

UNIVERSIDAD SAN FRANCISCO DE QUITO
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**WHO EAR AND HEARING DISORDERS SURVEY:
ECUADOR NATIONAL STUDY 2008 - 2009**

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HOJA DE APROBACION DE TESIS

**WHO EAR AND HEARING DISORDERS SURVEY:
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ABSTRACT:

OBJECTIVES: First national study of prevalence of ear and hearing disorders conducted in Latin America which follows the World Health Organization Ear and Hearing Disorder Survey protocol. 1) Provide regional governments, institutions and professionals with local and accurate information on the prevalence of ear and hearing pathologies in the Ecuadorian population, 2) Contribute to the global burden of disease by generating standardized data that can be compared among countries and regions. **METHOD:** This is a prospective, multi-stage cluster sample design study, conducted over a 9 month period (March to Dec 2009). Population tested: all members of households selected according to the sample strategy (cluster sample design, 28 clusters by population proportional to size in Ecuador). Testing was carried out in hospital facilities across the country including: audiometry / TEAOEs, and otological examination. Outcome measures included the diagnostic criteria for disabling hearing impairment established by the WHO. Data was entered in EARFORM software for basic statistical analysis and then compared to results obtained from contingency tables. **RESULTS:** 5762 subjects tested. The prevalence found in the ages 6 mths. to 3 yrs 11 mths. was 4.3%, 4 yrs to 14.11 mths. was 1.5%, 15 to 64 yrs was 2.6%, 64 years and older 40.9%, with a global prevalence of 5 % with a 95% CI of 3.9% a 6.1%. Out of the total population tested 14.52% are in need of action or services. **CONCLUSIONS:** The prevalence of disabling HI correlates with the prevalence found in other studies using the same protocol and it is slightly higher than the 4.2% global estimate for disabling hearing loss. The Ecuadorian population is in need of a substantial improvement in hearing services delivery.

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RESUMEN:

ABSTRACTO: Es el primer estudio nacional de prevalencia de desordenes de oído y audición en América Latina con el protocolo de la Organización Mundial de la Salud OMS (World Health Organization Ear and Hearing Disorder Survey Protocol). **OBJETIVOS:** 1) Proveer gobiernos regionales, instituciones y profesionales con información local confiable sobre la prevalencia de desordenes de oído y audición en la población ecuatoriana, 2) Contribuir a la carga global de morbilidad al generar información estandarizada la misma que puede ser comparada a través de países y regiones. **METODOS:** Estudio prospectivo, con un diseño multi etapa, conducido durante un periodo de 9 meses (Marzo a Dic. 2009). La población evaluada: Todos los miembros de una casa, la misma que fue seleccionada a través de la estrategia predeterminada (28 aglomerados seleccionados de acuerdo a PPS - Population Proportional to Size en Ecuador). Las evaluaciones se realizaron en Hospitales del Ministerio de Salud Publica del Ecuador en cada población, la evaluación incluía: audiometría / emisiones otoacústicas (TEAOEs), y evaluación otológica. Se utilizó el criterio de diagnóstico de la OMS. Los datos fueron ingresados en EARFORM software para análisis estadístico básico y comparación con tablas de contingencias. **RESULTADOS:** 5762 sujetos estudiados. La prevalencia encontrada de discapacidad auditiva en la población ecuatoriana fue 5% con un IC del 95% entre 3.9% y 6.1%. La prevalencia encontrada en la población de 6 meses a 3 años 11 meses fue del 4.3%, entre 4 años y 14 años 11 meses fue del 1.5%, 15 a 64 años 2.6%, 64 años y mayores 40.9%, De toda la población evaluada el 14.52% necesita servicios audiológicos u otológicos. **CONCLUSIONES:** La prevalencia de discapacidad auditiva correlaciona con la prevalencia encontrada en otros países utilizando el mismo protocolo, y es más alta que la prevalencia global estimada por la OMS 4.2%. Los resultados sugieren que existe un nivel significativo de población que necesita este tipo de servicios.

