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The North West Cameroon Disability Study

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Cover photo: Mothers wait with their children at village screening sessions

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For full and summary country reports for India and Cameroon respectively, and for further resources related to this study, visit http://disabilitycentre.lshtm.ac.uk

Accessible versions of all tables/figures are available upon request

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EXECUTIVE SUMMARY

Background

Few robust quantitative data on the magnitude and impact of disability on people's lives are available globally. Even amongst the limited evidence base that exists, different methodologies used in defining disability make comparison between countries and over time extremely difficult. These data are urgently needed to estimate the prevalence and impact of disability on people's lives, so as to plan appropriate, disability inclusive programmes, policies and societies.

Photo: Enumeration for the study

Aims and objectives

Aim:

To develop and test a best-practice population-based survey methodology (with nested case-control) to estimate the prevalence of disability in children and adults in Cameroon, and to compare the extent to which people with and without disabilities access key mainstream services and opportunities including health, education and livelihoods in North West Region, Cameroon.

Objectives:

1. Identify a population-based survey methodology that can assess prevalence of i)Visual, hearing, musculoskeletal impairment and depression; and ii)Self-reported Disability

2. In North West Region, Cameroon:

    i) To estimate the prevalence of impairment and disability
    ii) To explore the extent to which PWD access mainstream health, education, employment and livelihood opportunities in comparison to non-disabled peers
    iii) To identify factors that predict access to health, education, employment and livelihood amongst persons with disabilities
    iv) To Identify barriers and facilitators which mediate access to services

Methods

1. All-age Population-based survey of disability in Fundong Health District, North West Region, Cameroon
    a. Self-reported functional limitations
    b. Clinical screening for visual impairment, hearing impairment, musculoskeletal impairment and clinical depression (18+ only)
2. Nested case-control study of people with and without disabilities
    a. Impact of disability on access to health, education, livelihoods, participation etc.
    b. Availability of rehabilitation, inclusive education and assistive devices

Table A: Overall Prevalence of Disability												
	Total		0-17 years*		18-49 years		50+ years		Male		Female	
	n	% (95% CI)	N	% (95% CI)	n	% (95% CI)	N	% (95% CI)	N	% (95% CI)	n	% (95% CI)
Any disability	**373**	**10.5 (9.0-12.2)**	**91**	**4.7 (3.7-5.9)**	**68**	**6.9 (5.3-9.1)**	**214**	**33.6 (28.8-38.9)**	**144**	**9.9 (8.3-11.7)**	**229**	**10.8 (9.0-13.0)**
Self-Reported Limitation*	197	5.9 (4.7-7.4)	44	2.6 (1.8-3.6)	38	3.9 (2.7-5.6)	115	18.1 (13.9-23.1)	81	6.1 (4.8-7.6)	116	5.8 (4.4-7.7)
Any impairment or health condition	294	8.4 (7.5-9.4)	67	3.5 (2.7-4.4)	49	5.1 (3.7-6.5)	178	28.3 (24.8-31.9)	113	7.9 (6.5-9.3)	181	8.8 (7.6-10.0)
Vision impairment	82	2.3 (1.8-3.0)	8	0.4 (0.2-0.96)	5	0.5 (0.2-1.5)	69	10.9 (8.3-14.3)	36	2.5 (1.7-3.8)	46	2.2 (1.6-3.0)
Hearing impairment	127	3.6 (2.8-4.6)	22	1.1 (0.7-1.8)	11	1.1 (0.5-2.6)	94	15.0 (11.70-19.1)	44	3.1 (2.2-4.2)	83	4.0 (2.9-5.4)
Physical impairment	123	3.4 (2.7-4.4)	26	1.3 (0.8-2.3)	28	2.9 (1.9-4.3)	69	10.8 (8.3-14.0)	42	2.9 (2.1-4.0)	81	3.8 (3.0-4.9)
Epilepsy	25	0.7 (0.5-1.0)	12	0.6 (0.4-1.0)	11	1.1 (0.6-1.9)	2	0.3 (0.08-1.3)	9	0.6 (0.3-1.1)	16	0.8 (0.5-1.2)
Depression	7	0.2 (0.09-0.4)	-	-	4	0.4 (0.2-1.1)	3	0.5 (0.2-1.5)	4	0.3 (0.1-0.7)	3	0.1 (0.04-0.4)
Multiple impairments	**59**	1.7 (1.2-2.1)	1	0.05 (0-0.2)	8	0.8 (0.3-1.4)	50	7.9 (5.8-10.0)	19	1.3 (0.7-1.9)	40	1.9 (1.3-2.5)
*Any disability defined as any significant self-reported limitation or any moderate/severe clinical impairment or health condition												

Key findings:

1. Overall prevalence of disability in the North West Region, Cameroon is estimated at 10.5% (95% CI 9.0-12.2), with a slightly higher prevalence amongst women (10.8 vs. 9.9%).
2. Prevalence is strongly associated with age, ranging from 4.7% of children under 18, to 6.8% of adults aged 18-49 and 33.6% of adults aged 50+.
3. Overall prevalence of clinical impairments and/or disabling health conditions is 8.4% (95% CI 7.5-9.4), with significant increase by age (3.5% of children under 18, 5.1% of adults 18-49 and 28.3% of adults 50+).
4. Overall prevalence of blindness (VA<3/60 in the better eye) was 0.6% (95% CI 0.3-1.0), increasing to 2.4% (1.5-3.8) in the population 50+
5. Physical impairments (1.3%) and hearing impairments (1.1%) were the most common impairments/health conditions in children, followed by Epilepsy (0.6%) and vision impairment (0.4%).
6. Physical impairments (2.9%), Epilepsy (1.1%) and hearing impairments (1.1%) were most common amongst adults 18-49, followed by vision impairment (0.5%) and depression (0.4%).
7. In adults aged 50+, prevalence of hearing impairment was 15.0%, followed by vision impairment (10.9%), physical impairment (10.8%), depression (0.5% and epilepsy (0.3%).
8. There was a 0.05% prevalence of multiple impairments/health conditions amongst children under 18, 0.8% in adults 18-49 and 7.9% in adults over 50.
9. The prevalence of reported significant activity limitations was 5.9% (95% CI 4.7-7.4), and also increased significantly with age from 2.6% of children 2-17, to 3.9% of adults 18-49 and 18.1% of adults 50+.
10. 46% of participants identified as having a disability did not self-report significant functional limitations. Participants were more likely to report severe clinical impairments and physical impairments

11. Adults with disabilities were 3.6 times more likely never to have married, 3.7 times more likely not to have worked in the previous 7 days, and twice as likely to have had a serious health problem in the last 12 months than adults without disabilities
12. Adults with disabilities aged 18-49 were nearly 3 times more likely to be in the poorest quarter than adults without disabilities, whilst there is no relationship between poverty and disability amongst adults aged 50+
13. Children with disabilities were almost 20 times less likely to be in school compared to children without disabilities and amongst those enrolled, almost 3 times more likely to have repeated a grade. They were also twice as likely to have experienced a serious health condition in the last 12 months.
14. Significant participation restrictions and environmental barriers were experienced by children and adults with disabilities of all ages compared to those without disabilities in areas such as domestic life and going to school or work, but the difference between means lessened with age, suggesting participation restrictions are experienced by people with and without disabilities aged 50+
15. Awareness of and access to rehabilitation and assistive devices amongst people with disabilities was very low, with 3% having ever previously received any medical rehabilitation and 5% having received an assistive device.

Conclusions

The study has shown that the prevalence of disability in North West Cameroon is much higher than previous studies have estimated[1]. The figures suggest that disability is strongly associated with ageing but that the prevalence amongst children and younger adults is also important. Moreover, the impact of disability is particularly strong amongst children and young adults. People with disabilities of all ages are at greater risk of serious health problems, and awareness of and access to rehabilitative services and assistive devices is low.

Recommendations for Cameroon Disability Inclusion

The following use of the study findings is recommended to policy makers, service providers and other disability advocates and stakeholders:

1. To raise awareness of the prevalence of disability in North West Cameroon and Cameroon in general, and specifically the large prevalence of disability and multiple impairments amongst adults aged 50+
2. To advocate strongly for greater inclusion of children with disabilities in education in North West Cameroon and particularly to ensuring appropriate methods of education that allow disabled children to progress through school
3. To advocate for better access to health and rehabilitative services amongst children and adults with disabilities in North West Cameroon, including linking people with disabilities to available services (including SEEPD programme and Mbingo Baptist Hospital of the Cameroon Baptist Convention Health Services) and greater community outreach and support
4. To intensify efforts and advocacy for inclusive societies and services that alleviate the restrictions in participation felt by people with disabilities including barriers in the built and natural environment
5. To understand the differences in estimates derived from different methodologies of disability measurement, and the most appropriate measures for programs and surveys.

Practical Recommendations on disability data collection:

1. Self-Reported tools that measure activity limitation are the most appropriate and resource efficient way to measure disability in a population or within a program or project.
2. Moderate clinical impairments may not be captured using this method, so we recommend that all participants who report even “some” limitation in a particular domain should also undergo a simple clinical screen
3. Measures of participation should also be included to fully capture disability.

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INTRODUCTION

Background

People with disabilities are often perceived to be among the most marginalized and vulnerable members of society, experiencing substantial inequalities or barriers to accessing many important areas of life including mainstream and rehabilitative health, education, livelihood opportunities and social inclusion.

Few robust quantitative data on disability are available globally.

Reliable statistics on the magnitude and impact of disability are important 1)) to raise awareness of the impact of disability and promote full inclusion of persons with disabilities in Cameroon and 2)for planning appropriate, inclusive programs and services for people with disabilities. This is to achieve the goals set out in the United Nations Convention on the Rights of Persons with Disabilities (UN CRPD)[2] which was signed by Cameroon in 2008.

Disability Measurement

The prevailing methodology for disability measurement is via surveys, and there are a number of different approaches to this that focus on different components within disability. Figure 1 presents the International Classification of Functioning, Disability and Health (ICF) Model. This model views disability as the interaction between health conditions and/or impairments in body function and structure, activity limitations caused by the impairment/health condition and the impact on the individual's participation. The relationship between these components is mediated by environmental, personal and contextual factors.

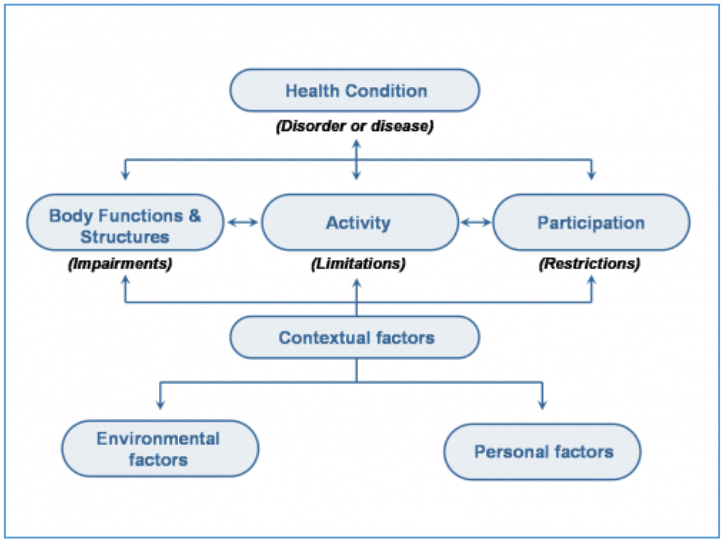


Fig 1: ICF Framework of disability
Source: Rehab-scales.org

Photo: Testing Visual Acuity

Measurement of disability tends to focus on a particular component within the ICF.

Impairments: One approach is to measure specific impairments in body function or structure using objective criteria. Members of ICED have previously been instrumental in developing epidemiological methods for assessment of the prevalence of i) hearing, ii) visual and iii) musculoskeletal impairment [3-5]. Impairment alone is an inadequate proxy for disability since people with the same impairment can experience different types and degrees of activity limitation and participation restriction, depending on the context. However impairment data is essential for planning appropriate and inclusive services amongst competing needs and scare resources.

Activity Limitations: A second approach is self-reported assessment of activity limitations in core domains of function. Domains may include such areas as seeing, hearing, walking, communicating, pain or fatigue, and can be assessed across a severity scale. This approach maximises the information that can be collected at low cost over large populations, and can be aggregated to estimate functioning levels and characteristics across the population[6, 7].

Participation: Several tools have been developed to assess restrictions to participation imposed on the individual by environmental, contextual and personal factors[8].

No previous studies have been undertaken to understand how these concepts inter-relate.

The recent World Report on Disability identified the lack of agreement on the best way to measure disability as a major gap and highlighted the need to develop methods to generate statistics on disability compatible with the World Health Organisation's International Classification of Functioning, Disability and Health framework[9]. This project aims to address this gap through development of a new comprehensive disability survey methodology that includes self-reported measures, impairment measures and participation measures of disability. The project will use this methodology to assess the magnitude and impact of disability in North West Cameroon.

Disability in North West Cameroon

The Cameroon Demographic and Health survey and the Multiple Indicator cluster Survey DHS-MICS 2011 found that 5.4% of the population had at least one disability[10]. A study by Cockburn et al. in North West Cameroon in 2010 also estimated a disability prevalence in the region of 6.2%, although the authors used a screening question which may have led to under-reporting[11].

Robust local data are needed on the magnitude of disability, the extent to which people with disabilities are accessing mainstream services and factors that influence this in order to plan appropriate and accessible services and full inclusion of people with disabilities.

Definitions

The study defines a person with a disability as per the United Nations Convention on the Rights of Persons with Disabilities (UN CRPD):

People with disabilities include those who have long-term physical, mental and intellectual or sensory impairments which in interaction with various attitudinal and environmental barriers may hinder their full and effective participation in society on an equal basis with others[2].

STUDY AIMS AND OBJECTIVES

Overall Study Aim

To develop and test a best-practice population-based survey methodology to estimate the prevalence of disability in children and adults in Cameroon, and to compare the extent to which people with and without disabilities access key mainstream services and opportunities including health, education and livelihoods in North West Region, Cameroon.

Study Objectives

1. Develop a population-based survey methodology to assess prevalence of i)Visual, hearing, musculoskeletal impairment and depression; and ii)Self-reported Disability

1. In North West Region, Cameroon:

    i) Estimate the prevalence of disability (impairments and activity limitations).
    ii) Explore the extent to which people with disabilities access mainstream health, education, employment and livelihood opportunities in comparison to non-disabled peers and their experiences of participation
    iii) Identify factors that predict access to health, education, employment and livelihood amongst persons with disabilities
    iv) Identify barriers and facilitators which mediate access to services

This study is part of a two country study that also includes India. Please visit the ICED website to download the India Report and other resources related to the wider study: http://disabilitycentre.lshtm.ac.uk

METHODS

Study setting

The study was conducted in Fundong Health District of North-West Region, Cameroon (estimated population size: 125,604). Fundong Health District was selected due to its proximity to several health and rehabilitative service providers, and due to English being the primary language in the region.

The study worked in partnership with service providers, policy makers and research institutes including the Cameroon Baptist Church and SEEPD Cameroon.

Study Design

The study consisted of an all-age population-based random sample, with nested case-control and a qualitative component.

1. Population-based survey:

All survey participants were a) interviewed for self-reported functional limitations and (aged 18+) depression b) screened for visual, hearing and musculoskeletal impairments (all ages). All participants screening positive for clinical impairments were further examined by clinical personnel to determine cause and referred for appropriate health and rehabilitative interventions.

A conservative estimate of 4% disability prevalence, based on previous studies, was used to calculate the sample size for the population-based study. Assuming a precision of 20%, 95% confidence, a design effect of 1.5 and 20% non-response, a sample size of 4056 was calculated. This translated into 51 clusters of 80 people (4080).

2. Nested Case-Control study:

All participants aged ≥5 years who screened positive to either self-reported functional limitations or clinical impairments ('cases') were invited to participate in the nested case-control study. For each case, one age, gender and cluster matched control without a disability was also selected. Cases and Controls were interviewed about socio-demographics, poverty, livelihoods, education, health, water and sanitation, activities and participation. Cases were also asked about perceived cause and history of disability and access to and awareness of rehabilitation services, assistive devices and rights.

An additional one adult and two children with disabilities per cluster were identified via case-finding to ensure that the sample size was sufficient for the nested case-control study to observe differences between cases and controls.

3. Qualitative study:

30 participants identified with disabilities from the population-based sample and the nested case control, plus 14 key informants, were interviewed using a semi-structured questionnaire for the qualitative component. The results of this component of the study are reported separately.

Project preparation

A scoping review of the literature to identify self-reported disability tools that have been used in, or been developed for, population-based surveys in LMIC's was undertaken. The Washington Group Extended Set on Functioning for adults, and the Washington Group/UNICEF Draft Child Functioning Tool were selected for use in the survey.

Stakeholders from national, regional and local constituencies, and representatives of civil society were approached for written approval of the study and input into final study design.

Cognitive testing of the questionnaires was carried out to assess feasibility and understanding, as well as a pilot of the full protocol with 30 local participants. The cognitive testing resulted in a small number of changes to improve clarity of wording, and several questions (n=~4) deemed context-irrelevant were removed.

The primary language in the study site is English, whilst the population also speak two local languages – Pidgin English and Nkom. The quality of the verbal translation into these languages was assessed for each interviewer: the interviewer asked the question in the local language and an independent person translated this back into English. Differences were note and discussed, and a phonetic phrase-sheet of standard translations of terms (e.g. depression, anxiety, assets) was developed to ensure consistency.

Team Recruitment and Training

Three field teams were recruited and each composed of the following:

- 2 Enumerators
- 3 Fieldworkers
- 2 Interviewers
- 1 Ophthalmic Nurse
- 1 Orthopaedic clinical officer
- 1 ENT nurse
- 2 Drivers + 2 Cars

Field team members underwent an intensive 9 day training on disability awareness and project protocols and methods prior to Pilot Testing.

Photo: One of the study teams

Selection of Clusters

Clusters were selected using probability proportionate-to-size sampling, whereby clusters (villages) are selected at cumulative population intervals based on total population size and requisite number of clusters. The Cameroon Census 2005 data was used as the sampling frame. 80 participants were enumerated per cluster. Within clusters, participants were selected using compact segment sampling conducted by enumerators 1-2 days before the survey. Using existing maps or sketch maps drawn by community members, clusters were divided into segments of approximately 80 people. One segment was then selected at random for inclusion in the survey.

Community Sensitisation, Enumeration and Participant Eligibility

Enumerators first visited the village leader in selected clusters to inform them about the survey and request permission.

A village guide then accompanied the enumerators to the selected segment. At each household, enumerators explained the study purpose and protocol to the household head or an eligible, adult key informant.

