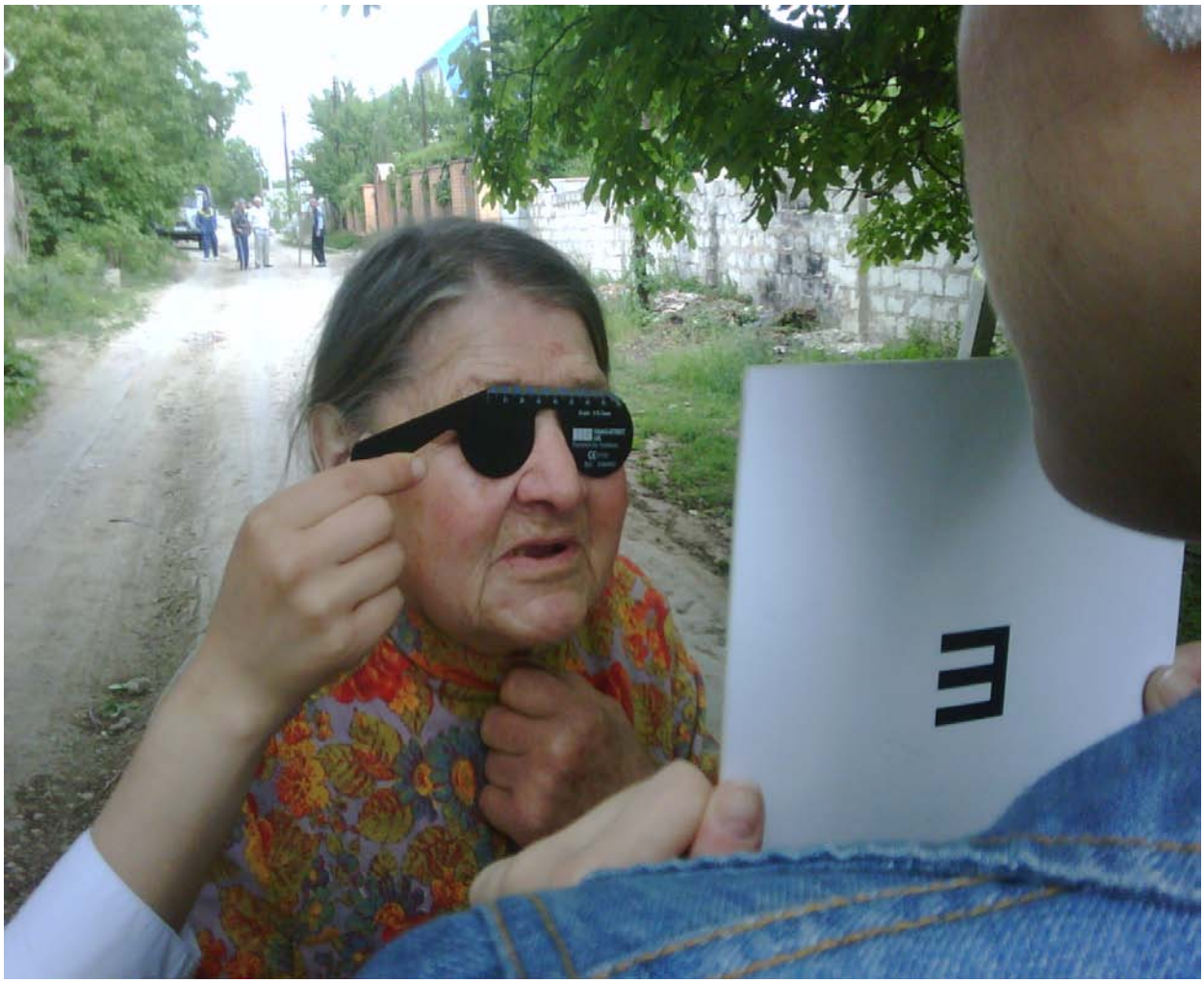


Rapid Assessment of Avoidable Blindness plus Diabetic Retinopathy in Moldova 2012

Dr. M Mansur Rabiu

RAAB+DR survey supported by The Fred Hollows Foundation (UK)

The Fred Hollows Foundation (UK)

Executive Summary

This is the report of the Rapid Assessment of Avoidable Blindness and Diabetic Retinopathy (RAAB+DR) survey conducted in Moldova from May-July 2012. Standard RAAB plus DR survey methodology was used to select and examine a total of 3885 persons 50 years and older across the whole country.

The prevalence of blindness is 1.6%, with cataract, glaucoma and other posterior segment diseases as major causes. Rural areas have cataract as major cause of blindness while it was glaucoma in urban areas. The cataract surgical coverage was 77.8%. The prevalence of diabetes among those 50 years and older was 11.4% and prevalence of Diabetic Retinopathy among those with diabetes was 55.9%, with sight threatening conditions in 14.6%.

The survey was an international research collaboration between the Fred Hollows Foundation (UK), HelpAge International Moldova, State Medical and Pharmaceutical University "Nicolae Testemitanu" and the Ministry of Health of the Republic of Moldova.

Dr M Mansur Rabiu, RAAB + DR trainer, IAPB-EMR, Saudi Arabia. August, 2012

Introduction

The World Health Organization (WHO) estimates that there about 39 million people blind in the world and another 246 are visually impaired[1]. However the magnitude and causes of blindness and visual impairment (VI) varies remarkably across different regions and countries of the world[1]. At the current trend and services, the number of people blind and visually impaired will continue to increase due to ageing population, unless concerted efforts are made to address the causes of blindness and visual impairment[2]. WHO in partnership with international agencies, professional bodies and governments have developed an international initiative to eliminate causes of avoidable blindness by the year 2020 - VISION 2020 - the Right to Sight. As part of this initiative, each country is expected to draw up its plans for combating avoidable blindness and VI using strategies developed by the initiative[2].

In order to develop locally appropriate strategies, reliable and up-to-date data on the magnitude and causes of blindness and VI is necessary. Unfortunately some countries of East Europe do not have current data on blindness and VI; this includes Moldova.

In 2010, The Fred Hollows Foundation United Kingdom [FHF (UK)] made a decision to explore the feasibility of supporting eye health work in south-east Europe commencing with Moldova. Preliminary research in 2011 revealed that there is limited data on eye health in Moldova and the region in general. It is a known fact that blindness and visual impairment is more prevalent among older people. Having established links with HelpAge International Moldova - an organization involved in supporting the needs of the elderly in Moldova, FHF (UK) recognized that there was a need to better understand the eye health situation in Moldova and especially the needs of older men and women. Information obtained from HelpAge International Moldova pointed towards a high level of need for eye care among the older people, particularly in rural areas, where poverty levels are higher than in urban areas.

Initial discussions with HelpAge International Moldova and the Department of Ophthalmology at the State Medical and Pharmaceutical University “Nicolae Testemitanu”

of the Republic of Moldova identified that there is a major need for improving the availability of screening and treatment of eye diseases in Moldova.

The first step in the process of establishing an eye care programme in the Republic of Moldova, therefore, was for FHF (UK) to support the State Medical and Pharmaceutical University "Nicolae Testemitanu" of the Republic of Moldova to undertake a Rapid Assessment of Avoidable Blindness (RAAB). The RAAB was to also include a component to determine the prevalence of diabetic retinopathy (DR) in the Republic of Moldova. The decision to include this disease is based on knowledge that diabetes is a growing health issue in the country.

The RAAB plus DR will enable the Moldovan Ministry of Health to undertake evidence based planning using the Vision 2020: The Right to Sight initiatives, as the survey provides information on the prevalence of avoidable blindness, visual impairment and diabetic retinopathy in the study area. It will also provide patient load estimates which helps planning for human resource and eye care service needs including diabetic retinopathy services. It will identify the main causes of blindness and visual impairment which will guide strategies for action, and identify problems related to access and quality of current services. Such information will enable programme design and planning to be responsive to eye care needs in the area. The RAAB plus DR results will also provide a baseline that can be used to determine programme effectiveness over time.

Collaboration

The State Medical and Pharmaceutical University "Nicolae Testemitanu" of the Republic of Moldova was contracted by FHF (UK) to undertake the RAAB plus DR in Moldova. HelpAge International Moldova, a part of the HelpAge International network, assisted with the planning and coordination of the RAAB plus DR training and survey. The Ministry of Health of the Republic of Moldova gave its approval for the RAAB plus DR. As a key partner in this survey and member of the Steering Group overseeing the survey, the Ministry also provided critical support to the implementation of the survey, linking the survey teams with local medical service providers, publicising the RAAB plus DR nationally through the media and

the Ministry's website in order to make the people of the Republic of Moldova aware of the survey.