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1. INTRODUCTION

DESCRIPTION OF HEARING AND HEARING DISORDERS:

Sound waves travel through the outer ear (pinna and external auditory ear canal), to the tympanic membrane, which vibrates and transmits this vibration to the ossicular chain (middle ear), which vibrates the oval window and causes a movement of the basilar membrane and the perilymphatic fluids stimulating the inner hair cells, at some stage, still unknown, the mechanical energy is transformed into electrical energy to stimulate the auditory nerve. The brain receives this information and processes it for understanding purposes. In other words, our ears are the entrance point but we hear with our brains. Normal hearing from an audiological point of view is defined as the capacity to hear between 250 to 8000 Hertz (unit used to measure frequency), between 0 and 20 decibels (unit used to measure loudness). These frequencies are known as the main frequencies for spoken language development and understanding.

Hearing disorders occur when there is a problem in the out ear, middles ear or inner ear. Hearing loss is divided into three types: conductive hearing loss (when the problem occurs in the outer or middle ear), mixed losses when in addition to a conductive problem there is some irreversible damage to the inner ear, and sensory – neural losses when the damage occurs in the inner ear o the eight nerve (hearing

nerve), this type of losses are irreversible. The degree of hearing loss is also classified by mild, moderate, severe and profound (TABLE (IV). Profound losses are also known as deafness. "Hearing loss is a chronic and often life-longing disability" (Smith, 2008). Depending on the severity and the frequencies affected it can severely impact spoken language development and communication. Hearing losses can be congenital or acquired. Congenital losses can be caused by genetic factors, intrauterine infections such as rubella, cmv, malformations, and neonatal complications. They can also be acquired by bacterial and virus infections such as otitis media and meningitis, noise exposure, trauma, ototoxicity.

GLOBAL OVERVIEW OF EAR AND HEARING DISORDERS:

Ear disease and hearing impairment are a neglected public health problem in developing countries in the infant and adult population. According to the measure Year Lived with Disability (YLD) global estimation for 2005 (see table I, Mathers 2005) hearing loss of adult onset represents the second highest percentage of contributors to the total YLD. Congenital and child-onset hearing loss are also a concern as many of the risk factors can be identified in people from a low socio-economic background, such as: low birth weight, overcrowding, lack of hygiene, respiratory track infections, among others. The WHO (World Health Organization) (2006) emphasizes three particular facts about hearing loss to support action in this field:

- 1) 80% of deaf and hearing impaired people live in low-middle income countries.
- 2) 1 of 40 people who would benefit from a hearing aid have one

- 3) 50% of deafness and hearing impairment is avoidable through prevention, early diagnosis and management.

Table I: The leading causes of YLD: global estimates for 2005 (Mathers,C. 2005)

Years lived with disability (YLD)	
Cause	Percent of total YLD
1 Unipolar depressive disorders	12.1
2 Other unintentional injuries	4.8
3 Hearing loss, adult onset	4.8
4 Cataracts	4.7
5 Alcohol dependence	3.3
6 Schizophrenia	2.8
7 Osteoarthritis	2.7
8 Age-related vision disorders	2.6
9 Bipolar affective disorder	2.5
10 Chronic obstructive pulmonary disease	2.0
11 Asthma	2.0
12 Cerebrovascular disease	2.0

(Mathers,C. 2005)

A recent literature review (Pascolini and Smith, 2009), searched 3000 studies done since 1980 from around the world. Of these, 108 were selected for detailed review but only 31 met the following criteria for inclusion:

- searched restricted articles published on or after 1980
- reported prevalence from cross-sectional surveys of representative populations of a country or area of a country,

- results for “persons” and not only for “number or ears”,
- definitions of hearing impairment clearly stated; other definitions acceptable if thresholds hearing levels and the frequencies reported,
- reported prevalence of bilateral hearing impairment “better ear”, methods described: cross-sectional design, sampling (including methods of randomization), sample size; sampling and non-sampling errors reported and discussed,
- sample size was sufficient to estimate prevalence with appropriate precision: response rate was 80% or higher,
- type of audiometric testing, ontological examination, background noise and location of the examination were described.

This information indicates the shortage of good available data on the prevalence and causes of hearing impairment and its prevalence in the population.