If the household head/adult key informant agreed to participate, the enumerator recorded the age, gender and relationship to the household head of all eligible household members[1].

A GPS point-reading and basic observed socio-economic indicators were also recorded.

Photo: Village elders drafting a sketch map of the cluster in the clay

All eligible household members were then invited to attend the survey screening at a central village location over the following two days. Enumerators visited each house within the segment door-to-door until 80 eligible participants had been recorded. Participants unable to physically attend the screening were screened in their homes.

[1] Eligible household members were defined as any person, any age, who 1) had stayed in the house at least six months of the last year 2) ate shared meals and 3) did not pay rent.

Population-Based Survey

All participants were given information about the study and asked to give signed written/finger print consent. A caregiver was also asked to provide consent for participants under 21 years and remain present throughout the screening process.

All participants (>2 years) underwent screening for self-reported functional limitation, followed by clinical screening (all ages) for vision, hearing, musculoskeletal impairment (MSI) and epilepsy. Participants aged 18+ were also screened for clinical depression. Protocols for each screen are described in Table 1. For the full screening questionnaire and protocol flow chart, refer to Appendix 2 and 3.

Proxy respondents were used for all self-reported screens for children aged <8 years and people unable to communicate.

Basic medicines were distributed by clinical team members where appropriate, and all participants with unmet health needs were referred to relevant services. All participants identified to have a disability were also referred to the local CBR programme.

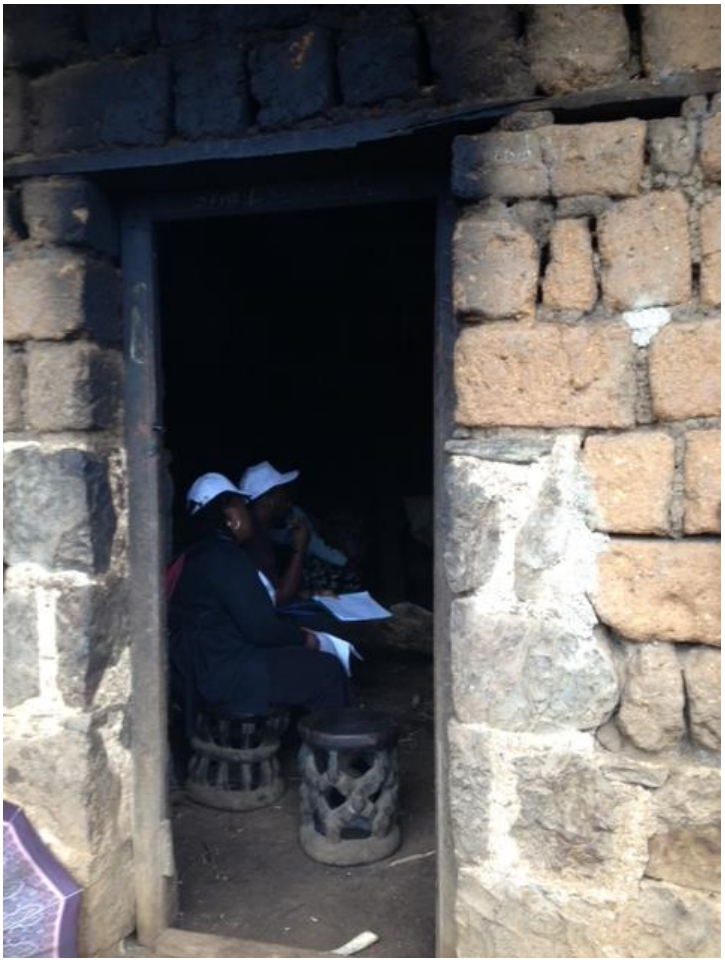


Photo: House visits to those unable to attend screening

Table 1: Screening Protocol				
	Tool	**Age**	**Screen Protocol**	**Examination**
Self-reported functional limitation	Washington Group/UNICEF child functioning module	2-7 8-17	Proxy respondent interviewed on behalf of the child on child's functioning (14 questions) Child interviewed directly on their functioning (14 questions)	No examination
	Washington Group Extended Set on Functioning for Adults (ES-F)[12]	≥18	Screening Questions on self-reported functional limitations and severity of limitation (12 Questions)	No examination
Visual Impairment	Rapid Assessment of Avoidable Blindness[2][13]	0-2 2-4 ≥5	Fix and Follow Finger counting VA testing in both eyes using tumbling 'E' chart with 6/18 and 6/60 optotypes. Pinhole testing for all eyes with V/A <6/18	All participants aged ≥5 years with VA <6/18 in either eye or children <5 years who failed the screen were examined by an ophthalmic nurse using a torch ligt and adirect ophthalmoscope to establish main cause of vision loss.
Hearing Impairment	WHO/PBD Ear and Hearing Disorders Examination protocol[3]	0-3 ≥4	Oto-Acoustic Emission Testing Oto-Acoustic Emission Testing and Pure Tone Audiometry	Participants with average hearing loss >35dBa (4-17years) or >41dBa (≥18 years) in either ear examined by an ENT nurse using an otoscope to determine cause and actions needed.
Musculoskeletal impairment and Epilepsy	Rapid Assessment of Musculoskeletal Impairment (RAM)[5]	0-7 ≥8	Screening Questions on the musculoskeletal system, use of aids and history of seizures directed to proxy respondent (7 Questions) Screening Questions on the musculoskeletal system, use of aids and history of seizures (7 Questions)	Any participant answering yes to at least 1Q examined by on orthopaedic clinical officer. Exam protocol included standardised observation of activities, physical examination, history, diagnosis, aetiology, severity and referral information
Clinical Depression	Patient Health Questionnaire (PHQ9)	≥18	Screening Questions on symptoms and severity (9 Questions)	No examination

[2] The RAAB was initially developed for use in ≥50 year olds and modified for this study with expert input to ensure suitability across all ages

Nested Case-Control Study

All participants ≥5 who screened positive via any of the above screening methods ('cases') were invited to participate in the nested case-control study.

Alongside cases identified via the population-based survey, a further 1 adult and 2 children with disabilities per cluster were identified through case finding, to ensure adequate sample size for the case-control study. Additional cases were identified via key informants from neighbouring segments within the cluster selected for the population survey.

For every case identified, one age, sex and cluster matched control without a disability was also selected from the population-based sample. Controls and cases were matched by age (±3 year for children 5-17 years; ±10 years for adults≥18 years).

i) Eligibility for nested Case-Control study

Cases for the case-control study were restricted to participants aged ≥5years with moderate or severe self-reported limitations or clinical impairments, as defined by international standards and recommendations. Eligibility across the 5 screening tools is outlined in Table 2.

Table 2: Eligibility for Case-Control Study

Self-reported functional limitation	Response of "a lot of difficulty" or "cannot do at all" in at least one of the following domains: seeing, hearing, walking, self-care, understanding, being understood, learning, remembering
	Response of "a lot of difficulty" or "cannot do at all" in at least one of the following domains: seeing, hearing, walking or climbing steps, understanding, being understood, remembering, concentrating, self care, upper body strength, fine motor dexterity
Vision	Visual Acuity <6/18 in better eye
Hearing	Age 5-17: OAE failure in both ears and PTA reading >35dBa in both ears Aged ≥18: OAE failure in both ears and PTA reading >41dBa in both ears
MSI	Diagnostic Case Confirmation of moderate or severe MSI or epilepsy, based on activity observation and physical examination
Depression	Composite score of 19 or higher

Sex and age matched controls were picked randomly from amongst enumerated participants in the cluster in which no members of the household met the criteria in Table 2.

Modules of the case-control questionnaire included: Socioeconomic indicators, Water and Sanitation, Education (aged <17) Marital Status, Literacy, Education and Livelihood (≥ 18), Health and Antenatal Care, Activity Limitations and Participation Restrictions, Environment

A disability Specific module for cases only included questions on access to/ knowledge of assistive devices, rehabilitative services, inclusive education, inclusive Water and Sanitation and disability benefits.

Referrals and Follow Up

Medical and rehabilitative referral services (including community-based rehabilitative services) available in the region were mapped pre-emptively and contacted to guarantee support. Clinical team members provided referrals to partner organisations as appropriate. All identified cases in the study, regardless of health or other need, were given information about the local Community-Based Rehabilitation program (SEEPD) for additional support in education, livelihoods, benefits etc.

Follow up support was provided at the end of the study, with field teams re-contacting all participants who had been offered medical and rehabilitative referrals to provide additional information and logistical support.

Data entry and analysis

The Screening Questionnaire results were 1) checked by the team leader for completion in each cluster 2) checked by the project coordinator. Data was double entered into a purpose-built Microsoft Access Database by two trained Data Entry Clerks.

The Case-Control Questionnaire was administered using ASUS Google Nexus 7 tablets. Data collected on each tablet was transferred daily via wifi connection to a cloud based server, with results backed up weekly onto a secured portable hard drive.

Data from both the Screening Questionnaire and the Case-Control Questionnaire were merged in STATA 12.0 for analysis.

Ethical approval

Ethical Approval for the study was granted by:

- The London School of Hygiene and Tropical Medicine (London, UK)
- National Ethics Committee for Research in Human Health (CNERSH, Cameroon)
- Cameroon Baptist Convention Health Board Institutional Review Board (Cameroon)

Administrative Authorisation was issued by the Ministry of Health (Cameroon)

RESULTS

Study population and demographics

4,080 people (51 clusters of 80 people) were enumerated for the population-based survey, of whom 3,567 were screened (response rate 87%). Table 3 shows the age and gender breakdown of the study participants in relation to the most recent Cameroon Census results. Women were slightly oversampled in the study (59% of the study sample and 52.1% of the district population estimate. Estimates given throughout the results section are disaggregated by gender.

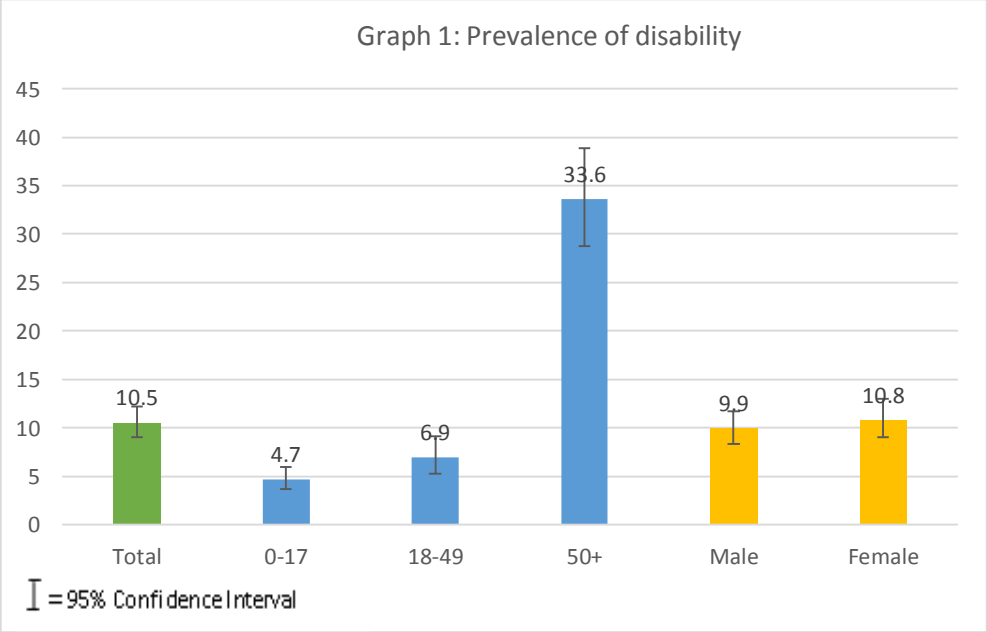
Table 3: Study Population

	Males		Females		Total	
Age group	**Region***	**Study sample**	**Region**	**Study sample**	**Region**	**Study sample**
0-9	285644 (31.4%)	609 (42%)	279340 (28.2%)	630 (30%)	564984 (29.7%)	1,239 (35%)
10-19	258047 (28.4%)	399 (27%)	257261 (26.0%)	423 (20%)	515308 (27.1%)	822 (23%)
20-29	136854 (15.0%)	77 (5%)	174712 (17.6%)	307 (15%)	311566 (16.4%)	384 (11%)
30-39	83977 (9.2%)	70 (5%)	107390 (10.8%)	197 (9%)	191367 (10.1%)	267 (7%)
40-49	55672 (6.1%)	67 (5%)	70492 (7.1%)	152 (7%)	126164 (6.6%)	219 (6%)
50-59	38749 (4.3%)	61 (4%)	47397 (4.8%)	146 (7%)	86146 (4.5%)	207 (6%)
60-69	28845 (3.2%)	60 (4%)	32158 (3.2%)	127 (6%)	61003 (3.2%)	187 (5%)
70-79	15709 (1.7%)	66 (5%)	14930 (1.5%)	86 (4%)	30639 (1.6%)	152 (4%)
80+	6436 (0.7%)	46 (3%)	6934 (0.7%)	44 (2%)	13370 (0.7%)	90 (3%)
Total	**909933 (47.9%)**	**1455 (40.8%)**	**990614 (52.1%)**	**2122 (59.2%)**	**1900547 (100%)**	**3,567 (100%)**
*Cameroon Census 2005 demographic projection for North West Region 2014						

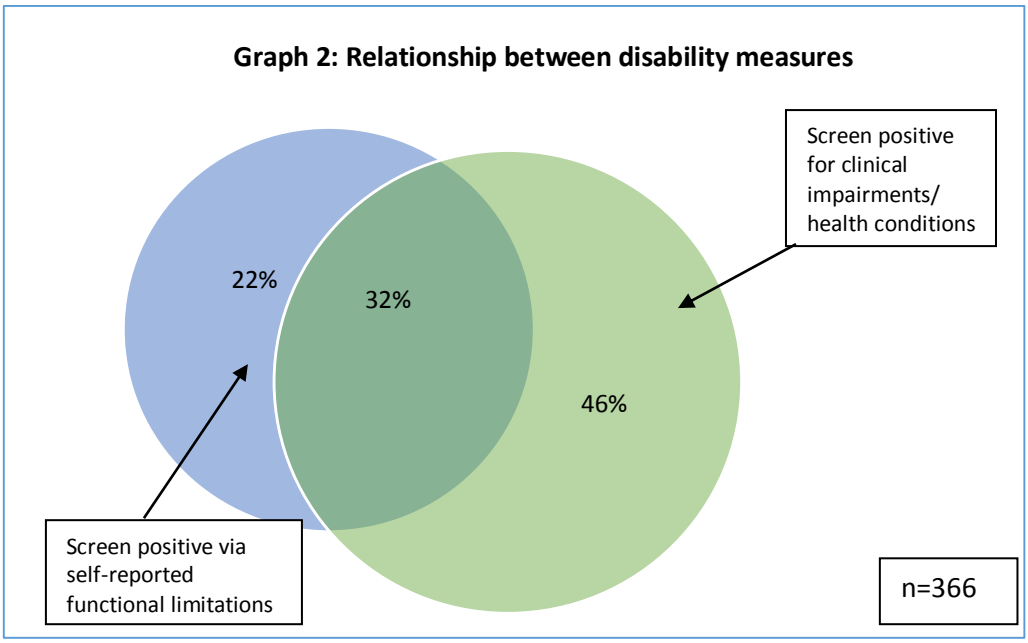
Prevalence of Disability

Disability was defined in the sample as any participant reporting a significant limitation in functioning in any basic activity domain, or screening positive for any moderate or severe clinical impairment, epilepsy or depression (refer back to Table 1).

The overall disability prevalence estimate for the sample was 10.5% (95% CI 9.0-12.2). Disability was slightly higher in women than men (10.8% vs 9.9%) and increased significantly with age from 4.7% of 0-17 year olds, to 6.8% of 18-49 year olds and 33.6% of those aged 50 and above – see Table 20 in Appendix for full estimates and Graph 1 below.



Graph 2: Relationship between disability measures

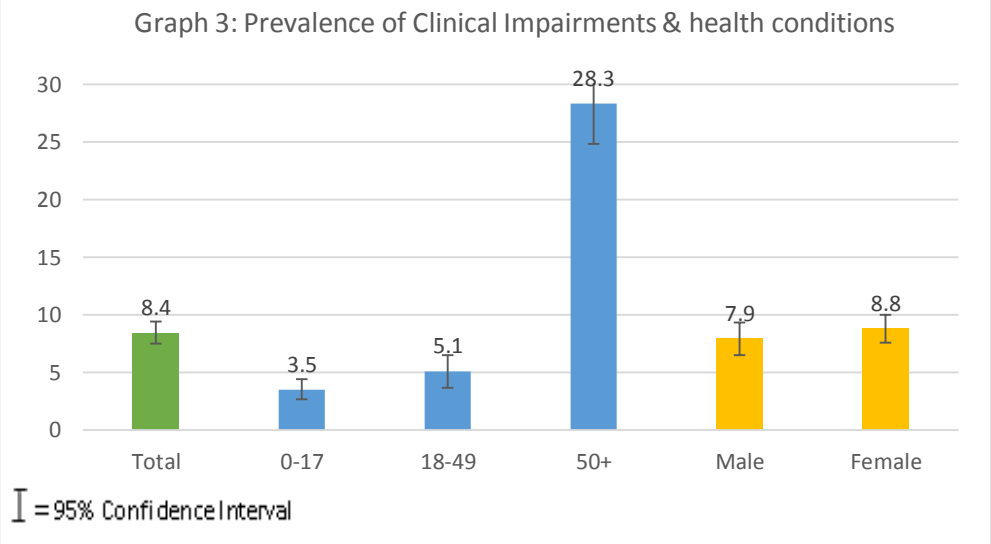


Amongst those identified to have a disability, 32% both self-reported a limitation and screened positive for a clinical impairment or health condition, 46% screened positive for a clinical impairment but did not self-report a limitation and 22% reported a functional limitation and did not screen positive for a clinical impairment (Graph 2). 7 children aged 0-1 identified to have clinical impairments are excluded from this cohort because the self-reported tool cannot be administered to children under the age of 2.

The results over the following pages show disaggregated data 1) amongst those reporting significant limitations in functioning 2) those screening positive for any moderate or severe clinical impairments, epilepsy and depression 3) on the relationship between the two measures.

Prevalence of clinical Impairments and disabling health conditions

8.4% (95%CI 7.5-9.4) of the study sample screened positive for a moderate or severe clinical impairment in vision, hearing or musculoskeletal impairment (MSI); Epilepsy or clinical depression. There was no significant difference by gender but a pronounced increase by age from 3.5% of children 0-17 to 28.3% of adults aged 50+ (Graph 3).