Brief information on RAAB + DR

The International Center for Eye health (ICEH), London, in collaboration with WHO and Hans Limburg, a health information specialist , has developed a simple, affordable and rapid survey method to collect reliable estimates of the magnitude and causes of blindness at district /regional level. This standardised methodology is called the Rapid Assessment of Avoidable Blindness (RAAB). RAAB only includes the over-50 year age group, where the prevalence of blindness and visual impairment is highest[3], so that required sample sizes are minimised and uses relatively straightforward sampling and examination techniques, minimising time and costs. Recently, additional methodology has been developed to include estimates for the prevalence of diabetes mellitus and DR. DR is an increasing cause of blindness and visual impairment worldwide. The new RAAB methodology is called RAAB plus DR. This methodology has been successfully used in Mexico and Saudi Arabia [3, 4].

The evidence generated from the survey, apart from providing data for planning eye care and diabetic retinopathy services in Moldova, may also attract more organisations to support eye care services in the country.

Aim

To estimate the prevalence and causes of blindness and visual impairment, and prevalence of diabetes mellitus and diabetic retinopathy among people aged≥50 years in the Republic of Moldova using 'RAAB plus DR' techniques.

Objectives

a. To determine the prevalence and magnitude of blindness and visual impairment (VI) in the selected group of population;
b. To determine the causes of blindness and VI;
c. To determine the prevalence of diabetes mellitus;
d. To determine the prevalence of diabetic retinopathy (any diabetic retinopathy and sight threatening diabetic retinopathy);
e. To assess cataract surgical services by determining cataract surgical coverage and visual outcome from cataract surgery, and
f. To determine the barriers to uptake of cataract services.

The survey will provide the following important information for the selected group of population needed for planning and monitoring of eye care in Moldova:

- prevalence of blindness, severe visual impairment and visual impairment;
- prevalence of blindness, severe visual impairment and visual impairment from all avoidable causes;
- percentage of blindness, severe visual impairment and visual impairment from cataract;
- prevalence of diabetes mellitus;
- prevalence of any diabetic retinopathy and sight threatening diabetic retinopathy;
- main causes of blindness, severe visual impairment and visual impairment;
- prevalence of aphakia and/or pseudophakia;
- cataract surgical coverage;
- visual outcome of cataract surgery;
- barriers to cataract surgery, and
- cataract surgery service indicators e.g. place, type of surgery and visual outcome.

Methods

The survey was a population based cross-sectional survey of persons aged 50 years and above in Moldova. The sampling and examination procedures of the RAAB plus DR methodology were followed.

A minimum sample of 3813 persons 50 years and older was calculated. This was determined using the RAAB software with the following parameters:

- Population of people 50 years and older = 868,113
- Assumed prevalence of severe visual impairment and blindness of 50 years and older = 2.5%
- Maximum error +-0.6%
- 95% confidence level
- Design effect of 1.5
- Non response rate of 5%

The sample was selected through a stratified multistage cluster random sampling technique using the RAAB software. Stratification was on urban, rural residence as categorized by the Moldovan population data. For the two strata of urban and rural residencies, a total of 111 communities (towns/villages) were randomly selected in the first sampling from the sampling frame of each of the regions. As rural population constitutes 61% of Moldovan population, a total of 68 clusters was selected from rural areas and the remaining from urban clusters. This selection was by probability proportional to size sampling (PPS). In each selected community the area was divided into segments that contain about 35 people aged ≥50 years and one segment was randomly chosen using the compact segment technique. The population data of the community and the map of the community showing distribution of residential houses were used to approximately segment the communities. All households in the selected segment were included in the survey until the required 35 people aged 50 years and above were identified. If the segment did not have 35 persons aged ≥50 years, another segment was randomly selected to complete the number. The list of survey clusters selected in the survey and timetable is presented in Appendix 1.

The survey team moved from house to house to examine the eligible persons. These are persons 50 years and older that have lived in that residence for at least 6 months of the previous year. The purpose and procedures of the study was explained verbally and or in writing to each eligible person who was then asked to sign/thumb-print an informed consent form to participate in the survey, with full explanation provided of the procedures, benefits, confidentiality and information on contact person for the survey in case of further enquiry or need for medical attention. Appendix 2 contains the Survey Consent form.

All consenting participants had their presenting visual acuity (VA) tested in each eye using a modified Snellens E chart at 6 meters. Pinhole vision was tested for any eye with VA less than 6/18. All subjects were examined for lens opacity, or aphakia/ pseudophakia. All persons with vision less than 6/18 in one or both eyes were examined further to determine the cause of visual impairment in each eye. The WHO guidelines were used to determine the cause of visual impairment for each eye and for the person[5]. Persons that have cataract were asked the reason for not having cataract surgery, while those that have had the surgery were asked where the surgery was done, and causes of vision less than 6/18 in the operated eye was determined. These causes were categorised into:

a. 'Selection' when the poor post-op vision is due to a pre-existing disease e.g. glaucoma, optic atrophy;
b. 'Surgical' due to purely surgical complications;
c. 'Spectacles' due to refractive error that results from the surgery, and
d. 'Sequelae' due to long term effect of surgery such as posterior capsular opacity, etc.

In addition to the above standard RAAB procedures, the diabetic status of all participants was assessed through interview and a random (none fasting) blood glucose test. The blood test was done with a glucometer using thumb prick blood drop, which was obtained using full sterile techniques. One lancet was used for only one person. Participants were questioned as to whether they are known diabetics and known diabetics were asked about the form of treatment they are receiving. They were also asked if they have ever had an eye examination for diabetics and how long ago was the last examination. The random blood sugar test was done using a Digital Glucometer- Accu-check blood sugar machine. 'Diabetics'

was defined as those with a previous diagnosis of diabetes, receiving treatment for glucose control or a random blood glucose level >11.1mm/l (200mg/dl). All 'diabetics' that had consented had dilated fundoscopy to assess presence and grade of diabetic retinopathy using a portable indirect ophthalmoscope. The Scottish DR grading was used for the grading of diabetic retinopathy for ease of application.

Persons that needed further assessment and treatment were referred to the nearest health facility that provides that service. At the end of each day's field work, the survey team ensured that all examined subjects have no complaint or problem.

To ensure optimal response rate from the survey eligible persons, the Ministry of Health contacted all the doctors/nurses in the hospitals/clinics closest to the survey selected areas to facilitate the conduct of the survey. This assisted in having in a very good response rate for the survey.

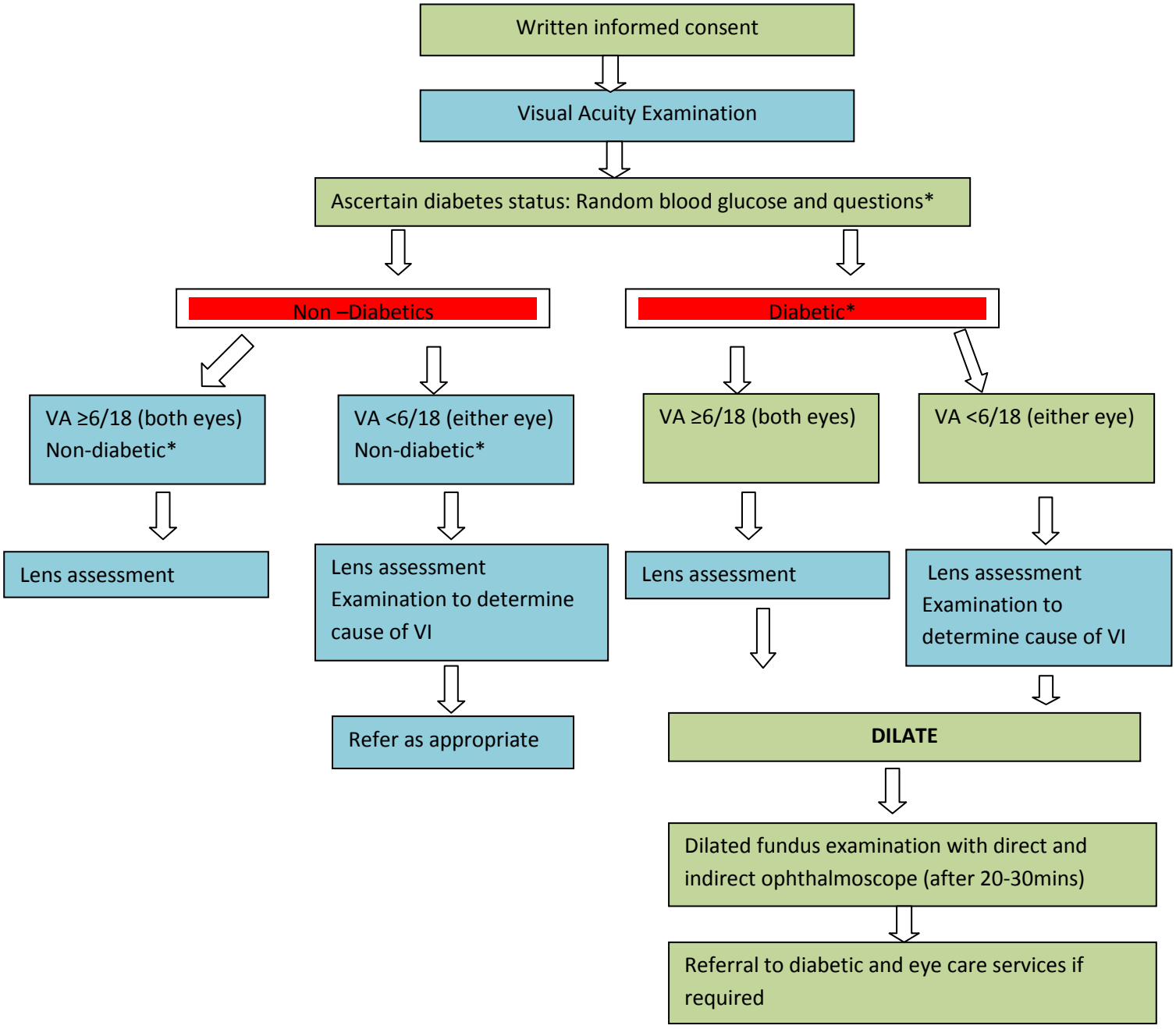
The following ophthalmic tools were used for examination: Modified Snellens charts, 6 metre ropes, pin holes, pen torches, direct ophthalmoscopes, portable indirect ophthalmoscopes. A comprehensive list of equipment and materials used by each survey team is in Appendix 3.