Currently, the WHO aims to eliminate 50% of the burden of avoidable hearing loss, by working on different areas such as: primary ear and hearing care, epidemiology and economic analysis, strategies for prevention, national programs and raising awareness (WHO 2011a). The primary ear and hearing care manuals aim at managing ear disease and hearing problems in developing countries. This manuals are divided in three levels: basic intermediate and advanced, providing students from different backgrounds with clear information to help prevent, recognize, diagnose and treat common ear disease and hearing impairment within their communities (WHO 2011b). Along with training the WHO works on encouraging and assisting countries

to develop national programs integrated within the health system or strength existing programs, such examples are those conducted in South East Asia (WHO 2011c). The prevention takes an important role as well, for which the WHO has developed guidelines for prevention of hearing impairment from ototoxic drugs, chronic otitis media, suppurative otitis media, and noise induced hearing loss, as well as prevention at secondary and tertiary levels (WHO 2011d). Finally the initiative on epidemiological and economic analysis helps countries to produce reliable data on the current situation in order to plan, develop and conduct better services than those already existing based on specific findings relevant to the local population's needs (WHO 2011e). The WHO hearing survey protocol is the result of this initiative.

Since WHO created the WHO EAR & HEARING DISORDERS SURVEY PROTOCOL, it has been used in at least 15 surveys in 11 different countries and regions, generating standardized data which allows comparison among surveys. Due to differences in population densities and shortage of funds, the WHO Ear and Hearing surveys were conducted in countries at a provincial or sub-national level finding a prevalence of disabling hearing impairment that ranges from 2.07 to 9% (see Table II)

Table II: Countries where the WHO hearing survey has been applied at a national or local scale

COUNTRY	YEAR	PREVALENCE of Hearing Disability	National / Subnational level	Regions studied
NIGERIA	2000	6.2%	National	3
BRAZIL	2003	6.8%	Subnational	1
OMAN	1997	2.07%	National	
INDIA	1997	6%	Subnational	2 (rural and semi urban setting)
INDONESIA	1998	5%	Subnational	1
MYANMAR	2001	8%	Subnational	2
SRI LANKA	2001	9%	Subnational	1
CHINA	2006	5.3%	Subnational	Jiangsu
	2006	6.1%		Guizhou
	2006	4.9%		Sichuan
	2006	4.5%		Jilin
Vietnam	2001	5.99%	National	6 provinces

(Pascolini & Smith, 2009)

This national survey in Ecuador using the WHO Protocol is the first survey of prevalence of hearing impairment conducted in this country and in this region on a

national scale. The only other successful survey in Latin America sub-region was conducted in the city of Canoas – Brazil in 2003 (Beria, et al 2007), but this was in only one city and the southern part of a very large country.

LOCAL OVERVIEW ON EAR AND HEARING DISORDERS:

Prior to this study there were no formal statistics or published studies of prevalence or incidence of deafness and hearing impairment in Ecuador. The pilot study conducted in 2008, previous to the national study showed a 6% prevalence of hearing disability in the population tested. One can assume that the lack of studies in the field conducted in Ecuador has an effect on the kind of services currently available, particularly services to those from a poor background. If a government does not have data on the type and degree of the problem its population faces, there is no proper budget allocation and improvement in services delivery.

In 2007, the Ecuadorian government started a new state policy in regards to disability, ECUADOR SIN BARRERAS, to oversee disability developing two main programs: MISION MANUELA ESPEJO Y MISION JOAQUIN GALLEGOS (Vicepresidencia, 2007). Mission Manuela Espejo started in November 2009, with the collaboration of 14 government institutions and an agreement with the Cuban government (Vicepresidencia 2009). Cuba contributed with 229 doctors, who together with 120 Ecuadorian doctors started a medical research to diagnose disabilities around the

country, to this date (March 2011) identifying 294.611 people with disabilities in the country (Vicepresidencia, 2011).

CONADIS, the National Board for Disabilities estimates to this date, November 2011, 213.000 people with a hearing and speech disability (CONADIS, 2011a). It recognizes as a disability when a person has one or more irreversible disabilities secondary to genetic illness, congenital or acquires, which persists even clinical or surgical treatment, which also limits a person's ability to perform regular activities, these conditions must be corroborated by clinical or technical assessment (CONADIS, 2011b).

The current distribution of disability by province (Table III) shows 35274 people with a hearing disability in Ecuador.