Across all age groups, the most prevalent impairment types were moderate or severe bilateral hearing impairment (3.6%), moderate or severe MSI (3.4%), moderate or severe bilateral visual impairment (2.3%). 1.7% of the sample screened positive for multiple impairments, 0.7% for epilepsy and (amongst adults only) 0.2% for clinical depression (Table 4, below).

Table 4: Prevalence and Severity of Impairments and health conditions

	Total		0-17 years*		18-49 years		50+ years	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any clinical impairment/ disabling health condition	294	8.4 (7.5-9.4)	67	3.5 (2.7-4.4)	49	5.1 (3.7-6.5)	178	28.3 (24.8-31.9)
Any vision impairment	82	2.3 (1.8-3.0)	8	0.4 (0.2-0.96)	5	0.5 (0.2-1.5)	69	10.9 (8.3-14.3)
Hearing impairment~	127	3.6 (2.8-4.6)	22	1.1 (0.7-1.8)	11	1.1 (0.5-2.6)	94	15.0 (11.70-19.1)
Physical impairment	123	3.4 (2.7-4.4)	26	1.3 (0.8-2.3)	28	2.9 (1.9-4.3)	69	10.8 (8.3-14.0)
Epilepsy	25	0.7 (0.5-1.0)	12	0.6 (0.4-1.0)	11	1.1 (0.6-1.9)	2	0.3 (0.08-1.3)
Depression (>17 only)	7	0.2 (0.09-0.4)	-	-	4	0.4 (0.2-1.1)	3	0.5 (0.2-1.5)
Multiple impairments	59	1.7 (1.2-2.1)	1	0.05 (0-0.2)	8	0.8 (0.3-1.4)	50	7.9 (5.8-10.0)

~ 29 participants failed the OAE test in both ears but did not undergo PTA assessment [3]

Clinical impairments in vision, hearing and MSI were graded based on international classifications and recommendations (see Appendix 2 for definitions). Impairments graded as “moderate”, “severe” or “profound” were included in disability estimates. Table 5 below presents the prevalence of vision, hearing and musculoskeletal impairments by severity and age. Profound and severe impairments were less prevalent than moderate impairments across all three impairment types.

[3] For the overall prevalence estimates we assumed these participants had a hearing impairment based on failing OAE test in both ears. For the severity estimates, we excluded those with missing PTA data and restricted the analysis to people aged ≥4 years.

Table 5: Prevalence and Severity of Impairments								
	Total		0-17 years*		18-49 years		50+ years	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any clinical impairment/ disabling health condition	294	8.4 (7.5-9.4)	67	3.5 (2.7-4.4)	49	5.1 (3.7-6.5)	178	28.3 (24.8-31.9)
Any vision impairment*	82	2.3 (1.8-3.0)	8	0.4 (0.2-0.96)	5	0.5 (0.2-1.5)	69	10.9 (8.3-14.3)
Moderate	55	1.9 (1.3-2.6)	6	0.4 (0.2-01.1)	3	0.3 (0.07-1.3)	46	7.2 (5.1-10.2)
Severe	10	0.3 (0.2-0.6)	2	0.1 (0.04-0.6)	0	0	8	1.3 (0.6-2.7)
Blind	17	0.6 (0.3-1.0)	0	0	3	0.2 (0.05-0.8)	14	2.4 (1.5-3.8)
Hearing impairment* ~	127	3.6 (2.8-4.6)	22	1.1 (0.7-1.8)	11	1.1 (0.5-2.6)	94	15.0 (11.70-19.1)
Moderate	76	2.5 (1.9-3.2)	4~	0.3 (0.1-0.6)	2	0.2 (0.05-0.8)	70	11.0 (8.3-14.5)
Severe	15	0.5 (0.3-0.8)	0	0	0	0	15	2.4 (1.4-4.0)
Profound	9	0.3 (0.1-0.6)	3~	0.2 (0.07-0.6)	1	0.1 (0.01-0.8)	5	0.8 (0.3-1.8)
Physical impairment	123	3.4 (2.7-4.4)	26	1.3 (0.8-2.3)	28	2.9 (1.9-4.3)	69	10.8 (8.3-14.0)
Moderate	113	3.2 (2.5-4.0)	24	1.2 (0.7-2.1)	24	2.4 (1.6-3.8)	65	10.2 (7.8-13.3)
Severe	10	0.3 (0.2-0.5)	2	0.1 (0.03-0.4)	4	0.4 (0.2-1.1)	4	0.6 (0.2-1.7)

* Severity Estimates for vision restricted to >4 years and for hearing >3 years as children under these ages are unable have the severity of their impairment tested.
~ 29 participants failed the OAE test in both ears but did not undergo PTA assessment [4]

Cause of clinical impairments

Vision Impairments

Posterior segment disease was the most common cause of vision loss across all ages (41%), followed by untreated cataract (31%) and refractive errors (29%). The cataract surgical coverage (CSC, proportion of all cataract patients or eyes that have received cataract surgery) was high. Assuming only people with VA<6/60 are operated on, 87% of people and nearly two-thirds of eyes (61%) had received surgery.

Hearing Impairment

The cause of 38% of diagnosed hearing impairments in the study was unknown. 31% of hearing loss was caused by impacted wax, much of which was treatable by the study team, and 23% was age-related.

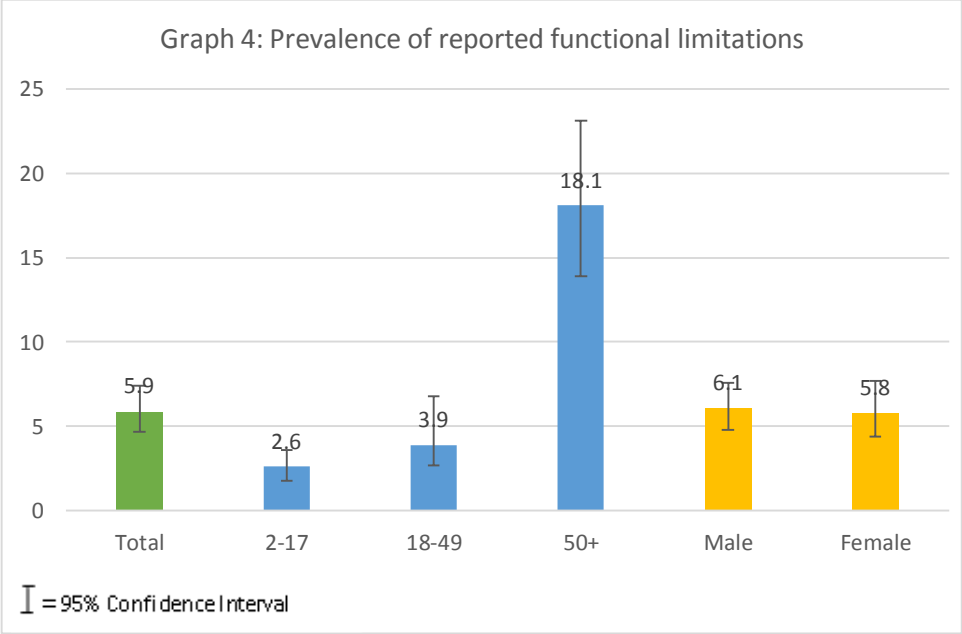
Musculoskeletal impairment:

[4] For the overall prevalence estimates we assumed these participants had a hearing impairment based on failing OAE test in both ears. For the severity estimates, we excluded those with missing PTA data and restricted the analysis to people aged ≥4 years.

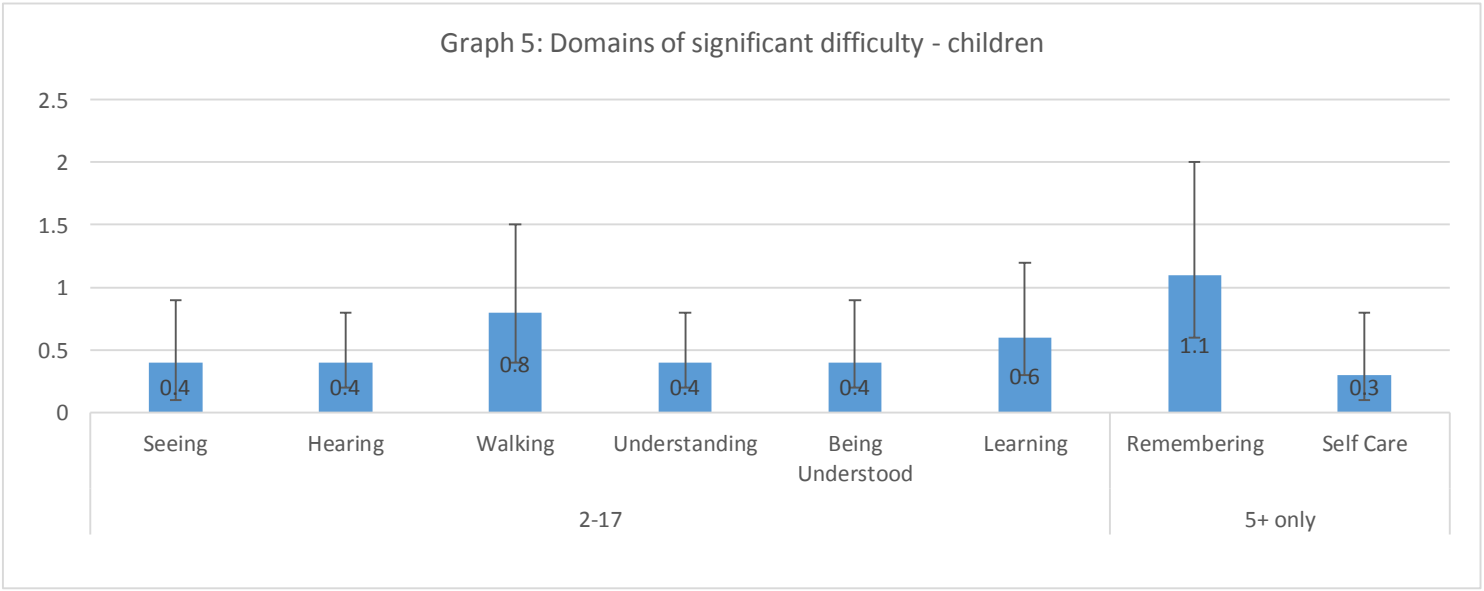
Cause was unknown for just over one third (38%) of participants identified with moderate or severe MSI. Nearly a fifth (21%) was due to trauma, 12% was congenital (without family history) and 11% was due to infection. Other aetiologies, including Neoplasm (2%) family history (1%), developmental (2%), and perinatal hypoxia (0.3%) were relatively rare. 55% of MSI was acquired after the age of 40 years, 12% between 16 and 39, 10% between 6 and 15, 7% within the first five years of life and 15% at birth.

Prevalence of functional limitations

5.9% (95% CI 4.7-7.4**)** of the total sample (aged 2 and above) were identified as having a disability via reported significant functional limitation (stating "a lot of difficulty" or "unable to do" in at least one basic activity domain).



There was no significant difference in the prevalence of men and women reporting functional limitations but a very significant increase amongst adults aged 50 and above. 18.1% of adults in this age group reported significant functioning limitation, compared with 3.9% of 18 to 49 year olds and 2.6% of children 2 to 17 (Graph 4 above).



Amongst children, remembering (1.1%) and walking (0.8%) were the most commonly reported domains in which significant functional limitation was reported. Table 6 provides a full breakdown of all children reporting "some difficulty" or"alot of difficulty/cant do" in each basic domain and complex domain. Nearly one-third of children (28.8%) were reported to have some difficulty remembering whilst one-quarter (20.8%) were reported to have some difficulty learning.

Table 6: proportion of children endorsing each domain

			At least some difficulty		A lot of difficulty/cannot do	
			n	%	n	%
BASIC ACTIVITY DOMAINS	2 to 17	Seeing	99	5.8 (4.5-7.4)	6	0.4 (0.1-0.9)
		Hearing	130	7.6 (6.4-8.9)	6	0.4 (0.2-0.8)
		Walking	93	5.4 (4.0-7.2)	13	0.8 (0.4-1.5)
		Understanding	86	5.0 (3.7-6.7)	6	0.4 (0.2-0.8)
		Being Understood	83	4.8 (3.8-6.2)	7	0.4 (0.2-0.9)
		Learning	357	20.8 (18.2-23.8)	11	0.6 (0.3-1.2)
	5+ only	Remembering	388	28.8 (25.3-32.6)	15	1.1 (0.6-2.0)
		Self Care	79	5.9 (4.5-7.5)	4	0.3 (0.1-0.8)
COMPLEX ACTIVITY/PARTICIPATION DOMAINS	2 to 17	Controlling Behaviour	397	23.2 (20.4-26.2)	55	3.2 (2.3-4.5)
		Playing	69	4.0 (3.0-5.3)	11	0.6 (0.3-1.2)
	5+ only	Worry	270	20.0 (16.5-24.1)	46	3.4 (2.3-5.1)
		Completion of Task	253	18.8 (16.0-21.9)	22	1.6 (1.0-2.7)
		Accept Change	305	22.6 (19.4-26.2)	27	2.0 (1.3-3.0)
		Get along with other children	59	4.4 (3.2-6.1)	5	0.4 (0.2-0.9)

=considered for purposes of study to have a disability

Amongst adults, 5.5% reported a lot of difficulty in climbing or walking, 2.9% in remembering or concentrating and 3% in seeing. Graph 6 below and Table 7 provide a full breakdown of all adults reporting "some difficulty" or"alot of difficulty/cant do" in each basic domain and complex domain.

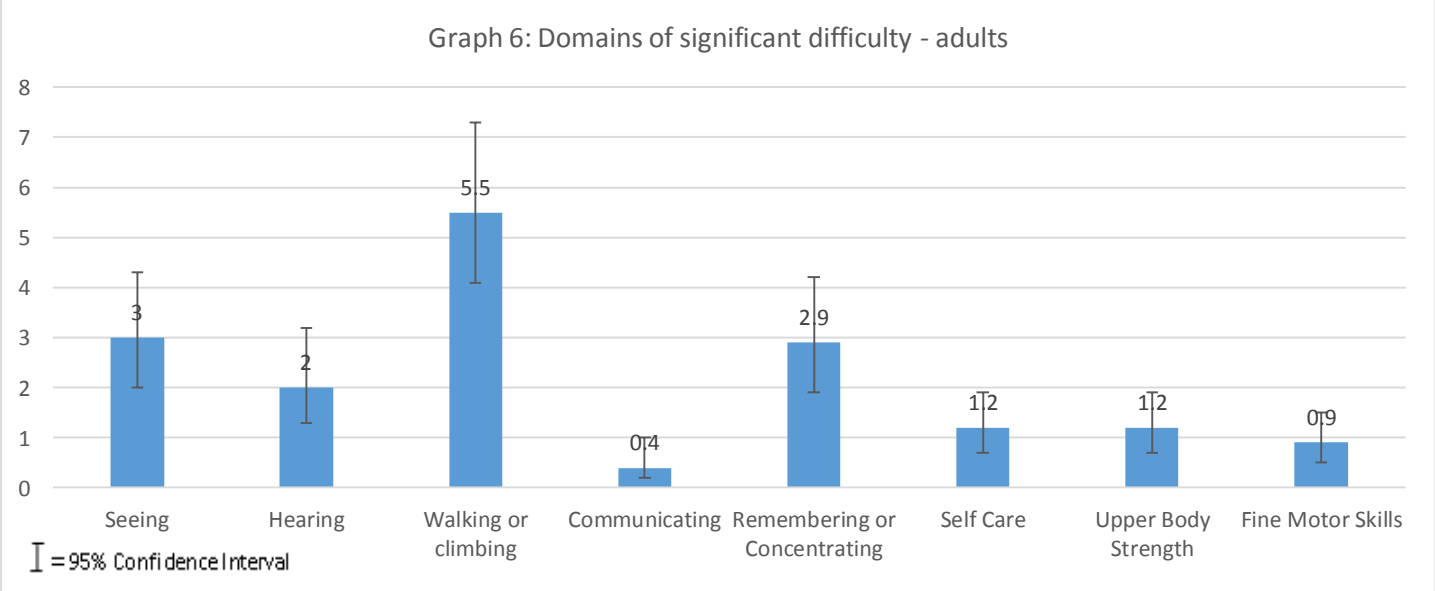


Table 7: proportion of adults endorsing each domain					
		Some difficulty		A lot of difficulty/cannot do	
		n	%	n	%
Basic Activity Domains	Seeing	613	38.0 (35.0-41.1)	48	3.0 (2.0-4.3)
	Hearing	314	19.5 (17.4-21.7)	33	2.0 (1.3-3.2)
	Walking or climbing	748	46.4 (42.5-50.3)	89	5.5 (4.1-7.3)
	Communicating	67	4.2 (3.1-5.5)	7	0.4 (0.2-1.0)
	Remembering or Concentrating	603	37.4 (34.3-40.5)	46	2.9 (1.9-4.2)
	Self Care	123	7.6 (5.6-10.3)	19	1.2 (0.7-1.9)
	Upper Body Strength	147	9.1 (7.6-10.9)	19	1.2 (0.7-1.9)
	Fine Motor Skills	232	14.4 (11.5-17.8)	14	0.9 (0.5-1.5)
Body Function Domains	Worry	495	30.7 (27.9-33.6)	212	13.1 (11.6 (14.8)
	Depression	371	23.0 (20.3-26.0)	185	11.5 (9.9-13.2)
	Pain	380	23.6 (21.0-26.3)	308	19.1 (16.9-21.6)
	Fatigue	233	14.4 (12.7-16.4)	134	8.3 (7.1-9.7)

=considered for purposes of study to have a disability

Relationship between clinical impairments and functional limitations

32% of participants in the study identified to have a disability (n=118) both reported functional limitations and screened positive for moderate or severe clinical impairments and/or disabling health conditions, showing correlation between the two types of tools.

22% of those identified to have a disability screened positive via self-report only. This included 24 children 2-17, 19 adults 18-49 and 36 adults 50+. 38% of this group screened positive for a mild hearing or physical impairment not meeting the definition used to define disability, 23% reported difficulties in seeing that may be related to mild visual impairment (not screened clinically in this study), 27% reported difficulties in domains not directly screened clinically (e.g. remembering, concentrating) and 13% (n=10) reported difficulties in domains that were clinically evaluated not to be impaired (hearing and walking).

Almost half of the participants identified to have a disability (46%, n=168) screened positive for moderate or severe clinical impairments and/or disabling health conditions but did not report significant limitations in these domains in the self-report tool. Amongst this group, 93% of adults and 69% of children reported at least some difficulty in at least one domain (basic or complex), but no basic domains in which they had “a lot of difficulty” or were “unable” to perform the activity.