Survey team composition

There were 3 survey teams and each survey team consisted of the following

- 1 Ophthalmologist or ophthalmic clinical officer
- 2 Ophthalmic residents
- A driver

FLOW DIAGRAM OF PROPOSED PROCEEDURES FOR RAAB PLUS DR



*Diabetics defined as: receiving treatment for glucose control, previous diagnosis with diabetes, or random blood glucose level ≥11.1mol/l

Data Management

All data was recorded in a simple two-page survey form (see Appendix 4). The survey forms were cross–checked daily in the field to identify and correct mistakes. Data was then entered into the new RAAB plus DR software by double entry, which has an in-built consistency check. The data was analysed using the RAAB version 4 beta April 2012 software to provide:

- Age-sex adjusted prevalence of blindness and VI at different VA levels, by age, sex, residence;
- Age-sex adjusted prevalence of cataract and aphakia/pseudophakia;
- Causes of blindness and VI at different VA levels,
- Cataract surgical coverage (CSC) persons by sex using the formula:
    - CSC Persons (%) = x + y/ x + y + z * 100
    - where
        - x = persons with one operated and one visually impaired eye (number of persons with unilateral (pseudo)aphakia and operable cataract in the other eye)
        - y = number of persons with bilateral (pseudo) aphakia
        - z = number of persons with bilaterally operable cataract (PINVA<3/60, <6/60,<6/18)
    - It measures the proportion of people, blind or visually impaired due to cataract, which have been operated in one or both eyes in the survey area
- Visual outcome of cataract surgery;
- Barriers to uptake of cataract services by sex and residence;
- The prevalence of diabetes (known and newly diagnosed) by age, sex and residence and other demographics;
- The prevalence of diabetic retinopathy and sight threatening diabetic retinopathy by age, sex and residence and other demographics.

To ensure minimal data collection error, all collected data was entered within 24 hours of collection and errors identified and reported back to the field teams for correction.

Ethical approval

The survey secured ethical approval from the Moldovan Government Ethical Committee and approval from the Ministry of Health of the Republic of Moldova. Written/thumb-printed consent was obtained from all subjects for participation in the survey. All information of subjects was confidentially handled. People identified with diabetes and/or ocular conditions requiring treatment or follow-up were referred to the nearest ophthalmic or medical centers as appropriate. The contact person for the survey and any medical attention during the survey was Dr Ala Paduca, Associate Professor (Docent), Department of Ophthalmology, State Medical and Pharmaceutical University "Nicolae Testemitanu" of the Republic of Moldova. The overall supervision of the survey teams was by Prof. Eugen Bendelic, Head of the Department of Ophthalmology at the State Medical and Pharmaceutical University "Nicolae Testemitanu" of the Republic of Moldova.

Training

A six-day training session was conducted by a certified RAAB trainer, Dr. Mansur Rabiu, and a retinal specialist in Moldova, Dr Angela Corduneanu, Associate Professor (Docent) of the Department of Ophthalmology, State Medical and Pharmaceutical University "Nicolae Testemitanu" of the Republic of Moldova. All field staff were thoroughly trained so that they uniformly followed the same procedure to identify eligible subjects, to assess visual acuity and examine the lens, and to grade and record diabetic retinopathy using the Scottish grading scheme. During training, the inter-observer variability was assessed for vision, lens assessment, causes of visual impairment and diabetic retinopathy grading to ensure that examiners have at least 70% agreement. Each team was given standardised instructions on definitions, method of selection of the subjects, examination protocol, and methods to obtain and record the data for their reference. The training time table is presented in Appendix 5.

Results

A total of 3877 subjects out of the 3885 eligible subjects were examined, giving a response rate of 98%. Five people were not available, 2 refused examination, and one was incapable of being examined (Table 1)

Table 1. Age and gender distribution of people examined in the sample

	Males		Females		Total	
	n	%	n	%	n	%
50 - 59 ye	521	41.0%	1,244	47.7%	1,765	45.5%
60 - 69 ye	417	32.8%	808	31.0%	1,225	31.6%
70 - 79 ye	267	21.0%	440	16.9%	707	18.2%
80+ years	66	5.2%	114	4.4%	180	4.6%
Total	**1,271**	**100.0%**	**2,606**	**100.0%**	**3,877**	**100.0%**

The sample population resembles the Moldovan 50 years and older population age and sex structure: Figures 1, 2, and 3.

Figure 1: Age groups - Proportion of Male Moldovan population and sample population

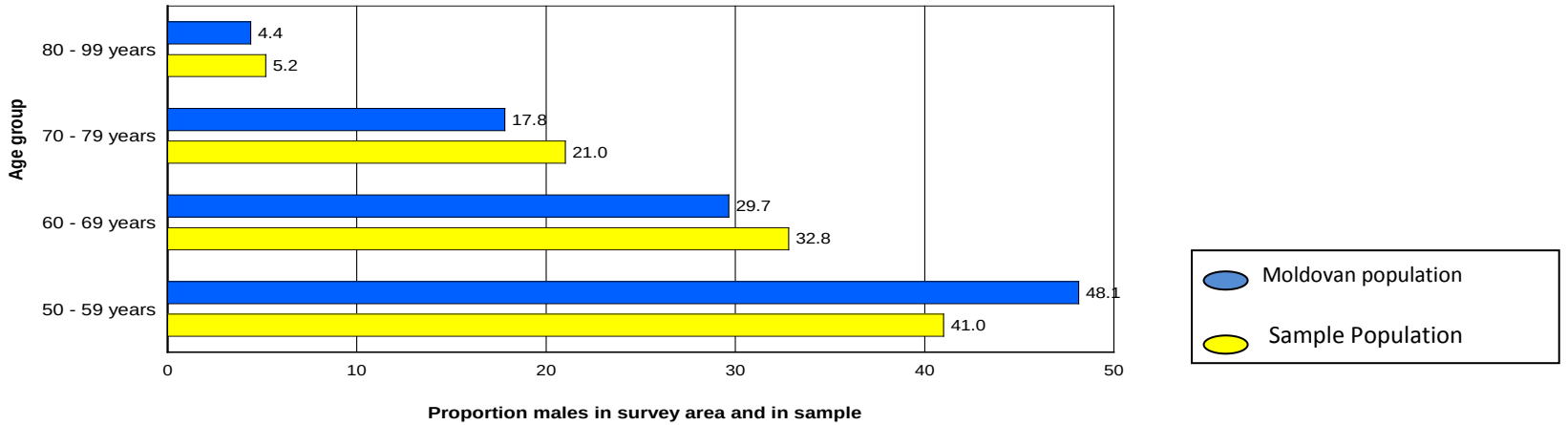


Figure2: Age groups - Proportion of Female Moldovan population and sample population

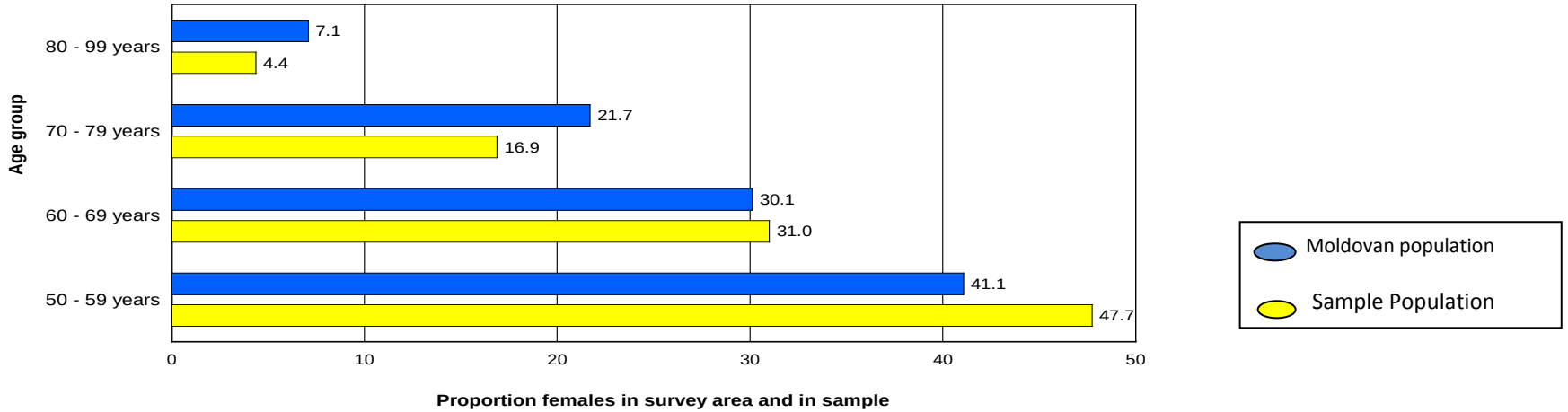
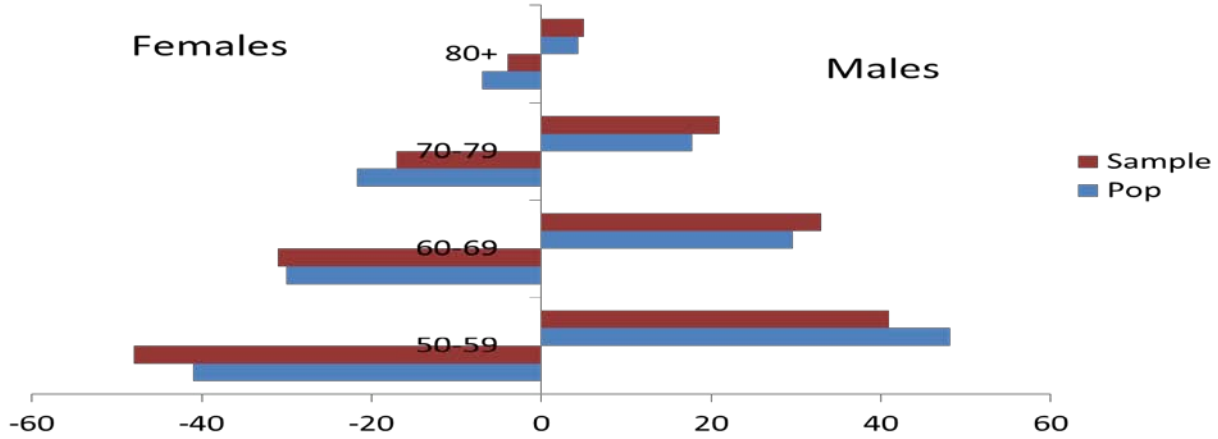


Figure 3: Age sex pyramid of Moldovan population and sample population



Blindness and visual impairment

A total of 55 people had a presenting vision of less than 3/60 in the better eye. Thus the blindness prevalence is 1.4% (CI 1.0-1.8) with males having 1.7% and females 1.3%. But the age and sex adjusted prevalence is 1.57% (CI 1.1-2.0) - males 1.5% and females 1.6%. The prevalence of severe visual impairment (SVI) is 2.2% (CI 1.7 - 2.6) with males 2.5% (1.6 - 3.4) and females 2.0 % (1.4 - 2.6) – see Table 2.

The prevalence of blindness was slightly higher in the rural areas 1.7% (CI 1.3-2.4) than the urban areas 1.5% (CI 1.4-1.9), but the difference is not statistically significant. However SVI is higher in the rural areas 2.6% (CI 2.0-3.3) compared to urban areas 1.4% (CI 0.9-2.2).

Table 2. Sample prevalence of blindness, severe (SVI) and moderate (MVI) visual impairment - bilateral PVA

VA category	Males		Females		Total	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Blindness (PVA<3/60)	22	1.7 (1.0 - 2.5)	33	1.3 (0.8 - 1.7)	55	1.4 (1.0 - 1.8)
SVI (<6/60-3/60)	32	2.5 (1.6 - 3.4)	52	2.0 (1.4 - 2.6)	84	2.2 (1.7 - 2.6)
MVI (<6/18-6/60)	161	12.7 (10.4 - 14.9)	341	13.1 (11.4 - 14.7)	502	13.0 (11.5 - 14.4)
Functional Low Vision	20	1.6 (0.9 - 2.2)	58	2.2 (1.5 - 2.9)	78	2.0 (1.5 - 2.5)

By extrapolation of the age and sex adjusted rates of the result ,this means there are estimated 13,693 people in Moldova, made up of 5642 males and 8052 females blind in Moldova - Table 3.

Table 3. Extrapolated magnitude of blindness, severe (SVI) and moderate (MVI) visual impairment - bilateral PVA

Vision category	**Males**		**Females**		**Total**	
	n	**% (95% CI)**	**n**	**% (95% CI)**	**n**	**% (95% CI)**
Blindness (PVA<3/60)	5,642	1.5 (0.8 - 2.3)	8,052	1.6 (1.1 - 2.1)	13,693	1.6 (1.1 - 2.0)
SVI (<6/60-3/60)	8,079	2.2 (1.3 - 3.1)	12,488	2.5 (1.9 - 3.0)	20,567	2.4 (1.9 - 2.8)
MVI (<6/18-6/60)	43,319	11.8 (9.6 - 14.0)	72,928	14.5 (12.9 - 16.2)	116,249	13.4 (11.9 - 14.8)
Functional Low Vision	5,471	1.5 (0.8 - 2.1)	13,010	2.6 (1.9 - 3.3)	18,482	2.1 (1.6 - 2.7)

The blindness prevalence increases with age, as it is 0.4% for age group 50—59 years but increases to 11.7% for 80+ years - Table 4.

Table 4: Prevalence of Blindness (PVA<3/60 in the better eye) by age groups

Age group	Males		Females		Total	
	n/N	% (95% CI)	n/N	% (95% CI)	n/N	% (95% CI)
50 - 59 years	2/521	0.4 (0.0 - 0.9)	5/1244	0.4 (0.1 - 0.7)	7/1765	0.4 (0.1 - 0.7)
60 - 69 years	4/417	1.0 (0.0 - 1.9)	7/808	0.9 (0.2 - 1.6)	11/1225	0.9 (0.3 - 1.5)
70 - 79 years	6/267	2.3 (0.5 - 4.0)	10/440	2.3 (1.0 - 3.5)	16/707	2.3 (1.3 - 3.2)
80+ years	10/66	15.2 (6.6 - 23.7)	11/114	9.7 (4.5 - 14.8)	21/180	11.7 (7.1 - 16.2)

Causes of blindness and visual impairment

The major causes of blindness are cataract untreated surgically (58.2%), glaucoma (10.9%), and other posterior segment causes (10.9%). Also for severe visual impairment, cataract is the major cause followed by other posterior segment diseases, but for moderate visual impairment, refractive error is the major cause followed by cataract - Table 5.