Multivariate logistic regression, adjusted for gender and age, was undertaken amongst those who screened positive for moderate/severe clinical impairments to understand further why some participants did not report significant functional limitations. Clinical cases who were older (66+) and women were more likely to report significant functional limitations. Clinical cases were more likely to report functional limitations if they had severe or profound impairments rather than moderate impairments. They were also three times as likely to report functional limitations if they had MSI rather than hearing impairments, and almost four times as likely to report limitations if they had multiple impairments. People with visual impairments or epilepsy were the least likely to report

functional limitations, although Epilepsy is not directly screened in the self-reported tool (see Table 8 for Odds Ratios).

Table 8: Odds of Reporting a Functional Limitation amongst participants screening positive for clinical impairments

	Screened +ve for WG (n=118)		Screened -ve for WG (n=168)		Adjusted OR (95% CI)
Age (years)	n	%	n	%	
2-17	20	17	39	23	1.0 (0.4-2.4)
18-33	12	10	17	10	0.9 (0.3-2.7)
34-49	7	6	13	8	0.6 (0.2-2.1)
50-65	19	16	27	16	**(baseline)**
66+	60	51	72	43	0.9 (0.4-2.0)
Sex					
Male	50	42	61	36	**(baseline)**
Female	68	58	107	64	0.6 (0.4-2.4)
Severity of impairment					
Moderate	73	62	136	81	**(baseline)**
Severe	19	16	9	5	4.9 (1.9-13.0)
Profound	20	17	6	4	8.0 (2.7-23.3)
Unknown inc. seizures	6	5	17	10	0.9 (0.3-3.4)
Type of impairment					
Depression	1	1	1	1	3.8 (0.2-77.8)
Vision	12	10	35	21	0.5 (0.2-1.3)
Musculoskeletal	39	33	39	23	2.9 (1.3-6.4)
Hearing	26	22	58	35	**(baseline)**
Epilepsy	1	1	16	10	0.2 (0.1-1.4)
Multiple	39	33	19	11	3.6 (1.6-8.3)

The Impact of disability on people's lives – a case control study

331 participants from the population-based sample aged 5+ who screened positive for disability, plus an additional 98 individuals with disabilities identified through case-finding (not included in prevalence estimates) were invited to take part in the case-control survey alongside a cluster, age and gender matched control from a household without any persons with disability. The total number of controls is lower than the number of cases because of the unexpectedly large prevalence of disability amongst adults 50+. This limited the number of households available from which to identify controls.

Table 9: Characteristics of Cases and Controls

	Cases (n=429)		Controls (n=274)		Age and Sex adjusted OR
	N	(%)	N	(%)	(95% CI)
Age Group					
5-17	114	27	90	33	0.8 (0.5-1.3)
18-33	54	13	45	16	0.8 (0.5-1.4)
34-49	33	8	42	15	0.5 (0.2-1.0)
50-65	70	16	51	19	**(baseline)**
66+	158	37	46	17	2.3 (1.4-3.9)
Gender					
Male	179	42	113	59	**(baseline)**
Female	250	58	161	41	1.5 (0.9-2.5)
SES*					
1st Quartile (poorest)	119	29	68	27	**(baseline)**
2nd Quartile	92	23	35	14	1.6 (1.0-2.7)
3rd Quartile	99	25	76	30	0.8 (0.5-1.3)
4th Quartile (richest)	94	23	76	30	0.9 (0.6-1.4)
*Some missing data (n=44)					

Table 9 gives the age, gender and socio economic status (SES)[5] breakdown of cases and controls. There were more cases than controls in the study due to the high prevalence of disability amongst older age groups and consequent limited number of households without any disability (from which to select eligible controls) in each cluster. There were more female cases than male cases, and cases were more likely to be in the oldest age group (66+). There was no significant difference in SES between cases and controls.

[5] SES scores created using Principal Component Analysis (PCA). PCA index includes asset variables such as household size, construction, toilet source, and durables.

Impact of disability on livelihoods

54%of cases and 63% of controls over the age of 17 were married or living with another person. Cases were 3.6 times more likely never to have married than controls (95% CI 1.7-6.9) – Table 10.

Relatively low prior education levels were seen amongst both cases and controls in the study with 63% of adults cases and 45% of adult controls never having previously attended school. Consequently literacy was low in both groups with 64% of cases and 45% of controls unable to read at all, with no significant difference by case-control status.

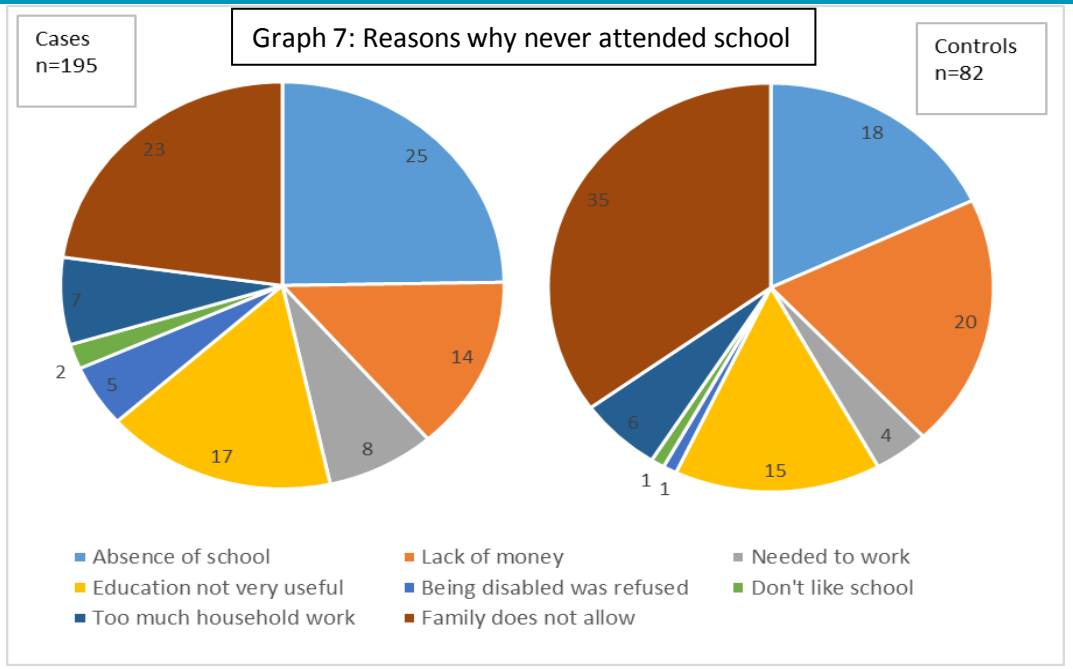
Table 10: Impact of disability on livelihoods

	Cases (n=315)		Controls (n=184)		
	n	%	n	%	Age and Sex Adj OR (95% CI)
Marital Status					
Married or living together	170	54	116	63	(baseline)
Divorced/ Separated	7	2	7	4	0.7 (0.2-2.1)
Widowed	73	23	31	17	1.2 (0.7-2.1)
Never Married/Living together	62	20	29	16	3.6 (1.7-6.9)
Previously attended school					
No	195	63	82	45	(baseline)
Yes	117	38	101	55	0.8 (0.5-1.3)
Literacy					
Read Well	45	14	48	26	0.6 (0.3-1.0)
Read A little	68	22	53	29	0.7 (0.4-1.2)
Not At all	199	64	82	45	(baseline)
Work in the last 7 days					
No	167	54	39	22	3.7 (2.4-5.6)
Yes	145	46	142	78	(baseline)

35% of controls and 23% of cases stated that their family had not allowed them to attend school (see Graph 7 below). 5% of cases said that they did not attend school because of their disability.

Cases were almost four times more likely not to have worked in the previous days. 54% of cases had not worked in the prior 7 days, compared with 22% of controls (Adj. OR 3.7, 95% CI 2.4-5.6). Amongst adults with disability not working, 31% reported being unable to work physically and 23% reported lengthy illnesses (>1 month) as the primary reason for not working. 22% of cases and 26% of controls reported old age and/or retirement as the reason they did not work (see Graph 8 below).

Table 11 presents socio-economic status of cases and controls disagreggated by major age group. There was no significant difference in socio-economic status between cases and controls aged 50 and above but cases aged 18-49 were almost 3 times more likely to be in the poorest quartile (Adj OR. 2.6, 95% CI 1.0-6.5).



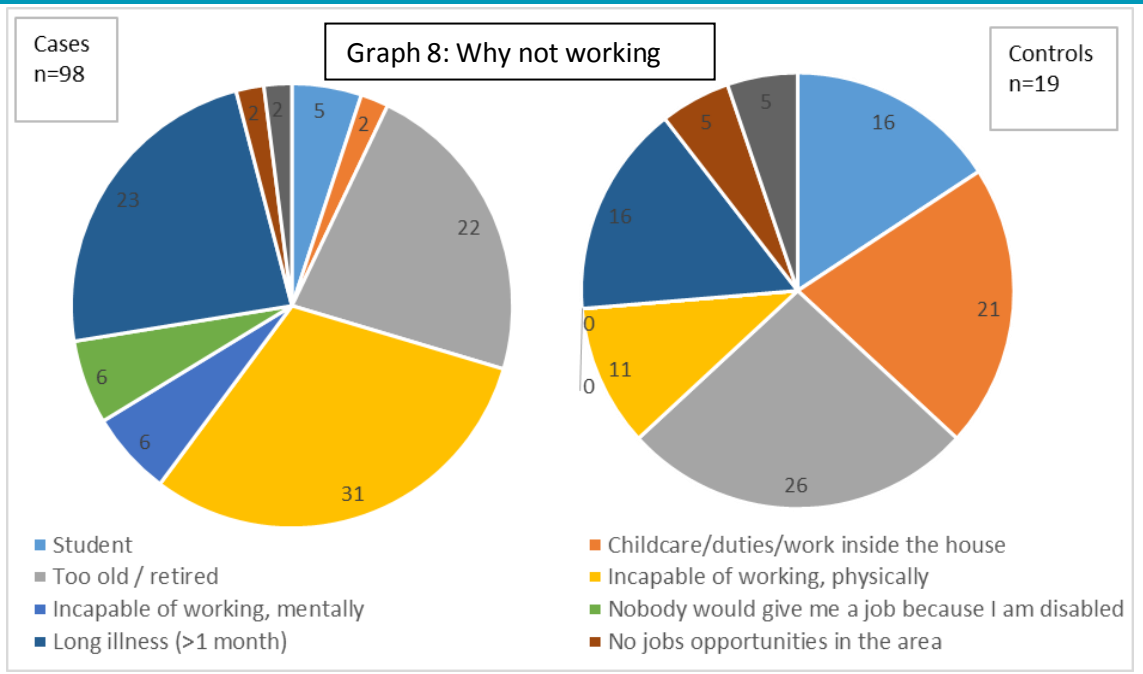


Table 11: Socio-economic status by age group*					
	Cases		Controls		Age and Sex Adj. OR (95% CI)
	N	%	n	%	
Age 18-49					
1st Quartile (poorest)	25	31	13	16	2.6 (1.0-6.5)
2nd Quartile	16	20	14	18	1.5 (0.6-3.8)
3rd Quartile	20	25	27	34	1.0 (0.4-2.2)
4th Quartile (richest)	19	24	25	32	(baseline)
Age 50+					
1st Quartile (poorest)	71	33	34	39	0.6 (0.3-1.3)
2nd Quartile	49	23	11	13	1.3 (0.5-3.2)
3rd Quartile	56	26	28	32	0.6 (0.3-1.4)
4th Quartile (richest)	41	19	15	17	(baseline)
*Some missing data (n=35)					

Impact of disability on education

114 children with disabilities aged 5 to 17, and 90 cluster, age and gender matched controls participated in the case-control study.

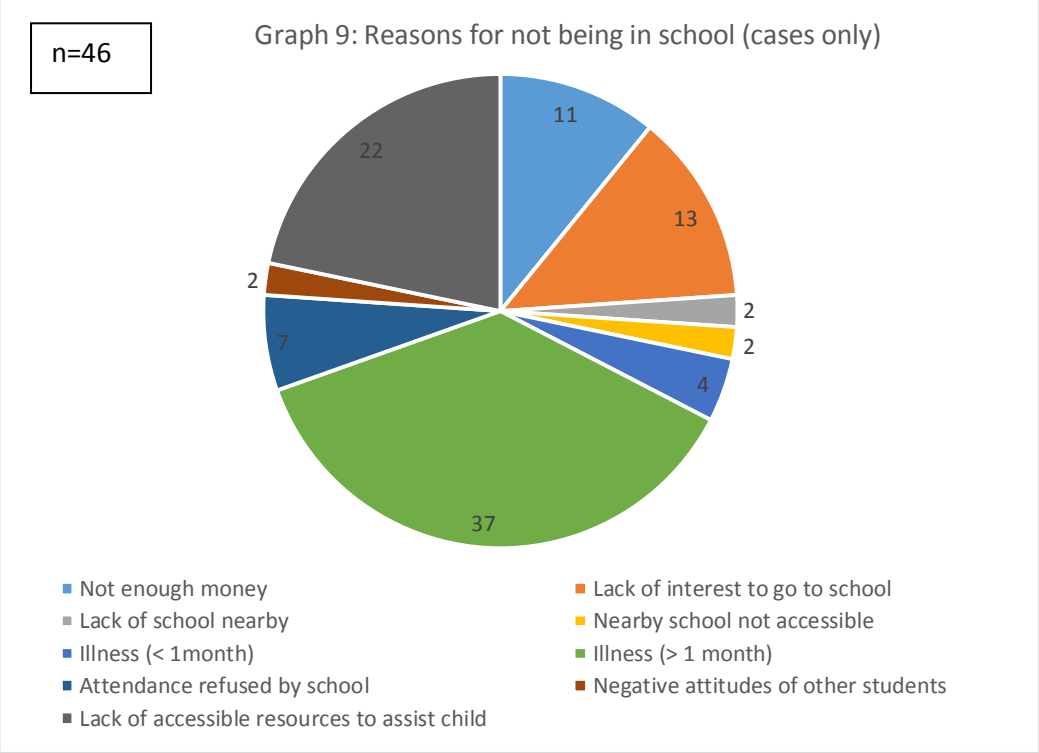
Children with disabilities were almost 20 times more likely not to be enrolled than children without disabilities (60% enrolled versus 97% of controls, Adj. OR 19.8, 95% CI 5.6-66.8). Amongst those children who were enrolled, children with disabilities were more likely to be in a lower grade although this finding was not statistically significant. However, children with disabilities were almost three times more likely to have repeated a grade, suggesting perhaps that children with disabilities were being progressed through grades despite not passing them (Table 12).

Table 12: Impact of disability on education

	Cases (n=114)		Controls (n=90)		Age and Sex Adj OR (95% CI)
	n	%	N	%	
Currently Enrolled					
No	46	40	3	3	19.8 (5.9-66.8)
Yes	68	60	86	97	(baseline)
Grade					
Same as other children my age	43	66	59	74	(baseline)
Lower than other children my age	21	32	13	16	2.0 (0.9-4.5)
Higher than other children my age	1	2	8	10	0.2 (0.2-1.3)
Ever Repeated a Grade					
No	20	44	31	55	(baseline)
Yes	45	36	69	45	2.8 (1.4-5.5)
Missed school days (last month)					
0-2	35	54	63	79	(baseline)
3-10	26	40	16	20	2.9 (1.4-6.2)
11+	4	6	1	1	7.2 (0.7-67.0)

Amongst the 3 controls not currently enrolled, 2 had previously been enrolled and 1 had never been to school. Reasons reported for not being enrolled were lack of money (n=2) and “other” (n=1). Among the 46 children with disabilities not enrolled, 48% had previously attended school and 52% had never attended school. The main reasons given for never or no longer attending school were lengthy illness of 1 month or more (37%) and a lack accessible of resources to assist the child learning (22%), see Graph 9.

5 children in the sample (1 with MSI, 2 deaf children and 2 with hearing impairments) attended special schools. All other children with and without disabilities in the sample who were enrolled, were enrolled in mainstream schools.



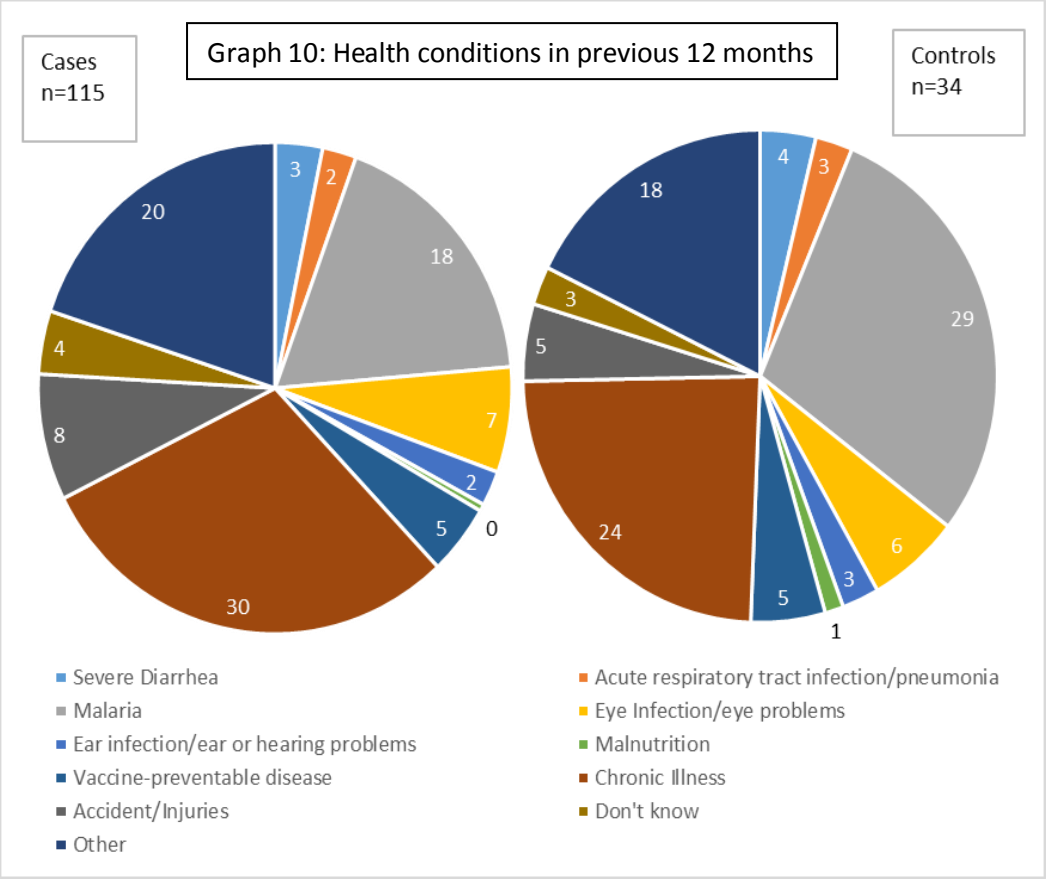
Impact of disability on health

Table 13 presents the age and sex adjusted odds ratios of reported serious health problems amongst cases and controls, disaggregated by age group. Cases of all ages were nearly twice as likely to have experienced a serious health problem in the prior twelve months as controls (42% of cases versus 25% of controls, Adj OR 1.9 95% CI 1.4-2.7). This relationship maintained across each age group, with the percentage of both cases and controls reporting a serious health problem increasing with age.