Table 5. Principal cause of blindness, severe (SVI) and moderate (MVI) visual impairment in persons (PVA)

Conditions	Blindness		SVI		MVI	
	n	%	n	%	n	%
1. Refractive error	0	0.0%	4	4.8%	326	64.9%
2. Aphakia uncorrected	3	5.5%	0	0.0%	6	1.2%

3.	Cataract untreated surgically	32	58.2%	59	70.2%	120	23.9%
4.	Cataract surgical complications	1	1.8%	0	0.0%	4	0.8%
5.	Non Trachomatous corneal opacity	2	3.6%	0	0.0%	0	0.0%
6.	Glaucoma	6	10.9%	4	4.8%	9	1.8%
7.	Diabetic retinopathy	2	3.6%	4	4.8%	18	3.6%
8.	ARMD	3	5.5%	5	5.9%	6	1.2%
9.	Other posterior segment disease	6	10.9%	8	9.5%	12	2.4%
10.	All other globe/CNS abnormalities	0	0.0%	0	0.0%	1	0.2%
Total		**55**	**100%**	**84**	**100%**	**502**	**100%**

Causes of blindness between rural and urban areas

The causes of blindness in rural areas are mainly cataract (67.4%) while it is glaucoma (33.3%) and posterior segment diseases (16.7%) in the urban areas - Table 6 and Figures 4 and 5.

Table 6. Causes of blindness in rural and urban areas

Conditions	Blindness%			
	Rural		Urban	
	n	(%)	n	(%)
1. Aphakia uncorrected	3	(7.0)	0	(0.0)
2. Cataract untreated	29	(67.4)	3	(25.0)
3. Cataract surgical complications	1	(2.3)	0	(0.0)
4. Non Trachomatous corneal opacity	1	(2.3)	1	(8.3)
5. Glaucoma	2	(4.7)	4	(33.4)
6. Diabetic retinopathy	1	(2.3)	1	(8.3
7. ARMD	2	(4.7)	1	8.3
8. Other posterior segment disease	4	(9.3)	2	16.7
TOTAL	**43**	**100**	**12**	**100**

Fig 4. Causes of Blindness in Rural areas %

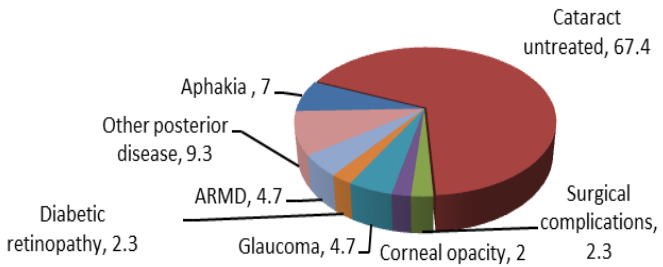
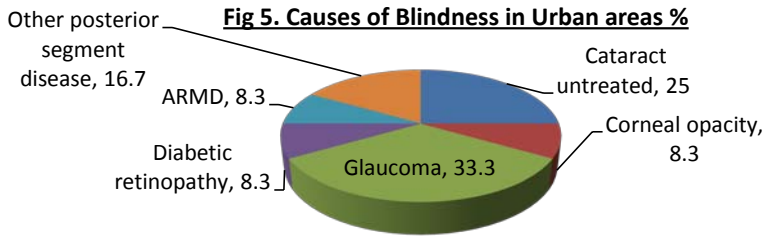


Fig 5. Causes of Blindness in Urban areas %



Cataract and cataract surgery

The age and sex adjusted prevalence of cataract responsible for blindness (vision less than 3/60 in better eye) among the study population is 0.65% (males 0.54%, females 0.72%); for unilateral cataract prevalence it is 3.46%. This translates to 5623 cataract blind persons and 30,069 persons with unilateral cataract. The age and sex adjusted cataract surgical coverage (CSC) for persons with cataract responsible for vision less than 3/60 is 77.8% with similar rates among both sexes - Table 7.

Table 7. Cataract surgical coverage (persons)

Vision category	Males (%)	Females (%)	Total (%)
VA < 3/60	77.0	76.2	76.5
VA < 6/60	57.5	61.7	60.1
VA < 6/18	29.7	36.6	33.9

A total of 85.5% of operated eyes (148/173) had IOL inserted during the cataract surgery, 23 eyes (13.2%) had no IOL, mostly are traumatic aphakia. Of all the operated eyes 83.3% (145/173) were operated in the government hospital. Only 16.2% were done in private hospitals.

Barriers to uptake of cataract surgery

The major obstacles to having cataract surgery are financial problem (mostly indirect costs) (28.2%), fear (24%) and 'Unaware that treatment is possible' (21.9%) - Table 8. Fear and 'unaware that treatment is possible' are more frequently reported in men but cost is more frequently reported in women.

Table 8. Barriers to cataract surgery - bilateral VA<6/60 due to cataract

Barriers	Males		Females		Total	
	n	%	n	%	n	%
Need not felt	1	4.2%	4	12.5%	5	8.9%
Fear	7	29.2%	6	18.8%	13	23.2%
Financial problem	6	25.0%	10	31.3%	16	28.6%
Treatment denied by provider	3	12.5%	4	12.5%	7	12.5%
Unaware treatment is possible	6	25.0%	6	18.8%	12	21.5%
Cannot access treatment	1	4.2%	2	6.3%	3	5.3%
Local reason	0	0.0%	0	0.0%	0	0.0%
Total	**24**	**100.0%**	**32**	**100.0%**	**56**	**100.0%**

Cataract surgery

The age and sex adjusted prevalence of bilateral aphakia/pseudophakia is 1.14% (males 0.74%, females 1.44%). Another 2.42% of the study population had unilateral pseudophakia/aphakia. About 13% of the eyes had no Intraocular lens (IOL). Only 45% of cataract operated eyes had good vision (vision of 6/18 or better) after surgery while over 24% had poor outcomes (vision of 6/60 or worse). However a quarter of the eyes with poor outcomes were the ones with no IOL, and 97% of all eyes that had good outcomes were from the IOL eyes - Table 9.

Table 9. Outcome after cataract surgery with available correction (eyes)

Outcomes category	Males		Females		Total	
	n	%	n	%	n	%
Good: can see 6/18	29	53.7%	49	41.1%	78	45.0%
Cannot see 6/18, can see 6/60	12	22.2%	40	33.6%	52	30.0%
Poor: cannot see 6/60	13	24.0%	30	25.2%	43	25%
Total	**54**	**100.0%**	**119**	**100.0%**	**173**	**100.0%**

The major causes of poor outcome were lack of spectacles or refractive correction (33.6%), selection (27.3%) – Table 10

Table 10. Cause of PVA<6/18 (borderline and poor outcome) after cataract surgery

	Cannot see 6/18, can see 6/60		Poor: cannot see 6/60		Total	
	n	%	n	%	n	%
Selection	10	19.2%	16	37.2%	26	27.4%
Surgery	10	19.2%	9	20.9%	19	20.0%
Spectacles	26	50.0%	6	13.9%	32	33.6%
Sequelae	6	11.5%	12	27.9%	18	19.0%
Total	**52**	**100.0%**	**43**	**100.0%**	**95**	**100.0%**

DIABETES AND DIABETIC RETINOPATHY

There were 444 people with either history of diabetes or new diagnosed diabetes in the study, giving a diabetic prevalence of 11.4% among the study population (Table 11). The prevalence was 10.3% in the rural areas and 13.5% in the urban areas.

14.2% of the diabetics were diagnosed during the survey while 85.8% of them were known diabetics. Amongst the newly diagnosed, about 2/3 were males.

Table 11. Prevalence of known and newly diagnosed diabetes by age group and by gender

Age Grps. (yrs)	Males		Females		Total	
	n	p (95% CI)	n	p (95% CI)	n	p (95% CI)
50 – 59	48	9.2% (6.7-11.7)	122	9.8% (8.1-11.5)	170	9.6% (8.2-11.1)
60 – 69	58	13.9% (10.8-17.0)	125	15.5% (12.8-18.1)	183	14.9% (12.8-17.1)
70 – 79	16	6.0% (3.3-8.7)	63	14.3% (10.4-18.2)	79	11.2% (8.6-13.7)
80+	6	9.1% (2.5-15.7)	6	5.3% (1.2-9.3)	12	6.7% (2.9-10.4)
All ages	**128**	**10.1% (8.5-11.6)**	**316**	**12.1% (10.6-13.6)**	**444**	**11.4% (10.2-12.6)**

Amongst all the diabetics about 55% had random blood sugar of less than 200mg/dl (11.1mmol/l) suggesting good blood sugar control; there was no significant difference between the sexes.

About 10.5% of all known diabetics are not using any treatment for the disease. About 60% of the known diabetics use tablets for control of the disease and 19.2% of them use insulin.

Diabetic Retinopathy

Among all the diabetics, 248 people (55.9%) had some form of retinopathy, maculopathy or both (Table 11). There were 243 (54.7%) people with any form of retinopathy and there were 161 (36.3%) people with maculopathy (Table 12). Sight threatening retinopathy (Grades R4 and or M2) was detected in 65 (14.6%) diabetics.

Table 12. Prevalence of DR in diabetics and in entire sample

DR Grading	Among diabetics		Full sample
	N	p (95% CI)	p (95% CI)
Retinopathy grade			
No retinopathy (R0)	195	43.9% (38.1-49.7)	5.0% (4.2-5.8)
Background DR - mild (R1)	157	35.4% (29.8-40.9)	4.0% (3.2-4.8)
Background DR - observable (R2)	52	11.7% (8.5-14.9)	1.3% (1.0-1.7)
Background DR - referable (R3)	17	3.8% (2.1-5.6)	0.4% (0.2-0.6)
Proliferative DR (R4)	11	2.5% (1.0-4.0)	0.3% (0.1-0.5)
Ungradable DR (R6)	6	1.4% (0.3-2.4)	0.2% (0.0-0.3)
Any retinopathy	243	54.7% (48.9-60.6)	6.3% (5.3-7.2)
Maculopathy grade			
No maculopathy (M0)	277	62.4% (56.8-67.9)	7.1% (6.2-8.1)
Maculopathy - observable (M1)	83	18.7% (14.2-23.2)	2.1% (1.6-2.7)
Maculopathy - referable (M2)	61	13.7% (10.5-17.0)	1.6% (1.2-2.0)
Any maculopathy	161	36.3% (30.6-42.0)	4.1% (3.4-4.9)
Any retinopathy and/or maculopathy	248	55.9% (49.9-61.8)	6.4% (5.4-7.4)
Sight threatening DR (R4 and/or M2)	65	14.6% (11.3-18.0)	1.7% (1.2-2.1)
Any laser scars	25	5.6% (3.6-7.6)	0.6% (0.4-0.9)

Amongst known diabetics about 30% have never had an eye examination for diabetic retinopathy, but over 54% have had an eye examination for diabetic retinopathy in the last one year - Table13.

Table 13. Last eye examination for DR among known diabetics

	Males		Females		Total	
	n	**%**	**n**	**%**	**n**	**%**
Never had eye examination for DR	32	32.3%	82	29.1%	**114**	**29.9%**
0-12 months ago	53	53.5%	153	54.3%	**206**	**54.1%**
13-24 months ago	2	2.0%	19	6.7%	**21**	**5.5%**
>24 months ago	12	12.1%	28	9.9%	**40**	**10.5%**
Total	**99**	**100.0%**	**282**	**100.0%**	**381**	**100.0%**

Diabetics and Blindness

Blindness prevalence is 1.6% among diabetics but 1.4% among non-diabetics, for SVI it is 2.5% versus 2.1%, for MVI it is 15.0% versus 12.7% among the diabetics and the non–diabetics, respectively - Table 14.

Table 14. Prevalence of MVI, SVI and blindness among people with and without diabetes

	Persons with diabetes		Persons without diabetes	
	n	**p (95% CI)**	**n**	**p (95% CI)**
Normal vision	359	80.9% (77.2-84.5)	2,877	83.8% (82.0-85.5)
MVI	67	15.0% (11.6-18.6)	435	12.7% (11.1-14.2)
SVI	11	2.5% (1.1-3.9)	73	2.1% (1.7-2.6)
Blindness	7	1.6% (0.5-2.7)	48	1.4% (1.0-1.8)
Total	**444**	**100.0%**	**3433**	**100.0%**

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Appendix 1

Moldova RAAB + DR survey Timetable

Date	District	Cluster name	Population	Urban- Rural	Team	Cluster No.	Comments
Thursday 17 May	Chisinau	Dumbrava	406	Rural	1	1	
	Chisinau	Hulboaca	1553	Rural	2	2	
	Raionul Anenii Noi	Troiţa Nouă	493	Rural	3	3	
Friday 18 May	Raionul Anenii Noi	Mereni	6174	Rural	1	4	
	Raionul Criuleni	Ratuş	1226	Rural	2	5	
	Raionul Criuleni	Răculeşti	1109	Rural	3	6	
Saturday 19 May	Free						
Sunday 20 May	Free						
Monday 21 May	Raionul Călăraşi	Păuleşti	1015	Rural	1	7	
	Raionul Călăraşi	Ţibirica	2431	Rural	2	8	
Tuesday 22 May	Raionul Hînceşti	Hînceşti	15281	Urban	1	10	
	Raionul Hînceşti	Buţeni	3512	Rural	2	11	
Wednesday 23 May	Raionul Hînceşti	Mireşti	915	Rural	1	13	
	Raionul Hînceşti	Voinescu	2762	Rural	2	14	
	Raionul Ialoveni	Horodca	1113	Rural	3	15	
Thurdsday 24 May	Raionul Ialoveni	Ruseştii Vechi	340	Rural	1	16	
	Raionul Leova	Cîzlar	183	Rural	2	17	
	Raionul Leova	Leova	10027	Urban	3	18	
Friday 25 May	Raionul Orhei	Orhei	25641	Urban	1	19	
	Raionul Orhei	Cihoreni	938	Rural	2	20	
	Raionul Orhei	Furceni	1280		3	21	
Saturday 26 May	Raionul Călăraşi	Călăraşi	14516	Urban	3	9	

Sunday 27 May	Raionul Hînceşti	Crasnoarmeiscoe	2359	Rural	3	12	
Date	District	Cluster name	Population	Rurla-Urban	Team	Cluster No.	Comments
Monday 28 May	Raionul Orhei	Pohorniceni	951	Rural	1	22	
	Raionul Sîngerei	Vrăneşti	697	Rural	2	23	
Tuesday 29 May	Raionul Sîngerei	Şestaci	19	Rural	1	25	
	Raionul Sîngerei	Sîngerei	12667	Urban	2	26	
Wdenesday 30 May	Raionul Ştefan Vodă	Tudora	2127	Rural	1	28	
	Raionul Teleneşti	Teleneşti	6855	Urban	2	29	
	Raionul Teleneşti	Crăsnăşeni	1298	Rural	3	30	
Thursday 31 May	Raionul Teleneşti	Flutura	278	Rural	1	31	
	Raionul Ungheni	Cornova	1129	Rural	2	32	
	Raionul Ungheni	Hristoforovca	570	Rural	3	33	
Friday 1 June	Raionul Ungheni	Ungheni	32530	Urban	1	34	
	Raionul Basarabeasca	Basarabeasca	11192	Urban	2	35	
	Raionul Basarabeasca	Abaclia	5519	Rural	3	36	
Saturday 2 June	Raionul Sîngerei	Cotiujenii Mici	1137	Rural	3	24	
	Raionul Sîngerei	Cotiujenii Mici	1137	Rural	3	24	
Sunday 3 June	Raionul Ştefan Vodă	Marianca de Jos	571	Rural	3	27	
Date	District	Cluster name	Population	Rural -Urban	Team	Cluster No.	Comments
Monday 4 June	Raionul Cantemir	Şofranovca	89	Rural	1	37	Add village
	Raionul Cantemir	Toceni	889	Rural	2	38	
Tuesday 5 June	Raionul Cahul	Borceag	1602	Rural	1	40	
	Raionul Cahul	Giurgiuleşti	2995	Rural	2	41	
Wednesday 6 June	Raionul Cahul	Cahul	35488	Urban	1	43	
	Raionul Donduşeni	Donduşeni	9801	Urban	2	44	
	Raionul Donduşeni	Rediul Mare	1150	Rural	3	45	
Thursday 7 June	Raionul Drochia	Gribova	2175	Rural	1	46	
	Raionul Drochia	Pelinia	7538	Rural	2	47	
	Raionul Floreşti	Unchiteşti,	121	Rural	3	48	Add village