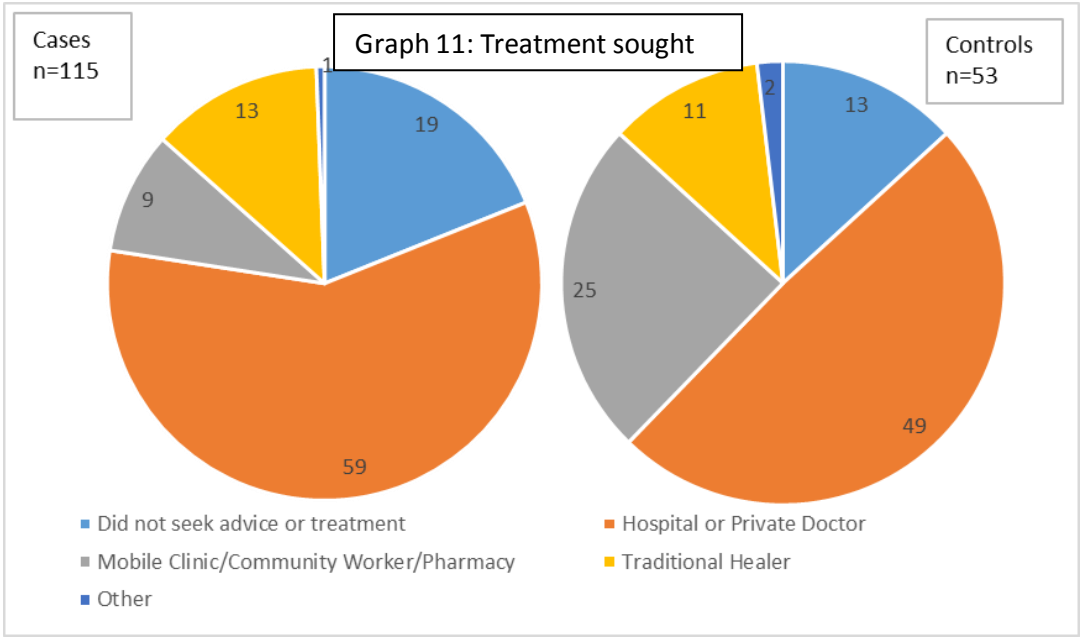
Table 13: Impact of disability on health

	Cases		Controls		Age and Sex Adj OR (95% CI)
	n	%	n	%	
Serious Problem Past 12 Months (total)					
No	251	59	204	75	(baseline)
Yes	178	42	68	25	1.9 (1.4-2.7)
Aged 5-17					
No	85	75	77	86	(baseline)
Yes	29	25	13	14	2.1 (1.0-4.4)
Aged 18-49					
No	53	61	65	76	(baseline)
Yes	39	39	21	24	2.0 (1.0-3.9)
Aged 50+					
No	113	50	62	65	(baseline)
Yes	115	50	34	35	1.9 (1.1-3.1)

Amongst those who had experienced a serious health problem, 21% of cases and 16% of controls had experienced more than one in the preceding 12 months. Graph 10 below presents the total number of health conditions experienced amongst cases and controls. 30% of health conditions experienced by cases were chronic illnesses, whilst 18% was related to Malaria. Similarly, amongst controls 29% of all serious health problems were Malaria-related, whilst 24% were related to chronic illness. "Other" conditions accounted for 20% of cases and 18% of controls' conditions.



59% of cases and 49% of controls sought medical treatment at a hospital or private doctor for the serious health conditions experienced (graph 11). 19% of cases and 13% of controls did not seek any treatment.



Impact of disability on participation and environmental access

A question set on participants' abilities to perform a range of activities in their current environment (and with any current assistance they get from people or devices), covering self care, domestic life, interpersonal behaviours, major life areas (school and work) and community/civic life was used to assess participation amongst cases and controls.

Each question was scored on a response scale of no difficulty, moderate difficulty, severe difficulty and inability to perform activity, and the question sets were differentiated by age[6]. The maximum score for each age group and domain is the total score if each question in the set is answered "unable to do". Table 14 shows the maximum and mean composite participation scores for cases and controls, disaggregated by age. Higher means (i.e. higher participation restrictions) were observed in cases across all age groups, although the difference between means lessens with age. An independent-samples t-test was conducted to compare means between cases and controls, and the difference between means was shown to be strongly statistically significant in each age group. This shows that people with disabilities face more participation restrictions than people without disabilities at all ages, but that people without disabilities also experience more participation restrictions with age.

Table 14: Impact of disability on participation

Age group	Max. score possible	N	Cases (mean)	Controls (mean)	P
Age 5-8	40	65	16.5	13	<0.05
Age 9-16	60	125	26.1	17	<0.001
Age 17-33	84	113	34.7	25.3	<0.001
Age 34-49	84	75	36	25.4	<0.001
Age 50-65	84	121	31.9	26.4	<0.001
Age 66+	84	204	33.8	28.3	<0.01

Table 15 disaggregates this data by domain. Both children and adults with disabilities faced greater participation restrictions in all domains than people without disabilities. Restrictions in domestic life (such as preparing meals, doing housework and taking care of others) felt by adults with disabilities were almost twice as high as those without, as was participation in community, social and civil life amongst children with disabilities (this includes recreation, sports and religious activities).

[6] A 5th option, "don't know" is also included. Participants answering "don't know" are not included in the analysis for that particular question

Table 15: Impact of disability on participation by age group and domain					
	Max score possible	n	Cases (mean)	Controls (mean)	p
Children 5-8					
Self Care	20	65	8.5	6.3	<0.05
Interpersonal Behaviours	12	65	4.3	4.1	0.69
Major Life Areas	5	53	2.3	1.4	<0.01
Community, Social and Civil Life	5	60	2.1	1.2	<0.001
Children 9-16					
Self Care	20	125	6.9	5	<0.001
Domestic Life	20	125	11.7	7.5	<0.001
Interpersonal Behaviours	12	125	5.3	3.5	<0.001
Major Life Areas	5	113	2.3	1.3	<0.001
Community, Social and Civil Life	5	117	2	1.1	<0.001
Children and adults 17-49					
Self Care	20	188	6.8	5.1	<0.001
Domestic Life	20	188	10.4	6.9	<0.001
Interpersonal Behaviours	20	188	8	6.4	<0.001
Major Life Areas	10	188	3.9	2.9	<0.001
Community, Social and Civil Life	15	188	7.7	5.3	<0.001
Children and adults 50+					
Self Care	20	325	6.6	5.8	<0.01
Domestic Life	20	325	10.3	7.6	<0.001
Interpersonal Behaviours	20	325	7.1	6.2	<0.01
Major Life Areas	10	325	3.6	3.2	<0.05
Community, Social and Civil Life	15	325	6.9	5.8	<0.01

12 questions on the frequency at which elements of the built and natural environment created barriers were also asked to both cases and controls. Response categories for each question were 1-Daily, 2- Weekly, 3- Monthly, 4- Less than Monthly, 5-Never, 6-Not Applicable. Excluding responses of N/A, Table 16 presents the mean scores for each question for cases and controls, disaggregated by age group and giving the p value of the t-test conducted to compare each mean between cases and controls.

In children aged 5-17, mean environmental barrier scores were the same or lower (corresponding to more frequent barriers in each area) across all environmental areas. However, the difference was not significant in terms of barriers created by light, noise and crowds; or the rules and policies or both businesses/organisations and government.

Amongst adult cases 18-40 and 50+, mean environmental barrier scores were the same or lower in all environmental areas, but many of these were not statistically significant ($p > 0.05$), suggesting that both adults with and without disabilities experience the same level of barriers related to the environment.

Table 16: Environmental Access									
	5 to 17			18 to 49			50+		
Environmental Domains	Controls (mean) n=90	Cases (mean) n=114	P	Controls (mean) n=87	Cases (mean) n=87	p	Controls (mean) n=97	Cases (mean) n=228	p
Transport	4.2	3.8	<0.05	3.7	3.4	0.1	3.9	3.5	<0.01
Natural environment	4.4	4.0	<0.05	3.8	3.6	0.2	4	3.5	<0.01
Surroundings	4.4	4.1	0.09	4.2	4.0	0.3	4.4	4.3	0.5
Format of information	4.4	3.9	<0.05	4.3	4.2	0.5	4.2	4.3	0.4
Availability of health care services	4.4	3.9	<0.05	4.1	3.7	<0.05	4.0	3.9	0.4
Availability of assistance at home	4.3	3.9	<0.01	4.1	3.8	0.1	4.1	3.7	<0.01
Availability of assistance at school	4.3	3.8	<0.05						
Other people's attitudes (at home)	4.4	4.0	<0.01	4.6	4.1	<0.05	4.5	4.5	0.7
Other people's attitudes (at school)	4.6	4.1	<0.001						
Prejudice and discrimination	4.8	4.3	<0.001	4.7	4.4	<0.05	4.8	4.6	<0.05
Policies and rules (Organisations)	4.8	4.8	0.7	4.5	4.5	0.6	4.6	4.6	0.7
Government programmes and policies	4.8	4.8	0.9	4.5	4.5	0.9	4.6	4.6	0.8

Access to rehabilitation and assistive devices amongst people with disabilities

A module for cases explored access to rehabilitation and assistive devices. Table 17 presents knowledge of, reported need for and access to services amongst cases in the study (n=429). The services that most cases were aware of, were traditional healers (83%) and general health services (73%). Awareness of core rehabilitative services including medical rehabilitation (8%) and assistive devices (24%) was very low. Reported need for services was consequently also very low, but the majority of individuals who reported needing a particular service also reported that they had previously received it.

Access to assistive devices was also low (Table 18). 8% of people with disabilities reported using glasses, whilst a further 17% reported needing, but not using them. Similarly, 4% reported using a hearing aid whilst a further 12% reported needing one. 36% of cases used a walking stick, and 3% used a wheelchair.

Table 17: Access to and awareness of rehabilitative services amongst people with disabilities						
	Have heard of services		Have needed services		Have Received Services	
	N	%	n	%	n	%
Medical Rehabilitation	33	8	18	4	11	3
Assistive Device Services	103	24	44	10	21	5
Specialist Educational Services	26	6	12	3	6	1
Vocational Training	70	16	37	9	22	5
Counselling for person with a disability	47	11	31	7	17	4
Counselling for parents/family	48	11	26	6	18	4
Welfare Services	51	12	25	6	9	2
Health Services	314	73	301	70	277	65
Health Information	127	30	106	25	89	21
Traditional or Faith Healers	356	83	269	63	254	59
Legal Advice	49	11	8	2	5	1
Specialist Health Services	40	9	22	5	14	3

Table 18: Access to and awareness of assistive devices amongst people with disabilities								
	Use device		Need but don't use device		Don't need device		Don't know what device is	
	n	%	n	%	N	%	N	%
Glasses	35	8	72	17	301	70	2	0
Magnifying Glass	2	0	11	3	166	39	231	54
White Cane	2	0	4	1	218	51	186	43
Braille	0	0	4	1	167	39	239	56
Hearing Aid	16	4	50	12	209	49	135	31
Wheelchair	12	3	17	4	341	79	40	9
Crutches	6	1	13	3	344	80	47	11
Walking Stick	154	36	12	3	238	55	6	1
Guide	14	3	7	2	256	60	133	31
Standing Frame	1	0	2	0	249	58	158	37

DISCUSSION

Prevalence of Disability

The overall disability prevalence estimate from the study was 10.5% (95% CI 9.0-12.2), reflecting all participants who either screened positive to self-reported screens of functional limitation (5.9%) or moderate or severe clinical impairments and disabling health conditions (8.4%). The Cameroon Demographic and Health survey and the Multiple Indicator cluster Survey DHS-MICS 2011 found that 5.4% of the population had at least one disability[10]. A study by Cockburn et al. in North West Cameroon in 2010 estimated disability prevalence in the region of 6.2%[1]. These two studies used self-reported measures only.

Photo: Observation of MSI

Disability was found to be strongly associated with age, increasing from 4.7% of children under 18 to 33.5% of adults aged 50 and above. It is important that advocates of social protection, inclusion and universal access to health care focus activities on identifying the needs of older people with disabilities and maximising their functioning, participation and wellbeing. Further work is needed on the relationship between disability and ageing and the potential sense of "inevitability" of function loss that impacts on health-seeking behaviour, and leads to large proportions of adults 50+ living with pronounced functional limitations that are reversible or manageable[14].

Measuring Disability

The study prevalence estimates are comparable with international estimates, and slightly higher than those of a study of disability conducted in North West Cameroon in 2010 and Cameroon nationwide in 2011.

Cockburn et al. estimated a disability prevalence in the region of 6.2% (95% CI 5.2-7.2) based on reported participation restriction or activity limitation that was "moderate", "severe" or "complete" according to the ICF checklist[1]. The ICF checklist, whilst not identical to the self-report measure used in this study, follows the same principles of reported activity limitation. The lower estimate from Cockburn et al. reinforces the finding of this study that there is a degree of under-reporting of clinical impairments in this population.

In this study, we used two different methods to measure disability at the population level – a self-reported activity-limitation tool and a battery of tools to assess clinical impairments and disabling health conditions in vision, hearing, MSI, epilepsy and clinical depression.

Amongst those who were identified to have a disability via either self-report or the clinical tools, 32% screened positive for both, 46% screened positive for clinical impairments/health conditions only and 22% screened positive via self-report only. These findings point to two clear conclusions:

First, that 22% of disability in the study could not be measured using clinical tools. This highlights that impairment tools alone are not sufficient to capture all activity limitations, especially in areas of cognition and mental health.

Second, that 46% of those considered to have a disability in the study did not self-identify as having significant activity limitations. Specifically, participants with moderate (rather than severe) clinical impairments, or impairments in domains such as hearing and vision, were less likely to report a significant difficulty in functioning than those with severe impairments or physical impairments. The findings of the qualitative component of this research (reported separately) corroborate that amongst this population, impairments in physical functioning create a greater participation restriction that impairments in other domains, given the hilly topography and livelihood focus on farming in the area [15].

The participation component of disability was also measured in the study, with all cases an controls reporting on participation restrictions and environmental barriers that they experienced. Children and adults with disabilities experienced 1.5 times as many restrictions in participation than adults and children without disabilities in all domains measured, and these data are extremely useful to contextualise the lived experience of disability amongst those with activity limitations and impairments. Moreover, as presented in Table 19 below, people with self-reported activity limitations experienced higher degrees of participation restriction than people who were identified to have moderate/severe clinical impairments but did not report any activity limitations. The final column gives the p value associated with an independent t test between the means of the two sub-groups of people with clinical impairments – those who also reported significant activity limitations and those who did not.

Table 19: Participation restrictions between those who did and did not self report disability

	Max score possible	Controls (mean)	Clinical cases + self report (mean)	Clinical cases no self report (mean)	P
Age 5-8	40	13	11	17.7	0.1
Age 9-16	60	17	19.3	30.7	<0.001
Age 17-33	84	25.3	29.7	40.8	<0.01
Age 34-49	84	25.4	33.5	42.7	0.14
Age 50-65	84	26.4	32.4	35.8	0.23
Age 66+	84	28.3	31	38	<0.001

At each age group except 5-8, both sub-groups of cases experienced greater participation restrictions than controls of the same age. However, the restrictions experienced by those reporting activity limitations is higher, highlighting the inter-related components of disability, and how clinical impairments may not necessarily restrict activity and participation to a uniform degree.

It is evident that different tools for measuring disability provide different information and different statistics. The method that is most appropriate for use in a population-based survey and program ultimately depends on the reason for data collection and the resources available. Clearly, if the

interest is in the prevalence and treatment options for a specific impairment (e.g. visual impairment and blindness) then a clinical tool is needed. If the interest is in disability more broadly and under the ICF, then a self-reported activity tool better captures the experiences of people with disabilities and the impact of their impairment/health condition on their ability to live their lives. It is important to be aware however that self-reported tools will miss moderate impairments and impairments in domains that are under-prioritised in a particular context, despite evidence above that these still have an impact on participation.

A best practice therefore, would be the use of a self-reported activity tool to measure the magnitude of significant limitations in functioning in a given population or programme. Alongside this, a simple clinical screen that could be administered to all participants who answer even some difficulty in a specific domain so that all moderate/severe impairments are identified and the appropriate referrals to maximise functioning offered, and a tool to measure and triangulate this with participation restrictions and external barriers that can be addressed and overcome. This recommendation is illustrated in the flow chart below:

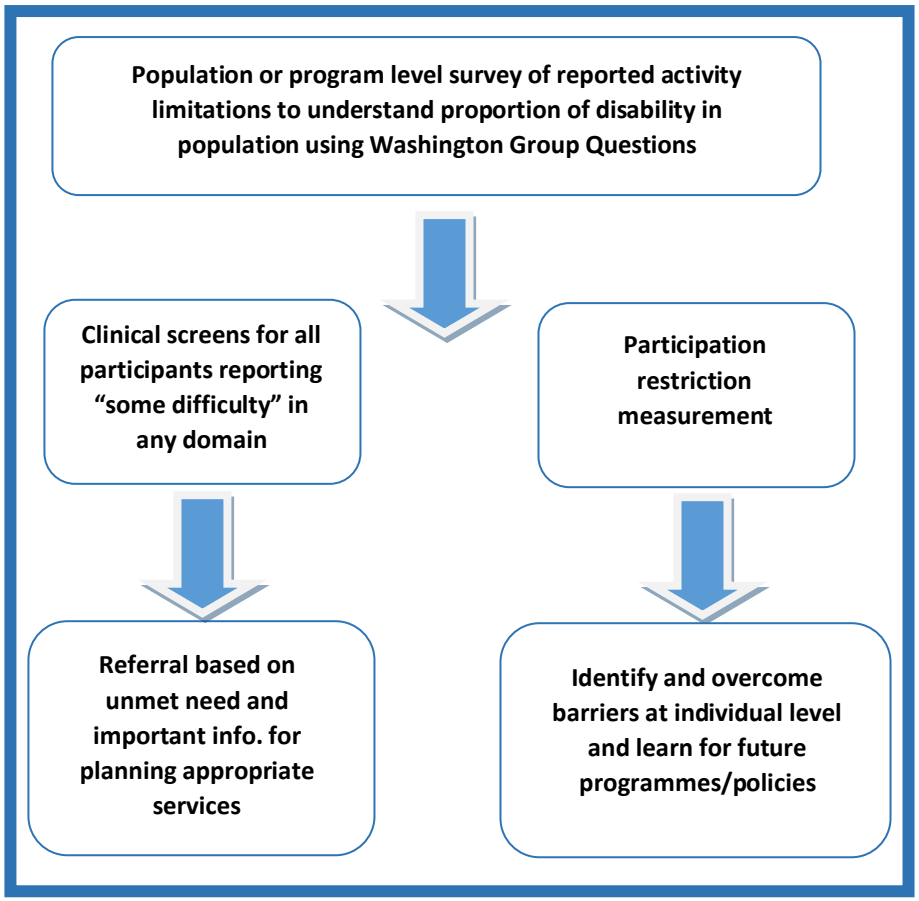


Fig.2: Disability Measurement Methodology

These findings are particularly important to policy makers and those concerned with identifying and quantifying disability in a population – whether for building evidence and statistics or identifying potentially vulnerable members of the community for inclusion in services, policies and programmes. Specifically, given the magnitude of disability in older age groups, and the pronounced participation restrictions identified in this age group, it is important that those concerned with measuring disability in the population, and equally providing support for older people in general, consider appropriate methods for this age group.

Impact of disability

Impact of disability was seen across a range of important life activities.

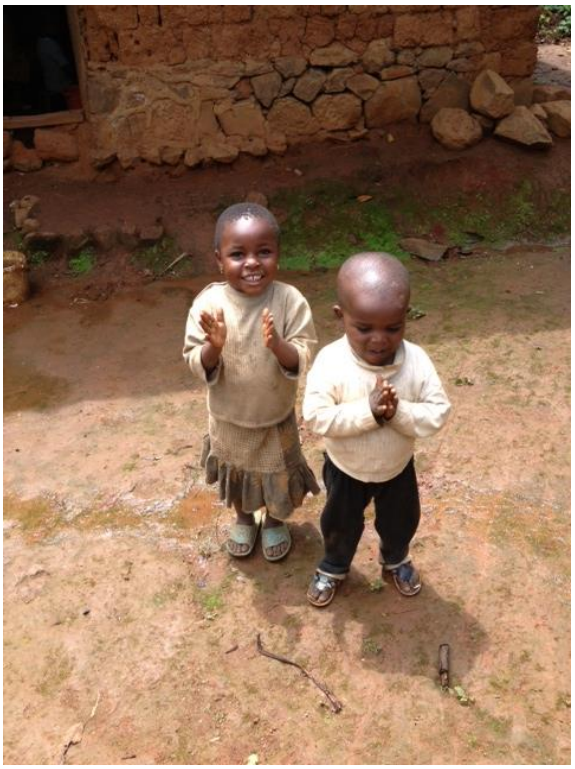


Photo: Young child with a disability, plus sibling

Children with disabilities were almost 20 times less likely to be in school than children without disabilities and amongst those enrolled, almost three times more likely to have a repeated a grade. Children with disabilities were also significantly more likely to be unwell and to have missed more than 11 days of school in the past month. The prevalence in this age group may be low, but clearly the impact on the child's experiences and potential for independence is high.

It should be noted that only 38% of adults with disabilities and 55% of adults without disabilities had previously attended school, compared with 60% of children with disabilities and 97% of children without disabilities in the sample. This suggests a potential improvement in the enrolment of children with disabilities in North West Cameroon over time, and a profound increase in general enrolment rates.

Adults with disabilities were significantly more likely never to have married, more likely not to have worked recently, more likely to have experienced a serious health condition in the prior 12 months and more likely to be in the lower socio-economic quartiles than adults without disabilities.

The relationship between disability and poverty also appears to be affected by the age of onset of disability. Working age adults with disability (aged 18-49) were significantly more likely to be poorer than adults of the same age without disability. However, participants aged 50+ with a disability, were not significantly likely to be poorer than adults without. This provides much needed evidence of how the impact of disability is potentially mediated by the age of acquisition and subsequently whether or not it impacts on either education, livelihoods and social participation.

Access to Services

A very low awareness of, and access to, services was identified amongst people with disabilities in the sample. 3% of people with disabilities had ever previously received medical rehabilitation and 5% had received an assistive device. This finding is somewhat surprising given the proximity of the study site to a large health-care facility with both community outreach and community based rehabilitation services. Reported need for services was also low in the sample, underlying perhaps a lack of knowledge about how impairments and activity limitations can be treated and minimised and requiring better outreach to communities to educate them on the potential services available.

How can this information be used?

The prevalence estimates of disability, self-reported limitations and clinical impairments are of great use to policy makers, service providers and disability advocates in Cameroon. Moreover, these data contribute to the limited evidence base on disability globally.

The case-control study provides important data on the impact of disability, most notably on children's participation and on the strong relationship between disability and poor health, and disability and participation restriction.

The comparison of estimates using different tools adds important findings to international disability data collection methods and understanding the interaction between different components of disability – namely impairments in body function and structure, activity limitations and participation restrictions.

Strengths and weaknesses

Strengths:

The study used a robust and scientifically valid sampling methodology to provide vigorous estimates of disability compatible with the ICF. The study measured and compared the relationship between different components of disability and provided much needed information on the impact of disability on access to services and participation in North West Cameroon.

Weaknesses:

The study case-control matching was compromised by the unexpectedly large prevalence of disability in older age groups. This meant that a small number of households per cluster did not contain at least one person with a disability.

It is also acknowledged that Case-finding additional cases with disability from neighbouring segments for the case control study is likely to identify individuals with more 'obvious' and severe disabilities, and potentially missed those with more hidden impairments such as mild/moderate cognitive or hearing impairments.

Tools and diagnostic tests for mental health in this study were limited, and further work is needed on incorporating screening methodologies for mental health into disability measurement tools.

Conclusions

The study has shown that the prevalence of disability in North West Cameroon is much higher than previous studies have estimated[1]. The figures suggest that disability is strongly associated with ageing but that the prevalence amongst children and younger adults is also important. Moreover, the impact of disability is particularly strong amongst children and young adults. People with disabilities of all ages are at greater risk of serious health problems, and awareness of and access to rehabilitative services and assistive devices is low.

It is also important to note that the study setting was in a part of the country with disproportionate levels of health and rehabilitative services focused on disability. It is plausible that the prevalence of, and impact of, disability in other parts of the country may be even higher and further work is needed in this area.

Recommendations for Cameroon disability inclusion

The following use of the study findings is recommended to policy makers, service providers and other disability advocates and stakeholders:

1. To raise awareness of the prevalence of disability in North West Cameroon and in Cameroon in general, and specifically the large prevalence of disability and multiple impairments amongst adults aged 50+
2. To advocate strongly for greater inclusion of children with disabilities in education and particularly to ensuring appropriate methods of education that allow disabled children to progress through school
3. To advocate for better access to health and rehabilitative services amongst children and adults with disabilities, including linking people with disabilities to available services (including SEEPD programme and Mbingo Baptist Hospital of the Cameroon Baptist Convention Health Services) and greater community outreach and support
4. To intensify efforts and advocacy for inclusive societies and services that alleviate the restrictions in participation felt by people with disabilities
5. To understand the differences in estimates derived from different methodologies of disability measurement

Practical Recommendations on disability data collection:

1. Self-Reported tools that measure activity limitation are the most appropriate and resource efficient way to measure disability in a population or within a program or project.
2. Moderate clinical impairments may not be captured using this method, so we recommend that all participants who report even “some” limitation in a particular domain should also undergo a simple clinical screen
3. Measures of participation should also be included to fully capture disability.

Stakeholder Response:

Dissemination sessions were held in December 2014 in Yaounde and Bamenda, to share the findings with key stakeholders and finalise the recommendations. The Yaounde workshop were attended by a representative for the Minister of Social Welfare, the PLATFORM federation of DPOs, International Researchers, representatives from the International Institute of Statistics, NGOs and media. The Bamenda workshop was presided over by a representative of the Governer of North West Region and the Regional Delegate for Social Affairs.

Government representatives at the national and regional levels welcomed the findings and the evidence provided on the prevalence and impact of disability in Cameroon. Focus was placed on

determining how to increase access to available services and to increase coverage of services to all people with disabilities. In particular, further understanding of the link between disability and ageing and the appropriate support mechanisms to assist older people with disabilities and change attitudes towards disabling and ageing were suggested.

A clear outcome from the two workshops was the call for stakeholders from all sectors to converge and create a platform for regular discussion and coordination of activites to maximise opportunities and access to services amongst people with disabilities in Telengana State. A focus on ensuring that people had access to information on available services was also suggested.The CEO of SERP in particular pledged that SERP services would focus on building confidence amongst people with disabilities and advocating for attitudinal change.

The study findings were overall praised for providing much needed evidence on the impact of disability on people's lives, and the study's intention to provide community feedback sessions between Dec 2014-Jan 2015 was commended.

Table 20: Overall Prevalence of Disability												
	Total		**0-17 years***		**18-49 years**		**50+ years**		**Male**		**Female**	
	N	**% (95% CI)**	**N**	**% (95% CI)**	**N**	**% (95% CI)**	**N**	**% (95% CI)**	**N**	**% (95% CI)**	**N**	**% (95% CI)**
Any disability	**373**	**10.5 (9.0-12.2)**	**91**	**4.7 (3.7-5.9)**	**68**	**6.9 (5.3-9.1)**	**214**	**33.6 (28.8-38.9)**	**144**	**9.9 (8.3-11.7)**	**229**	**10.8 (9.0-13.0)**
Self Reported Limitations~~	197	5.9 (4.7-7.4)	44	2.6 (1.8-3.6)	38	3.9 (2.7-5.6)	115	18.1 (13.9-23.1)	81	6.1 (4.8-7.6)	116	5.8 (4.4-7.7)
Any clinical impairment or disabling health condition	294	8.4 (7.5-9.4)	67	3.5 (2.7-4.4)	49	5.1 (3.7-6.5)	178	28.3 (24.8-31.9)	113	7.9 (6.5-9.3)	181	8.8 (7.6-10.0)
Any vision impairment*	82	2.3 (1.8-3.0)	8	0.4 (0.2-0.96)	5	0.5 (0.2-1.5)	69	10.9 (8.3-14.3)	36	2.5 (1.7-3.8)	46	2.2 (1.6-3.0)
Moderate	55	1.9 (1.3-2.6)	6	0.4 (0.2-01.1)	3	0.3 (0.07-1.3)	46	7.2 (5.1-10.2)	23	2.0 (1.2-3.1)	32	1.8 (1.2-2.7)
Severe	10	0.3 (0.2-0.6)	2	0.1 (0.04-0.6)	0	0	8	1.3 (0.6-2.7)	2	0.2 (0.04-0.7)	8	0.4 (0.2-0.9)
Blind	17	0.6 (0.3-1.0)	0	0	3	0.2 (0.05-0.8)	14	2.4 (1.5-3.8)	11	0.9 (0.5-1.8)	6	0.3 (0.2-0.9)
Hearing impairment* ~	127	3.6 (2.8-4.6)	22	1.1 (0.7-1.8)	11	1.1 (0.5-2.6)	94	15.0 (11.70-19.1)	44	3.1 (2.2-4.2)	83	4.0 (2.9-5.4)
Moderate	76	2.5 (1.9-3.2)	4~	0.3 (0.1-0.6)	2	0.2 (0.05-0.8)	70	11.0 (8.3-14.5)	26	2.1 (1.4-3.0)	50	2.7 (1.9-3.9)
Severe	15	0.5 (0.3-0.8)	0	0	0	0	15	2.4 (1.4-4.0)	5	0.4 (0.2-1.0)	10	0.5 (0.3-1.1)
Profound	9	0.3 (0.1-0.6)	3~	0.2 (0.07-0.6)	1	0.1 (0.01-0.8)	5	0.8 (0.3-1.8)	2	0.2 (0.04-0.7)	7	0.4 (0.2-0.9)
Physical impairment	123	3.4 (2.7-4.4)	26	1.3 (0.8-2.3)	28	2.9 (1.9-4.3)	69	10.8 (8.3-14.0)	42	2.9 (2.1-4.0)	81	3.8 (3.0-4.9)
Moderate	113	3.2 (2.5-4.0)	24	1.2 (0.7-2.1)	24	2.4 (1.6-3.8)	65	10.2 (7.8-13.3)	39	2.7 (1.9-3.8)	74	3.5 (2.7-4.6)
Severe	10	0.3 (0.2-0.5)	2	0.1 (0.03-0.4)	4	0.4 (0.2-1.1)	4	0.6 (0.2-1.7)	3	0.2 (0.07-0.6)	7	0.3 (0.2-0.7)
Epilepsy	25	0.7 (0.5-1.0)	12	0.6 (0.4-1.0)	11	1.1 (0.6-1.9)	2	0.3 (0.08-1.3)	9	0.6 (0.3-1.1)	16	0.8 (0.5-1.2)
Depression	7	0.2 (0.09-0.4)	-	-	4	0.4 (0.2-1.1)	3	0.5 (0.2-1.5)	4	0.3 (0.1-0.7)	3	0.1 (0.04-0.4)
Multiple impairments	**59**	1.7 (1.2-2.1)	1	0.05 (0-0.2)	8	0.8 (0.3-1.4)	50	7.9 (5.8-10.0)	19	1.3 (0.7-1.9)	40	1.9 (1.3-2.5)

*Data on visual impairment were missing for 49 people. Data on hearing impairment were missing for 56 people.
* Severity Estimates for vision are restricted to >4 years for hearing >3 years as children under these ages are unable have the severity of their impairment tested.
~~ Missing WG data dropped from WG prevalence estimates, estimates for age ranges excludes <2 as not eligible for WG screening
~ There were 29 participants who failed the OAE test in both ears but for whom PTA assessment was not undertaken: 11 were under 4 years and therefore PTA not possible and the remaining 18 were aged ≥4 years but PTA assessment could not be done due to environmental difficulties (e.g. loud rain) or individual level cognitive difficulties. For the overall prevalence estimates we assumed these participants had a hearing impairment based on failing OAE test in both ears. For the severity estimates, we excluded those with missing PTA data and restricted the analysis to people aged ≥4 years.

Table 21: Prevalence of functional limitations in adults (by domain)											
		Total		18-49 years		50+ years		Male		Female	
		N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
No basic domains scored "a lot of difficulty" or "can't do"		1011	62.7 (60.0-65.4)	683	69.9 (66.8-72.8)	328	51.6 (46.7-56.4)	300	61.7 (57.5-65.8)	711	63.1 (59.7-66.4)
At least one basic domain "a lot of difficulty" or "can't do"		153	9.5 (7.4-12.1)	38	3.9 (2.7-5.6)	115	18.1 (13.9-23.1)	59	12.1 (9.0-16.2)	94	8.3 (6.2-11.1)
At least one complex domain scored "somewhere between a little and a lot" or "a lot"		549	34.0 (31.5-36.6)	283	29.0 (26.1-32.0)	265	41.7 (37.2-46.3)	163	33.5 (29.6-37.7)	386	34.2 (31.0-37.5)
Basic Activity Domains	Seeing	48	3.0 (2.0-4.3)	4	0.4 (0.2-1.1)	44	6.9 (4.8-10.0)	20	4.1 (2.4-6.9)	28	2.5 (1.6-3.8)
	Hearing	33	2.0 (1.3-3.2)	6	0.6 (0.3-1.3)	27	4.2 (2.5-7.2)	11	2.3 (1.3-4.0)	22	2.0 (1.1-3.3)
	Walking or climbing	89	5.5 (4.1-7.3)	18	1.8 (1.2-2.9)	71	11.2 (8.3-14.9)	33	6.8 (4.7-9.8)	56	5.0 (3.5-6.9)
	Communicating	7	0.4 (0.2-1.0)	5	0.5 (0.2-1.2)	2	0.3 (0.07-1.3)	2	0.4 (0.1-1.7)	5	0.4 (0.2-1.2)
	Remembering or Concentrating	46	2.9 (1.9-4.2)	13	1.3 (0.7-2.5)	33	5.2 (3.4-7.8)	17	3.5 (2.2-5.5)	29	2.6 (1.6-4.1)
	Self Care	19	1.2 (0.7-1.9)	3	0.3 (0.09-1.0)	16	2.5 (1.4-4.3)	10	2.1 (1.1-4.0)	9	0.8 (0.4-1.5)
	Upper Body Strength	19	1.2 (0.7-1.9)	3	0.3 (0.09-1.0)	16	2.5 (1.5-4.3)	7	1.4 (0.7-3.0)	12	1.1 (0.5-2.1)
	Fine Motor Skills	14	0.9 (0.5-1.5)	2	0.2 (0.05-0.8)	12	1.9 (1.0-3.4)	4	0.8 (0.3-2.2)	10	0.9 (0.5-1.7)
Body Function Domains	Worry	212	13.1 (11.6 (14.8)	129	13.2 (11.0-15.7)	83	13.1 (10.4-16.2)	68	14.0 (11.5-17.0)	144	12.8 (10.9-14.9)
	Depression	185	11.5 (9.9-13.2)	109	11.2 (9.3-13.3)	76	11.9 (9.4-15.1)	61	12.6 (9.7-16.1)	124	11.0 (8.1-13.3)
	Pain	308	19.1 (16.9-21.6)	113	11.5 (9.5-14.0)	195	30.7 (26.8-34.8)	96	19.8 (16.3-23.7)	212	18.8 (16.3-21.7)
	Fatigue	134	8.3 (7.1-9.7)	57	5.8 (4.5-7.5)	77	12.1 (9.8-14.9)	36	7.4 (5.3-10.3)	98	8.7 (7.3-10.4)