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Friday 8 June	Raionul Floreşti	Căpreşti	837	Rural	1	49	
	Raionul Floreşti	Floreşti	13164	Urban	2	50	
	Raionul Glodeni	Limbenii Noi	1676	Rural	3	51	
Saturday 9 June	Raionul Dubăsari - rural	Corjova	2055	Rural	3	39	
Sunday 10 June	Raionul Cahul	Tartaul de Salcie	862	Rural	3	42	
Date	District	Cluster name	Population	Rural-urban	Team	Survey Cluster No.	Comments
Monday 11 June	Raionul Glodeni	Cajba	1671	Rural	1	52	
	Raionul Căuseni	Plop	276	Rural	2	53	
Tuesday 12 June	Raionul Căuseni	Căinari	4184	Urban	1	55	
	Raionul Nisporeni	Găureni	728	Rural	2	56	
Wednesday 13 June	Raionul Şoldăneşti	Climăuţii de Jos	1070	Rural	1	58	
	Raionul Şoldăneşti	Şipca	756	Rural	2	59	
	Raionul Briceni	Trestieni	522	Rural	3	60	
Thursday 14 June	Raionul Briceni	Mărcăuţii Noi	46	Rural	1	61	
	Raionul Cimişlia	Iurievca	526	Rural	2	62	
	Raionul Cimişlia	Topala	896	Rural	3	63	
Friday 15 June	Raionul Edineţ	Chetroşica Veche	817	Rural	1	64	
	Raionul Edineţ	Hancăuţi	1122	Rural	2	65	
	Raionul Edineţ	Edineţ	15624	Urban	3	66	
Saturday 16 June	Raionul Căuseni	Ursoaia Nouă	200	Rural	3	54	
Sunday 17 June	Raionul Nisporeni	Mileşti	3044	Rural	3	57	
Date	Distirct	Cluster name	Population	Rurla-Urban	Team	Survey Cluster No.	Comments
Monday 18 June	Raionul Făleşti	Bocani	1419	Rural	1	67	
	Raionul Făleşti	Doltu	1073	Rural	2	68	
Tuesday 19 June	Raionul Rezina	Buşăuca	1193	Rural	1	70	
	Raionul Rezina	Tarasova	584	Rural	2	71	

Wdenesday 20 June	Raionul Soroca	Cureşniţa	499	Rural	1	73	
	Raionul Soroca	Tolocăneşti	81	Rural	2	74	Add village
	Raionul Soroca	Soroca	28362	Urban	3	75	
Thursday 21 June	Raionul Străşeni	Lupa-Recea	499	Rural	1	76	
	Raionul Străşeni	Recea	2633	Rural	2	77	
	Raionul Străşeni	Bucovăţ	1313	Urban	3	78	
Friday 22 June	Raionul Taraclia	Tvardiţa	5882	Rural	1	79	
	U.T.A. Găgăuzia	Avdarma	3564	Rural	2	80	
	U.T.A. Găgăuzia	Chiriet-Lunga	2498	Rural	3	81	
Saturday 23 June	Raionul Făleşti	Bocşa	990	Rural	3	69	
Sunday 24 June	Raionul Rîşcani	Lupăria	237	Rural	3	72	
Date	District	Cluster name	Population	Rural-Urban	Team	Cluster No.	Comments
Monday 25 June	U.T.A. Găgăuzia	Comrat	23,327	Urban	1	82	
	U.T.A. Găgăuzia	Vulcăneşti	15,462	Urban	2	83	
Tuesday 26 June	Raionul Ocniţa	Corestăuţi	1,137	Rural	1	85	
	Raionul Ocniţa	Frunză	1,476	Urban	2	86	
Wdenesday 27 June	Municipiul Chişinău	sectorul Botanica	156,633	Urban	1	88	
	Municipiul Chişinău	sectorul Botanica	156,633	Urban	2	89	
	Municipiul Chişinău	sectorul Botanica	156,633	Urban	3	90	
Thursday 28 June	Municipiul Chişinău	sectorul Botanica	156,633	Urban	1	91	
	Municipiul Chişinău	sectorul Botanica	156,633	Urban	2	92	
	Municipiul Chişinău	sectorul Ciocana	101,834	Urban	3	93	
Friday 29 June	Municipiul Chişinău	sectorul Ciocana	101,834	Urban	1	94	
	Municipiul Chişinău	sectorul Ciocana	101,834	Urban	2	95	
	Municipiul Chişinău	sectorul Ciocana	101,834	Urban	3	96	
Saturday 30 June	U.T.A. Găgăuzia	Dudulești	45	Rural	3	84	Add village
Sunday 1 July	Municipiul Chişinău	Sîngera	7,354	Urban	3	87	
Date	District	Cluster name	Population	Rural-Urban	Team	Survey Cluster	Comments

						No.	
Monday 2 July	Municipiul Chişinău	sectorul Buiucani	107,744	Urban	1	97	
	Municipiul Chişinău	sectorul Buiucani	107,744	Urban	2	98	
Tuesday 3 July	Municipiul Chişinău	sectorul Centru	90,494	Urban	1	100	
	Municipiul Chişinău	sectorul Centru	90,494	Urban	2	101	
Wdenesday 4 July	Municipiul Chişinău	sectorul Rîşcani	132,740	Urban	1	103	
	Municipiul Chişinău	sectorul Rîşcani	132,740	Urban	2	104	
	Municipiul Chişinău	sectorul Rîşcani	132,740	Urban	3	105	
Thursday 5 July	Municipiul Chişinău	sectorul Rîşcani	132,740	Urban	1	106	
	Municipiul Bălţi	Bălţi	122,669	Urban	2	107	
	Municipiul Bălţi	Bălţi	122,669	Urban	3	108	
Friday 6 July	Municipiul Bălţi	Bălţi	122,669	Urban	1	109	
	Municipiul Bălţi	Bălţi	122,669	Urban	2	110	
	Municipiul Chişinău	Codru	14,277	Urban	3	111	
Saturday 7 July	Municipiul Chişinău	sectorul Buiucani	107,744	Urban	3	99	
Sunday 8 July	Municipiul Chişinău	sectorul Centru	90,494	Urban	3	102	

Appendix 2: Survey consent form

Participant information sheet: Survey of blindness and diabetic eye disease in Moldova

You are being invited to take part in a research study. Before you decide to take part, it is important for you to understand why the research is being done and what it will involve.

What is the purpose of the study?
We are conducting a survey to find out how many people in Moldova are blind and what the causes of blindness are. We would also like to find out how many people have eye problems that can be caused by diabetes. We hope this information will help the planning of eye care services in your region.

What will your participation involve?
You will have your eyesight checked and your eyes examined by a doctor. We will then do a finger prick blood test to see whether or not you might have diabetes. Should the test show you might have diabetes you will be given some eye drops so that the doctor can examine your eye in more detail to see if you have eye damage from diabetes. The eye drops may sting and be uncomfortable and blur your vision for a few hours, so that you will not be able to drive for the rest of the day. We will refer you for treatment if you have an eye problem or possible diabetes.

Why have I been chosen?
We have randomly selected 111 areas in whole of Moldova and are inviting all people aged over 50years in these areas to take part in the study. You have been chosen because your household is in one of these areas.

Confidentiality
All information which is collected about you during the course of the research will be kept strictly confidential and will not be shared with anyone else.

Do I have to take part?
No. It is up to you to decide whether or not to take part. If you decide to take part you are still free to withdraw at any time and without giving a reason.

Should you have any further questions about that are not answered here or have require any further information or explanation please contact:

Dr. Paduca Ala, State Medical and Pharmaceutical University “Nicolae Testemitanu”, Republic of Moldova. Email: paducaa@yahoo.com.

Moldova RAAB DR Survey Consent form

Date:……/……/2012

Cluster No:……..

Survey ID No.	Name	Signatures

Appendix 3

Check list

Visual acuity items

1. 2 Modified E charts
2. 2 pinholes, preferable with multiple holes
3. 2 ropes-measure for 6 and 3 meter
4. 3 pencils with erasers and sharpeners

Examination items

1. 1 pen torch + spare batteries
2. 1 direct ophthalmoscope + spare batteries
3. 1 indirect ophthalmoscope + extra charged battery

Forms and papers

1. Survey forms X 40
2. Consent forms X 40
3. Map of population unit divided in segments
4. Referral slips

Drugs

1. Basic drugs for treatment- Topical antibiotics , anti-allergy etc
2. Mydriatic drugs and Tropicamide X 3 eye drops

Blood Test items

1. 1 Blood glucose machine
2. 1 Lancet pen
3. Lancets for Blood sugar X 50 lancets
4. Aseptic alcohol swabs X 100 pieces
5. Cotton wool
6. Disposable box

Support materials

1. Identity card
2. Shoulder bag to carry all materials
3. 1 clipboard to hold the forms
4. Bottle of water

Appendix 4: Survey form

RAPID ASSESSMENT FOR AVOIDABLE BLINDNESS MOLDOVA

A. GENERAL INFORMATION

Survey area: Moldova | 0 1 | Cluster: | Year - month: 2 0 1 2 - | Individual no.:
Name: | Sex: Male: O (1) Female: O (2) | Age (years):

Residence
Rural O (1)
Urban O (2)

Examination status:
Examined: O (1) (go to B)
Not available: O (2) (go to E)
Refused: O (3) (go to E)
Not able to communicate: O (4) (go to E)

Always ask: "Did you ever have any problems with your eyes?" Yes: O (1) No: O (2)

B. VISION

Using distance glasses: No: O (1) Yes: O (2)
Using reading glasses: No: O (1) Yes: O (2)