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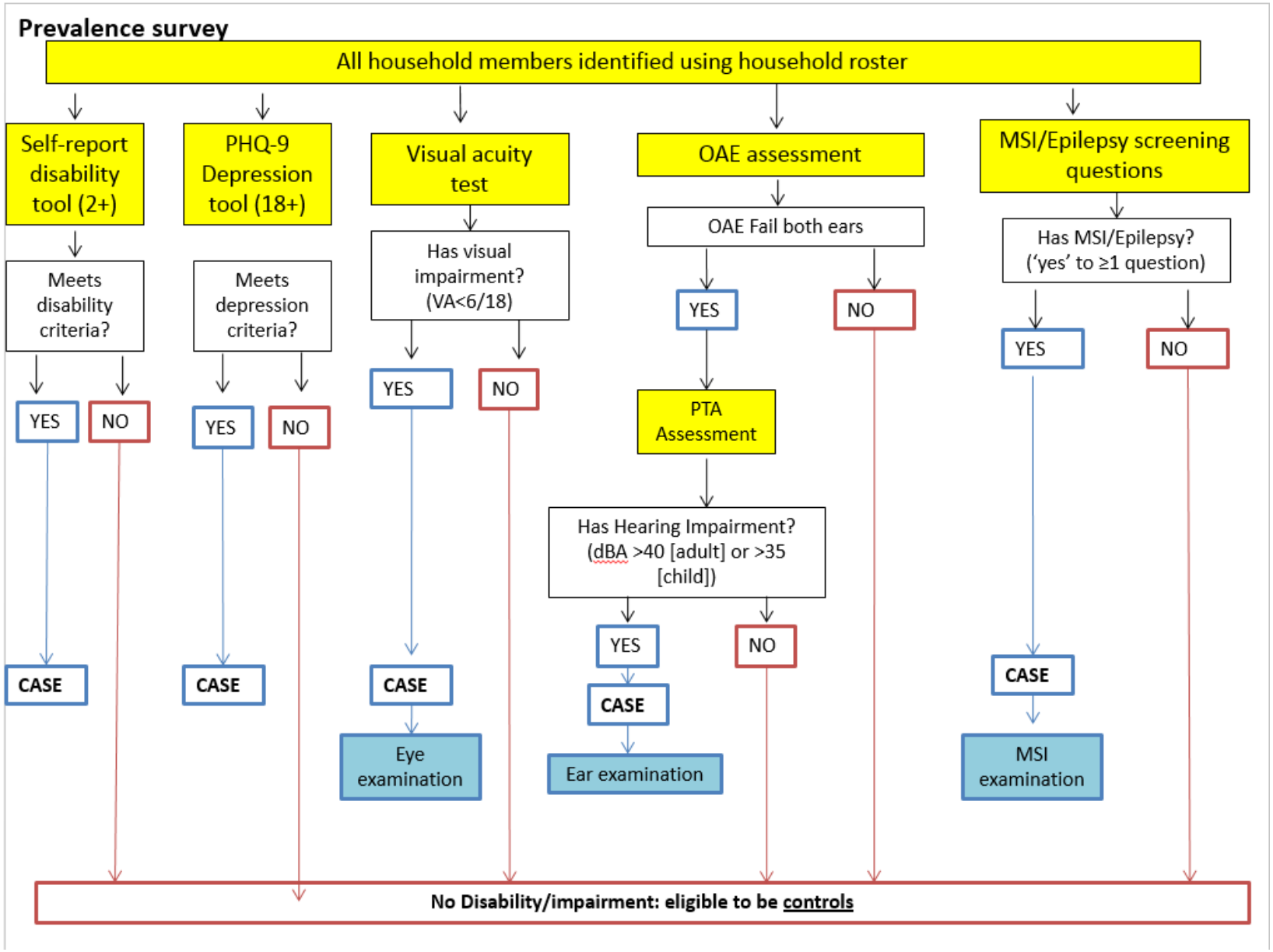
APPENDIX 1: SCREENING PROTOCOL



APPENDIX 2: Screening Questionnaire

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

CAMEROON DISABILITY STUDY - Screening and Examination Questionnaire

1. Interviewer No: ☐☐☐
2. Date (Day/Month/Year): __ __/__ __/__ __
3. Cluster No: ☐☐
4. House No: ☐☐
5. Subject Name: _____
6. Subject ID No: ☐☐☐
7. Gender Male: O (1) Female: O (2)
8. Age (years): ☐☐
9. Age (in months if <1 year): ☐☐

10. Screening Completion Matrix

	10.1 Screen Completed? Yes = 1 Unable to Complete = 2 Refused = 3	10.2 Screen Case = 1 Not Screen Case = 0	10.3 If screen positive, exam Completed? Yes = 1 Unable to Complete = 2 Refused = 3	10.4 If unable to complete screen or exam please give reason	10.5 Referral Needed Yes = 1 No = 0
A. WG Disability			N/A		N/A
B. PHQ9			N/A		
C. MSI Impairment					
D. Visual Impairment					
E. Hearing Impairment (OAE)			N/A		N/A
F. Hearing Imp (PTA) if OAE +ve					
G. Hearing Exam (if OAE and PTA screen positive)					

TO BE FILLED IN BY FIELD TEAM MEMBER RESPONSIBLE FOR CHECKING QUESTIONNAIRES FOR COMPLETION		CONFIRMED	
REMARKS:	_____ _____	Case	O (1)
		Control	O (2)
	Interviewer #	Not eligible for Case/Control	O (3)

TO BE FILLED IN BY DATA ENTRY CLERK		
	Entry 1	Entry 2
INITIALS:		
DATE OF ENTRY:		
REMARKS:		

BILITY STUDY 2013 - Screening and Examination Questionnaire

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Interviewer ID No ☐☐☐

A. Washington Group Questions for all participants AGED 2 to 17

I am now going to ask you some questions about certain everyday activities, and whether you have any difficulties in doing them. Please tell me if you do not understand question, and I will repeat it

Note to Interviewer: If respondent is aged 8-17 and being interviewed directly, replace "does [name]" with "do you" in questions.
Read all response options in full for each question asked

Children aged 2-17 years

1a) Does [name] wear glasses or contact lenses Yes O (1) No O (0)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
[if child wears glasses] 1b) Does [name] have difficulty seeing, when wearing his/her glassses?	O (1)	O (2)	O (3)	O (4)	O (5)
[if child does NOT wear glasses] 1c) Does [name] have difficulty seeing?	O (1)	O (2)	O (3)	O (4)	O (5)

Children aged 2-17 years

2a) Does [name] use a hearing aid? Yes O (1) No O (0)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
[if child uses a hearing aid] 2b) Does [name] have difficulty hearing, when using his/her hearing aid(s)?	O (1)	O (2)	O (3)	O (4)	O (5)
[if child does NOT use a hearing aid] 2c) Does [name] have difficulty hearing?	O (1)	O (2)	O (3)	O (4)	O (5)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
Children aged 2-17 years 3) Compared with children of the same age, does [name] have difficulty walking	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 5- 17 years 4) Compared with children of the same age, does [name] have difficulty with self-care such as feeding or dressing him/herself?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 2 -4 years 5a) Does [name] have difficulty understanding you?	O (1)	O (2)	O (3)	O (4)	O (5)
6a) Do you have difficulty understanding what your child wants?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 5-17 years 5b) Compared with children of the same age and using [his/her] usual language, does [name] have difficulty understanding other people?	O (1)	O (2)	O (3)	O (4)	O (5)
6b)Compared with children of the same age and using [his/her] usual language, does [name] have difficulty being understood by other people?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 2-3 years 7a) Compared with children of the same age, does [name] have difficulty learning the names of common objects?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 3-17 years 7b) Compared with children of the same age, does [name] have difficulty learning to do new things?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 5-17 years 8) Compared with children of the same age, does [name] have difficulty remembering things that they have learned?	O (1)	O (2)	O (3)	O (4)	O (5)

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Interviewer ID No. ☐☐

	The same or Less	More	A lot more	Dont Know
Children aged 5-17 years 9) Compared with children of the same age, how much does [he /she] worry or feel sad?	O (1)	O (2)	O (3)	O (4)
Children aged 2-4 years 10a) Compared with children of the same age, how much does [name] kick, bite or hit other children or adults?	O (1)	O (2)	O (3)	O (4)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
Children aged 5-17 years 10b) Compared with children of the same age, how much difficulty does [name] have controlling [his/her] behaviour?	O (1)	O (2)	O (3)	O (4)	O (5)
11) Compared with children of the same age, does [name] have difficulty completing a task?	O (1)	O (2)	O (3)	O (4)	O (5)
12) Compared with children of the same age, does [name] have difficulty accepting change to plans or routine?	O (1)	O (2)	O (3)	O (4)	O (5)
13) Does [name] have difficulty getting along with children of [his/her] age?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 2-5 years 14 a1) Compared with children of the same age, does [name] have difficulty playing with toys or household objects?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 2-12 years 14a2) Compared with children of the same age, does [name] have difficulty playing with other children?	O (1)	O (2)	O (3)	O (4)	O (5)
Children aged 13-17 years 14b) Compared with children of the same age, does [name] have difficulty doing things with other children? (Include things that children usually do together.)	O (1)	O (2)	O (3)	O (4)	O (5)

Child SCREENS POSITIVE IF:
ANY QUESTION 1 to 8 SCORES "A lot More", "A lot of Difficulty" or "Cannot do at all"

Screen case: O (1)
Not Screen case: O (0)

COMPLETE FRONT PAGE BEFORE STARTING NEXT SECTION

To Parent: Based on your/ your child's responses, it seems that your child may experience difficulties in doing certain things compared to other children his/her age, and we would like to ask some more questions about this.

3

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Interviewer ID No. ☐☐☐

A. Washington Group Questions for all participants 18+

I am now going to ask you some questions about certain everyday activities, and whether you have any difficulties in doing them. Please tell me if you do not understand question, and I will repeat it

Note to Interviewer: Read all response options in full for each question asked

1a) Do you wear glasses or contact lenses Yes O (1) No O (0)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
[if respondent wears glasses/contact lenses] 1b) Do you have difficulty seeing, even when wearing your glassses/contact lenses?	O (1)	O (2)	O (3)	O (4)	O (5)
[if respondent does NOT wear glasses/contact lenses] 1c) Do you have difficulty seeing?	O (1)	O (2)	O (3)	O (4)	O (5)

2a) Do you use a hearing aid? Yes O (1) No O (0)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
[if respondent uses a hearing aid] 2b) Do you have difficulty hearing, even when using your hearing aid(s)?	O (1)	O (2)	O (3)	O (4)	O (5)
[if respondent does NOT use a hearing aid] 2c) Do you have difficulty hearing?	O (1)	O (2)	O (3)	O (4)	O (5)

3a) Do you use any equipment or receive help for getting around? Yes O (1) No O (0)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
[if respondent uses equipment or receives help to get around] 3b) Do you have difficulty walking or climbing steps, even when using your equipment or with help?	O (1)	O (2)	O (3)	O (4)	O (5)
[if respondent does NOT use equipment or receive help to get around] 3c) Do you have difficulty walking or climbing steps?	O (1)	O (2)	O (3)	O (4)	O (5)

4a) Do you use sign language? Yes O (1) No O (0)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
4b) Using your usual language, do you have difficulty communicating, for example understanding or being understood?	O (1)	O (2)	O (3)	O (4)	O (5)

	No difficulty	Some difficulty	A lot of difficulty	Cannot do at all	Dont Know
5) Do you have difficulty remembering or concentrating?	O (1)	O (2)	O (3)	O (4)	O (5)
6) Do you have difficulty with self care, such as washing all over or dressing?	O (1)	O (2)	O (3)	O (4)	O (5)
7) Do you have difficulty raising a 2 litre bottle of water or soda from waist to eye level?	O (1)	O (2)	O (3)	O (4)	O (5)
8) Do you have difficulty using your hands and fingers, such as picking up small objects, for example a button or pencil, or opening or closing containers or bottles	O (1)	O (2)	O (3)	O (4)	O (5)

	Daily	Weekly	Monthly	A few times a year	Never	Dont Know
9a) How often do you feel worried, nervous or anxious?	O (1)	O (2)	O (3)	O (4)	O (5)	O (6)

→ **If NEVER or DONT KNOW to 9a) Go to Q10**

4

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

Cluster no: ☐☐ Household no: ☐☐☐ Subject ID no: ☐☐☐ Interviewer ID No. ☐☐☐

9b) Do you take medication for these feelings? Yes O (1) No O (0)

	A little	A lot	Somewhere between a little and a lot	Dont Know
9c) Thinking about the last time you felt worried, nervous or anxious, how would you describe the level of these feelings?	O (1)	O (2)	O (3)	O (4)

	Daily	Weekly	Monthly	A few times a year	Never	Dont Know
10 a) How often do you feel depressed? Would you say	O (1)	O (2)	O (3)	O (4)	O (5)	O (6)

→ **If NEVER or DONT KNOW to 10a) Go to Q 11**

10b) Do you take medication for depression? Yes O (1) No O (0)

	A little	A lot	Somewhere between a little and a lot	Dont Know
10c) Thinking about the last time you felt depressed, how depressed did you feel?	O (1)	O (2)	O (3)	O (4)

	Never	Some Days	Most Days	Every Day	Dont Know
11a) In the past three months, how often did you have pain?	O (1)	O (2)	O (3)	O (4)	O (5)

→ **If NEVER or DONT KNOW to 11a) go to Q12**

	A little	A lot	Somewhere between a little and a lot	Dont Know
11b) Thinking about the last time you felt pain, how much pain did you have?	O (1)	O (2)	O (3)	O (4)

	Never	Some Days	Most Days	Every Day	Dont Know
12a) In the past three months, how often did you feel very tired or exhausted?	O (1)	O (2)	O (3)	O (4)	O (5)

→ **If NEVER to 12a) go to END OF SECTION**

	Some of the day	Most of the day	All of the day	Dont Know
12b) Thinking about the last time you felt very tired or exhausted, how long did it last?	O (1)	O (2)	O (3)	O (4)

	A little	A lot	Somewhere between a little and a lot	Dont Know
12c) Thinking about the last time you felt this way, how would you describe the level of tiredness?	O (1)	O (2)	O (3)	O (4)

Participant SCREENS POSITIVE If:Any Question 1 to 8 scores "A lot", "A lot of Difficulty" or "Cannot do at all"

Screen case: O (1)
Not Screen case: O (0)
COMPLETE FRONT PAGE BEFORE STARTING NEXT SECTION

To Participant: Based on your responses, it seems that you may experience difficulties in doing certain things compared to other people, and we would like to ask some more questions about this.

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Interviewer ID No. ☐☐☐

B. PHQ-9 Questions for all participants >17

I am now going to ask you a few questions about how you have been feeling recently. Please tell me if you do not understand a question, and I will repeat it

Over the last two weeks, how often have you been bothered by any of the following problems?

	Not at all	Several Days	More than Half the Days	Nearly Every Day
1. Little interest or pleasure in doing things	O (0)	O (1)	O (2)	O (3)
2. Feeling down, depressed, or hopeless	O (0)	O (1)	O (2)	O (3)
3. Feeling tired or having little energy	O (0)	O (1)	O (2)	O (3)

→ **If no responses in SHADED AREA go to NEXT SECTION**

4. Trouble falling/staying asleep, sleeping too much	O (0)	O (1)	O (2)	O (3)
5. Poor appetite or overeating	O (0)	O (1)	O (2)	O (3)
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	O (0)	O (1)	O (2)	O (3)
7.Trouble concentrating on things, such as reading the newspaper or watching television	O (0)	O (1)	O (2)	O (3)
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	O (0)	O (1)	O (2)	O (3)
9.Thoughts that you would be better off dead or of hurting yourself in some way	O (0)	O (1)	O (2)	O (3)

Column Totals: _____ + _____ + _____

Total Score (Add Totals together): _____

Participant SCREENS POSITIVE if: Total score greater than 19 and includes at least one answer in the shaded area

Screen case: O (1)
Not Screen case: O (0)
COMPLETE FRONT PAGE BEFORE STARTING NEXT SECTION

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

C. RAPID ASSESSMENT OF MUSCULOSKELETAL IMPAIRMENT

A. GENERAL INFORMATION

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Examiner Code No. ☐☐☐

Examination status: Examined: O (1)
Unable to examine: O (2) Reason: _____
Refused: O (3)

B. SCREEN FOR MUSCULOSKELETAL IMPAIRMENT

I am going to ask you now a few questions about your physical health and abilities.