Presenting vision	**Right eye**	**Left eye**
Can see 0.3	O (1)	O (1)
Cannot see 0.3 but can see 0.1	O (2)	O (2)
Cannot see 0.1 but can see 0.05	O (3)	O (3)
Cannot see 0.05 but can see 0.02	O (4)	O (4)
Light perception (PL+)	O (5)	O (5)
No light perception (PL-)	O (6)	O (6)

Pinhole vision	**Right eye**	**Left eye**
Can see 0.3	O (1)	O (1)
Cannot see 0.3 but can see 0.1	O (2)	O (2)
Cannot see 0.1 but can see 0.05	O (3)	O (3)
Cannot see 0.05 but can see 0.02	O (4)	O (4)
Light perception (PL+)	O (5)	O (5)
No light perception (PL-)	O (6)	O (6)

C. LENS EXAMINATION

	Right eye	**Left eye**
Normal lens / minimal lens opacity:	O (1)	O (1)
Obvious lens opacity:	O (2)	O (2)
Lens absent (aphakia):	O (3)	O (3)
Pseudophakia without PCO:	O (4)	O (4)
Pseudophakia with PCO:	O (5)	O (5)
No view of lens:	O (6)	O (6)

D. MAIN CAUSE OF PRESENTING VA<0.3
(Mark only one cause for each eye)

	Right eye	**Left eye**	**Principal cause in person**
Refractive error:	O (1)	O (1)	O (1)
Aphakia, uncorrected:	O (2)	O (2)	O (2)
Cataract, untreated	O (3)	O (3)	O (3) **(F)**
Cataract surgical complicatio	O (4)	O (4)	O (4)
Trachoma corneal opacity:	O (5)	O (5)	O (5)
Other corneal opacity:	O (6)	O (6)	O (6)
Phthisis:	O (7)	O (7)	O (7)
Onchocerciasis:	O (8)	O (8)	O (8)
Glaucoma:	O (9)	O (9)	O (9)
Diabetic retinopathy:	O (10)	O (10)	O (10)
ARMD:	O (11)	O (11)	O (11)
Other posterior segment:	O (12)	O (12)	O (12)
All globe/CNS abnormalities:	O (13)	O (13)	O (13)
Not examined (can see 0.3)	O (14)	O (14)	O (14)

E. HISTORY, IF NOT EXAMINED
(From relative or neighbour)

Believed	**Right eye**	**Left eye**
Not blind	O (1)	O (1)
Blind due to cataract	O (2)	O (2)
Blind due to other causes	O (3)	O (3)
Operated for cataract	O (4)	O (4)

F. WHY CATARACT OPERATION WAS NOT DONE
(Mark up to 2 responses, if VA<0.3, not improving with pinhole, with visually impairing lens opacity in one or both eyes)

Need not felt	O (1)
Fear for surgery or poor result	O (2)
Cannot afford operation	O (3)
Treatment denied by provider	O (4)
Unaware that treatment is possible	O (5)
No access to treatment	O (6)
Local reason (optional)	O (7)

G. DETAILS ABOUT CATARACT OPERATION

	Right eye	**Left eye**
Age at operation (years)		
Place of operation		
Government hospital	O (1)	O (1)
Voluntary / charitable hospital	O (2)	O (2)
Private hospital	O (3)	O (3)
Eye camp / improvised setting	O (4)	O (4)
Traditional setting	O (5)	O (5)
Type of surgery		
Non IOL	O (1)	O (1)
IOL implant	O (2)	O (2)
Couching	O (3)	O (3)
Cost of surgery		
Totally free	O (1)	O (1)
Partially free	O (2)	O (2)
Fully paid	O (3)	O (3)
Cause of VA<0.3 after cataract surgery		
Ocular comorbidity (Selection)	O (1)	O (1)
Operative complications (Surgery)	O (2)	O (2)
Refractive error (Spectacles)	O (3)	O (3)
Longterm complications (Sequelae)	O (4)	O (4)
Does not apply - can see 0.3	O (5)	O (5)

DIABETES AND DIABETIC RETINOPATHY

A. Diabetes Assessment (complete for everyone)

1 Have you ever been told by a doctor or nurse that you have diabetes, sugar in your urine or high blood sugar? No O (1) Yes O (2)

2 Action: Measure blood sugar | | | mmol/l | 3 Refused blood test O

B. Questions for known diabetics (i.e. said 'YES' to question A1)

4 What age were you when you were told you had diabetes? | | Years

5 Are you currently receiving treatment for diabetes? No
- If 'Yes', what type of treatment do you receive? Yes

No treatment O (1)
Diet O (2)
Tablets O (3)
Insulin O (4)
Tablets and insulin O (5)
Other O (6)

6 Before today, have you ever had your eyes examined because of your diabetes e.g. drops were put in your eyes before the examination or a photograph was taken of the back of your eye? No
- If 'Yes', when was the last time you had your eyes examined because of your diabetes? Yes

Not examined O (1)
0-12 months ago O (2)
13-24 months ago O (3)
>24 months ago O (4)

C. Diabetic retinopathy assessment Complete if known diabetic ('YES' to A1) or if blood sugar ≥200mg/dl

7 Examination method: dilatation and fundoscopy O (1), fundus camera O (2)
8 Refused dilation O
9 Refused fundus photograph O

10 **Retinopathy**	**Right Eye**	**Left Eye**
R0 (No visible retinopathy)	O (1)	O (1)
R1 (mild)*	O (2)	O (2)
R2 (observable background)*	O (3)	O (3)
R3 (referable)*	O (4)	O (4)
R4 (proliferative)*	O (5)	O (5)
R6 (Not adequately visualized)*	O (6)	O (6)

Reason not adequately visualised? _____

11 **Maculopathy**		
M0 (No maculopathy)	O (1)	O (1)
M1 (Observable)*	O (2)	O (2)
M2 (Referable)*	O (3)	O (3)
M6 (Not adequately visualized)*	O (4)	O (4)

12 **Laser photocoagulation scars**		
Laser scars absent	O (1)	O (1)
Scars present – pan retinal laser	O (2)	O (2)
Scars present – macular laser	O (3)	O (3)
Scars present – pan retinal and macular laser	O (4)	O (4)

*Refer if newly diagnosed/uncontrolled diabetes. Refer if any signs of retinopathy or if not visualized (R1-6/M1-6)

Appendix 5

Moldova RAAB DR Training and Survey

Thursday 10 May

900-1230pm

1. General Introduction
2. Blindness, visual impairment and their control
3. What is RAAB?
4. Why RAAB?
5. Methods of RAAB
   - Survey area selection
   - Sample size determination
   - Sampling :
   - Cluster sampling selection
   - Household selection- COMPACT SEGMENTING
   - Subjects selection
6. Data Collection Procedure: Examination protocol-

- General information,
- VA measurement,
- Ophthalmic measurement
- Other information

Lunch

130pm-400pm

7. Diabetics testing and DR assessment
8. Survey forms and coding instructions
9. Survey team composition, materials needed
10. Survey teams and supervision
11. Logistics arrangements (Ethics, Consent, Transport, Accommodation/feeding, Service e.t.c)

Friday 11 May

900-1230pm

1. Recapping yesterday
2. Introduction –DR presentation
3. Diabetes/ DR forms
4. Practical : Random blood sugar testing and safety measures

Ophthalmologists only – Dr Angela/Mansur

5. DR Training - (grading system, grading with indirect, -Scottish grading) – 60-90 mins

Lunch

130-4000pm

Ophthalmologists only – Dr Angela

6. Clinic: Examination of Diabetic patients in clinic

For nurses and optometrists

7. Visual acuity recording with and without pinhole
8. Clinic: Practice VA

Saturday 12 May

900-1230pm

Ophthalmologists only – Dr Angela/Mansur

1. DR Training continues -IOV assessment (based on grading of photos)- 90-120 mins- Dr Angela

All field staff

2. Exercise on filling forms -120 mins

Lunch

130-400pm

(For Data clerk)

3. Session RAAB software and DM/DR database:

Monday 14 May

900-1230pm

1. Introduction to IOV - 30 mins
2. Clinic: Standardization and Inter-observer variation (IOV)
   (Each group to examine 30-40 patients) - 120-150 mins

Lunch

130pm-400pm

1. Discussions on Standardization and IOV
2. Software download and basic navigation- Data entry, analysis

Tuesday 15 May

800-500pm

Pilot study- to visit 2 villages for field exercise

Wednesday 16 May

900-1230pm

Review of pilot study and logistics

- Cluster identification
- VA and eye examination
- Blood test and DR
- Fundus photography
- Form submission and feedback system

130-400pm

Concluding Session and Wrap-up

Thursday 17 May

Survey starts