1. Who is responding?

Screen by eligible person: O (1)
Screen by proxy: O (0)

2. Use this prefix for 5 and under (by proxy): Compared to other children

	Yes	No
1. Is any part of your body missing or misshapen?:	O (1)	O (0)
2. Do you have any difficulty using your arms?:	O (1)	O (0)
3. Do you have any difficulty using your legs?:	O (1)	O (0)
4. Do you have any difficulty using any other part of your body?:	O (1)	O (0)
5. Do you need a mobility aid or prosthesis?:	O (1)	O (0)
6. Do you have convulsions, involuntary movement, rigidity or loss of consciousness?:	O (1)	O (0)

3. Duration

	Yes	No
1. Has it lasted>1m?	O (1)	O (0)
2. Is it permanent?	O (1)	O (0)

Examine Participant if: Answer to at least one Q 1-6 is Yes and Answer to at least one "Duration" question is Yes

MSI Exam Needed Yes O (1) / No O (0)

C. OBSERVATION OF ACTIVITIES

		Yes	No
I. Position	1. Squat/sit bending knees:	O (1)	O (0)
	2. Stand up straight on natural legs:	O (1)	O (0)
	3. Hold arms straight above head, fingers straight:	O (1)	O (0)
II. Mobility	1. Walk along the 11 metre rope:	O (1)	O (0)
	2. Do it in less than 10 secs:	O (1)	O (0)
	3. Do it without limping:	O (1)	O (0)
III. Right hand function	1. Touch Nose:	O (1)	O (0)
	2. Pick up coin and put in cup:	O (1)	O (0)
	3. Tip coin into bowl:	O (1)	O (0)
IV. Left hand function	1. Touch Nose:	O (1)	O (0)
	2. Pick up coin and put in cup:	O (1)	O (0)
	3. Tip coin into bowl:	O (1)	O (0)

D. SEIZURE HISTORY

1 Have you ever had a seizure?
No history of seizure: O (0)
History of seizure: O (1)

2 Have you had three or more seizures in the past year?
3 or more seizures: No O (0) / Yes O (1)
Not applicable (never had seizure): O (3)

3 Number of episodes in last year:
0: O (1)
1-2: O (2)
3-10: O (3)
>10: O (4)
Not applicable (never had seizure): O (5)

4 Type of seizure (tick one only)
Absences: O (1)
Convulsions: O (2)
Not applicable (never had seizure): O (3)

E. DURATION AND CONSANGUINITY

1 Age at impairment:
Since birth: O (1)
after birth-1 year: O (2)
1-5 years O (3)
6-15 years: O (4)
16-39 years: O (5)
>40 years: O (6)
Not applicable (No impairment:) O (7)

2 Consanguinity: No O (0) / Yes O (1)

F. AETIOLOGY *Tick one only for each impairment*

		Impairment no: 1	2
	Family history:	O	O (1)
	Congenital but no family history:	O	O (2)
	Perinatal hypoxia:	O	O (3)
Trauma	RTA:	O	O (4)
	Civil violence:	O	O (5)
	Domestic violence:	O	O (6)
	Deliberate self harm:	O	O (7)
	Other inc accidents:	O	O (8)
	Specify.....		
	Developmental / Nutritional:	O	O (9)
	Infection:	O	O (10)
	Neoplasm:	O	O (11)
	Iatrogenic:	O	O (12)
	Traditional	O	O (13)
	Unknown:	O	O (14)
	Other:	O	O (15)
	Specify.....		
	Not applicable (No impairment:)	O	O (16)

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G. STRUCTURE AND FUNCTION

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

Region	Structure affected Yes	Structure affected No	Laterality Left = 1 Right = 2 Both = 3	Nature of change (see codes below)	Magnitude (see codes below)
1. Head and Neck	O (1)	O (0)			
2. Shoulder region	O (1)	O (0)			
3. Upper arm	O (1)	O (0)			
4. Elbow Joint	O (1)	O (0)			
5. Forearm	O (1)	O (0)			
6. Wrist Joint	O (1)	O (0)			
7. Hand	O (1)	O (0)			
8. Hand/Finger Joints	O (1)	O (0)			
9. Whole arm	O (1)	O (0)			
10. Pelvis	O (1)	O (0)			
11. Hip joint	O (1)	O (0)			
12. Thigh	O (1)	O (0)			
13. Knee Joint	O (1)	O (0)			
14. Lower leg	O (1)	O (0)			
15. Ankle Joint	O (1)	O (0)			
16. Foot	O (1)	O (0)			
17. Foot/Toe Joints	O (1)	O (0)			
18. Whole Leg	O (1)	O (0)			
19. Trunk	O (1)	O (0)			
20. C-spine	O (1)	O (0)			
21. T-spine	O (1)	O (0)			
22. L-spine	O (1)	O (0)			
23. Whole body	O (1)	O (0)			

Nature of Change Codes: No change in structure = 0; Total absence = 1; Partial absence = 2; Additional Part = 3; Aberrant dimensions = 4; Discontinuity = 5; Deviating Position = 6; Qualitative changes = 7; Not Specified = 8; Not applicable = 9

Magnitude of Function: No impairment = 0; Mild Impairment = 1; Moderate Impairment = 2; Severe Impairment = 3; Complete Impairment = 4

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CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Examiner Code No. ☐☐☐

G. DIAGNOSTIC CASE CONFIRMATION
Case: O (1)
Not case: O (0)

H. CASE SEVERITY
Case severity: Mild O (1) Moderate: O (2) Severe: O (3)

I. DIAGNOSIS DECISION ALGORITHM

Is it congenital? Yes → **a. CONGENITAL/GENETIC**

UPPER LIMB
- O (01) Polydactyly
- O (02) Syndactyly
- O (03) Other congenital hand deformity
- O (04) Other congenital absence of all or part of upper limb
- O (05) Other congenital abnormality of upper limb

LOWER LIMB
- O (10) Developmental dysplasia of hip
- O (11) Proximal focal femoral deficiency
- O (12) Congenital absence of all or part of tibia
- O (13) Congenital absence of all or part of fibula
- O (14) Other congenital absence of all or part of lower limb
- O (15) Club foot
- O (16) Other congenital abnormality of lower limb

UPPER AND LOWER LIMB
- O (20) Amniotic bands
- O (21) Arthrogryphosis

SPINE
- O (30) Congenital deformity of cervical spine
- O (31) Congenital deformity of thoracolumbar spine

HEAD AND NECK
- O (40) Cleft lip
- O (41) Cleft lip and palate
- O (42) Other congenital deformity of head or face

GENERAL
- O (50) Multiple congenital abnormalities
- O (51) Sickle cell disease
- O (52) Osteogenesis imperfecta
- O (53) Haemophilia
- O (54) Muscular Dystrophy

No → Is it due to an infection? Yes → **b. INFECTIVE**
- O (01) Joint Infection
- O (02) Bone infection limb
- O (03) Bone infection spine
- O (03) Skin/soft tissue infection/wound

No → Is it due to trauma? Yes → **c. ACQUIRED TRAUMA**
- O (01) Burn contracture
- O (10) Fracture non unioin
- O (11) Fracture malunion
- O (12) Spinal injury
- O (13) Head injury
- O (20) Recurrent/chronic dislocation
- O (21) Post traumatic joint stiffness
- O (30) Tendon problem
- O (31) Muscle problem
- O (32) Peripheral nerve problem
- O (40) Amputation
- O (50) Other Trauma

No → Is it neurological in cause or nature? Yes → **d. NEUROLOGICAL**
- O (01) Epilepsy
- O (02) Leprosy
- O (03) Developmental delay
- O (04) Cerebral palsy - spastic
- O (05) Cerebral palsy - other
- O (06) Paraplegia
- O (07) Hemiplegia
- O (08) Quadriplegia
- O (09) Facial weakness
- O (10) Peripheral nerve palsy
- O (11) Polio
- O (12) Other neurological

No → **e. ACQUIRED NON TRAUMATIC**
- O (01) Degenerative joint disease
- O (02) Non infective non traumatic joint disease
- O (03) Bow legs
- O (04) Knock knees
- O (05) Other joint deformity
- O (11) Bone tumour (benign or malignant)
- O (21) Skin/Soft tissue tumour
- O (40) Spinal deformity-kyphosis
- O (41) Spinal deformity-lordosis
- O (42) Spinal deformity-scoliosis
- O (43) Spinal pain limiting function
- O (44) TB spine/spine infection
- O (50) Limb pain limiting function
- O (60) Lymphoedema
- O (70) Other acquired non traumatic

f. NO DIAGNOSIS
- O (01) No Diagnosis

J. CASE DIAGNOSIS CODE

Diagnosis 1 _____ ☐☐☐

Diagnosis 2 _____ ☐☐☐

K. TREATMENT INFORMATION

	Previous Yes	Previous No	Needed Yes	Needed No
1. None:	O (1)	O (0)	O (1)	O (0)
2. Medication:	O (1)	O (0)	O (1)	O (0)
3. Plaster/Splintage:	O (1)	O (0)	O (1)	O (0)
4.Physiotherapy	O (1)	O (0)	O (1)	O (0)
5. Special Seating:	O (1)	O (0)	O (1)	O (0)
6. Mobility aid:	O (1)	O (0)	O (1)	O (0)
7. Tricycle:	O (1)	O (0)	O (1)	O (0)
8.Appliance:	O (1)	O (0)	O (1)	O (0)
9. Orthosis	O (1)	O (0)	O (1)	O (0)
10. Prosthesis:	O (1)	O (0)	O (1)	O (0)
11.Wheelchair:	O (1)	O (0)	O (1)	O (0)
12.Surgery:	O (1)	O (0)	O (1)	O (0)
13. Permanent care:	O (1)	O (0)	O (1)	O (0)
14. Traditional medicine:	O (1)	O (0)	O (1)	O (0)
15 Other:	O (1)	O (0)	O (1)	O (0)
Specify:				

L. WHY I HAVE NOT HAD (FURTHER) TREATMENT

- Unaware of Impairment O (1)
- Believes it to be a curse O (2)
- Services not available or very far O (3)
- No / delayed information about services O (4)
- Cannot afford treatment O (5)
- No one to accompany O (6)
- No time available / other priorities O (7)
- Old age and need not felt O (8)
- Adequate function / need not felt O (9)
- Fear of treatment O (10)
- Not applicable O (11)

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Examiner Code No. ☐☐☐

D. VISUAL IMPAIRMENT

A. GENERAL INFORMATION

Examination status: Examined: O (1)
Unable to examine: O (2) Reason:
Refused: O (3)

Screen Case: O (1)
Not Screen case: O (0)

Always ask: "Did you ever have any problems with your eyes?"

B. VISION SCREEN

Using distance glasses: **Yes** O (1) **No** O (0)
Using reading glasses: **Yes** O (1) **No** O (0)

i)AGE 5+ YEARS

Presenting

	Right eye	Left eye	
Can see 6/18	O (1)	O (1)	
Cannot see 6/18 but can see 6/60	O (2)	O (2)	
Cannot see 6/60 but can see 3/60	O (3)	O (3)	CASE
Cannot see 3/60 but can see 1/60	O (4)	O (4)	
Light perception (PL+)	O (5)	O (5)	
No light perception (PL-)	O (6)	O (6)	

With Pinhole

	Right eye	Left eye
Can see 6/18	O (1)	O (1)
Cannot see 6/18 but can see 6/60	O (2)	O (2)
Cannot see 6/60 but can see 3/60	O (3)	O (3)
Cannot see 3/60 but can see 1/60	O (4)	O (4)
Light perception (PL+)	O (5)	O (5)
No light perception (PL-)	O (6)	O (6)

ii)AGE 0-2 YEARS

Can the child look at and follow a moving object? **Yes:** O (1) **No:** O (0) **Unable to examine** O (2)

iii)AGE 3-4 YEARS

Can child count/copy fingers from 6 meters with both eyes open? **Yes:** O (1) **No:** O (0) **Unable to examine** O (2)

E. WHY CATARACT OPERATION WAS NOT DONE

(Mark up to 2 responses, if VA<6/18, not improving with pinhole, with visually impairing lens opacity in one or both eyes)

- Need not felt O (1)
- Fear of surgery or poor result O (2)
- Cannot afford operation O (3)
- Treatment denied by provider O (4)
- Unaware treatment is possible O (5)
- No one to accompany O (6)
- No time available / other priorities O (7)
- Told to wait for cataract to mature O (8)

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<6/18

(Mark only one cause for each eye)

	Right eye	Left eye	Principal cause in person
Refractive error:	O (1)	O (1)	O (1)
Cataract, untreated	O (2)	O (2)	O (2)
Aphakia, uncorrected:	O (3)	O (3)	O (3)
Surgical complications:	O (4)	O (4)	O (4)
Trachoma:	O (5)	O (5)	O (5)
Phthisis/disorganised/removed:	O (6)	O (6)	O (6)
Other corneal scar/opacity:	O (7)	O (7)	O (7)
Globe abnormality:	O (8)	O (8)	O (8)
Cortical blindness:	O (9)	O (9)	O (9)
Dilate pupil			
Glaucoma:	O (10)	O (10)	O (10)
Diabetic retinopathy:	O (11)	O (11)	O (11)
ARMD:	O (12)	O (12)	O (12)
Onchocerciasis:	O (13)	O (13)	O (13)
Other post. segment / CNS:	O (14)	O (14)	O (14)
Not examined (can see 6/18)	O (15)	O (15)	O (15)

F. 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<6/18 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 6/18	O (5)	O (5)
Are you satisfied with results of cataract surgery?		
Very satisfied	O (1)	O (1)
Partially satisfied	O (2)	O (2)
Indifferent	O (3)	O (3)
Partially dissatisfied	O (4)	O (4)
Very dissatisfied	O (5)	O (5)

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

E. OAE SCREEN FOR HEARING IMPAIRMENT

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Examiner Code No. ☐☐☐

1. OAE Equipt No. ☐☐

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RIGHT EAR	Pass	Fail	Not done - discharging ear	Not done - other
	O (1)	O (2)	O (3)	O (4)

LEFT EAR	Pass	Fail	Not done - discharging ear	Not done - other
	O (1)	O (2)	O (3)	O (4)

3 State reason if "not done - other": _____

Pure Tone Audiometry (PTA) needed if Participant FAILS OAE in BOTH EARS or if OAE can not be done/read for any reason

Pure Tone Audiometry Test Needed Yes O (1) No (0)

COMPLETE FRONT PAGE BEFORE STARTING NEXT SECTION

F. PTA FOR HEARING IMPAIRMENT IF BOTH EARS FAIL OAE

II. AUDIOMETRY **If aged 4+ and OAE fails in BOTH ears or can not be done**

1. Ambient Noise ☐☐ dBA

2. PTA Equipment No. ☐☐

2. Hearing Thresholds

	Right (dBHL)		Left (dBHL)
a.	☐☐	1 KHz	☐☐
b.	☐☐	2 KHz	☐☐
c.	☐☐	4 KHz	☐☐
d.	☐☐	0.5 KHz	☐☐
e.	☐☐	1 KHz	☐☐
f. Average score a-d	☐☐		☐☐

Note: If 1KHz (e.) score not within +/- 5dbHL of 1KHz (a.) score repeat PTA screen

Partipant SCREENS POSITIVE if Average score (f) is >35dBa for 0-17 year olds or >40dBa for 18+ in BOTH ears

Screen case: O (1)
Not Screen case: O (0)

COMPLETE FRONT PAGE BEFORE STARTING NEXT SECTION

CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

G. WHO/PBD Ear and Hearing Disorders Examination Form

A. GENERAL INFORMATION

Cluster no: ☐☐ Household no: ☐☐ Subject ID no: ☐☐☐ Examiner Code No. ☐☐☐

B. BASIC EAR ASSESSMENT FOR HEARING IMPAIRMENT CASES ONLY

	Right			Left		
	No	Yes	Not Asked	No	Yes	Not Asked
I. Ear Pain	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)

	Right			Left		
	N	M	N/E	N	M	N/E
II. Auricle	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)

N = Normal; M= Malformation; N/E = Not Examined

	Right			Left		
III. External Canal	N	Y	N/E	N	Y	N/E
1. Normal	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)
2. Inflammation	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)
3. Wax	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)
Removed?	O (0)	O (1)		O (0)	O (1)	
4. Foreign Body	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)
Removed?	O (0)	O (1)		O (0)	O (1)	
5. Otorrhoea	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)
Removed?	O (0)	O (1)		O (0)	O (1)	
6. Fungi	O (0)	O (1)	O (2)	O (0)	O (1)	O (2)

N= No; Y= Yes; N/E = Not Examined

	Right				Left			
IV. Ear Drum	N	Y	N/E	U	N	Y	N/E	U
1. Perforation	O (0)	O (1)	O (2)	O (3)	O (0)	O (1)	O (2)	O (3)
2. Dullness or Retraction	O (0)	O (1)	O (2)	O (3)	O (0)	O (1)	O (2)	O (3)
3. Red and Bulging	O (0)	O (1)	O (2)	O (3)	O (0)	O (1)	O (2)	O (3)
4. Normal	O (0)	O (1)	O (2)	O (3)	O (0)	O (1)	O (2)	O (3)

N= No; Y= Yes; N/E = Not Examined; U= Unsure

	Right				Left			
V. Middle Ear	N	Y	N/E	U	N	Y	N/E	U
1. Normal	O (0)	O (1)	O (2)	O (3)	O (0)	O (1)	O (2)	O (3)
2. Otorrhoea	O (0)	O (1)	O (2)	O (3)	O (0)	O (1)	O (2)	O (3)
VI. Others	O (0)	O (1)	O (2)	O (3)	O (0)	O (1)	O (2)	O (3)

1. If Yes, Specify _____

VII. Additional Information

1. How Long has the subject had difficulty hearing?

Since Infancy/childhood (0-4y) O (1)
Somce adulthood (15-59y) O (2)
Since old age (60y+) O (3)
Uncertain O (4)
No Difficulty O (5)
Not Asked O (6)

2. Does any relative of the subject have difficulty hearing?

No O (0)
Yes O (1) → 3. If yes, specify: Brother or Sister O (1); Child of Subject O (2); Parent of Subject O (3)
Uncertain O (3)
Not Asked O (4)

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CAMEROON DISABILITY STUDY 2013 - Screening and Examination Questionnaire

D. CAUSE OF EAR DISEASE AND/OR HEARING IMPAIRMENT

Please tick all that apply

	Right ear	Left ear
Normal ear **AND** normal hearing	O (1)	O (1)
I. Ear Disease		
1. Wax	O (2)	O (2)
2. Foreign Body	O (3)	O (3)
3. Otitis Externa...	O (4)	O (4)
4. Acute Otitis Media	O (5)	O (5)
5. Chronic Suppurative Otitis Media	O (6)	O (6)
6. Serous Otitis media (with effusion)	O (7)	O (7)
7. Dry perforation of Tympanic Membrane	O (8)	O (8)
II. Infectious Diseases	O (9)	O (9)
Specify _____		
III. Genetic Conditions	O (10)	O (10)
Specify _____		
IV. Non-Infectious Conditions	O (11)	O (11)
Specify _____		
V. Underermined Cause	O (12)	O (12)
Specify _____		
VI. Other	O (13)	O (13)
Specify _____		

E. ACTION NEEDED

I. No Action Needed O (1)

II. Action Needed	N	Y	U
1. Medication	O (0)	O (1)	O (2)
2. Hearing Aid	O (0)	O (1)	O (2)
3. Language/Speech Rehabilitation	O (0)	O (1)	O (2)
4. Special Needs Education	O (0)	O (1)	O (2)
5. Vocational Training	O (0)	O (1)	O (2)
6. Surgery Referral	O (0)	O (1)	O (2)
Urgent	O (0)	O (1)	O (2)
Non Urgent	O (0)	O (1)	O (2)

N= No; Y= Yes; U=Unsure

	N	Y	U
7. Others	O (0)	O (1)	O (3)

Specify _____

III. Any Additional Examiner Remarks:

_____
_____
_____
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APPENDIX 3: clinical impairment severity definitions

Table 22: Clinical impairment severity definitions

	Measurement	Severity	Threshold
Vision	Visual Acuity – presenting vision in better eye	No Impairment	VA> 6/18
		Moderate	VA <6/18 but >6/60
		Severe	VA <6/60 but >3/60
		Profound (blind)	VA <3/60
Hearing	Level of hearing loss in better ear	No Impairment	<25 dBA (adults) and <35 dBA (children)
		Mild*	25-40 dBA (adults)
		Moderate	41-60db (adults), 35-60db (children)
		Severe	61-80db
		Profound (deaf)	>80dba
MSI	Overall functional performance of musculoskeletal system based on observation and examination	No Impairment	No presence of musculoskeletal structural impairment that affects the structures ability to function at all
		Mild*	Structure impairment with mild effect on the musculoskeletal system's ability to function as a whole 5-24%
		Moderate	Structure impairment with moderate effect on the musculoskeletal system's ability to function as a whole 25-49%
		Severe	Structure impairment with severe effect on the musculoskeletal system's ability to function as a whole 50-100%

*Mild impairments not included in estimates of disability/overall estimates of prevalence of clinical impairments