Table III. POPULATION REGISTERED AT CONADIS

PROVINCIA	AUDITIVA	FISICA	INTELECTUAL	LENGUAJE	PSICOLOGICO	VISUAL	TOTAL
AZUAY	1937	11443	4184	322	450	2086	20422
BOLIVAR	698	2004	1036	117	101	615	4571
CARCHI	929	2303	838	77	237	493	4877
CAÑAR	711	2744	1298	177	218	601	5749
CHIMBORAZO	1778	4311	2492	118	127	982	9808
COTOPAXI	975	3381	1842	237	171	920	7526
EL ORO	1367	7328	4453	173	745	1552	15618
ESMERALDAS	859	5292	2970	251	244	1363	10979
GALAPAGOS	23	96	85	3	9	22	238
GUAYAS	7021	35112	17229	903	2238	7899	70402
IMBABURA	1913	3743	1499	140	263	856	8414
LOJA	1434	4979	3911	136	548	1387	12395
LOS RIOS	1007	9101	3232	230	335	1501	15406
MANABI	3148	22762	5236	277	3741	4918	40082
MORONA SANTIAGO	308	1686	781	108	156	555	3594
NAPO	439	1599	741	132	68	456	3435
ORELLANA	332	1668	624	102	151	675	3552
PASTAZA	245	948	458	33	68	265	2017
PICHINCHA	6549	20939	9599	661	1609	4901	44258
SANTA ELENA	700	3542	1491	79	166	697	6675
SANTO DOMINGO DE LOS TSACHILAS	707	4172	1582	84	353	758	7656
SUCUMBIOS	408	2096	967	72	178	661	4382
TUNGURAHUA	1488	3724	2120	168	254	742	8496
ZAMORA CHINCHIPE	298	1346	717	61	90	272	2784
TOTAL	35274	156319	69385	4661	12520	35177	313336

CONADIS 2011c

The WHO Hearing Survey Ecuador 2009, started its development in 2005, after talks among Dr. Andrew Smith (Former Officer for Prevention of deafness and blindness for the WHO), Dr. Alejandra Ullauri (Audiovital, Hearing Clinics), and Martin Rupenthal from CBM. The main objective was to use the WHO protocol in Ecuador as the first experience at a national level in the region. These initial talks took the preliminary team to find alliances with local academic, health and audiological institutions, who together develop a research proposal approved for a pilot study in 2007, conducted in 2008, leading to the national study in 2009. This study's main goal is to contribute with basic data to build-hearing services that are efficient and cost effective. This survey provides governments with high quality, relevant, and consistent information on its local situation. In addition it will contribute to the WHO objectives to prevent and control hearing impairment and deafness around the world.

CURRENT GUIDELINES FOR PRIMARY EAR AND HEARING CARE:

The WHO in 2006 created the Ear and Hearing Disorders Primary Care manuals, a set of material for training purposes on ear and hearing primary care. The translated version to Spanish was launched in 2007. The manuals were divided into three levels: basic, intermediate and advance. The WHO recognizes the amount of people in developing countries that live with a hearing disorder for whom there are very few programs to provide medical and rehabilitation services (2006). The lack of professionals in this area, and the lack of training courses is another reason for the

lack of programs in these countries. Hearing disorders may last a life time and its complications may also threaten a person's life.

The basic manual has been designed to care for the urgent need of services at an entry level, working and training community health visitors and rehabilitative services based on the community. The idea for this manual is to socialize the problem and provide basic prevention and treatment strategies that can take place at home, schools, community centers, etc. This manual focuses on basic questions such as: how can I prevent ear infections in my family, what can I put and not put in their ears, how can I recognize a hearing problem, how can I recognize speech problem, what can I do about hearing difficulties. It is a very user friendly manual, with visual interpretation of its text and it is directed to the community and could be managed by teachers, parents, community health visitors, etc.

The intermediate level is divided in 7 modules: the ear and its physiology, hearing disorders and deafness, the external ear, external ear canal, middle ear diagnosis treatment and referral options, hearing assessment, hearing solutions. This manual comes with a trainee and a trainer's manual. This manual is designed to train primary ear and hearing care workers that will have competent skills in the diagnosis and treatment of common ear and hearing disorders.

The advance manual was designed to confirm the training of those with the intermediate level, but it can also be used on its own. It goes more in depth about

prevalence, detection, diagnosis and treatment of common of ear and hearing disorders, aural rehabilitation and educations and it has specific section on hearing aids.

The WHO, recognizes Primary health Attention as the nucleus of the health system in a country and recognizes as well hearing disorders as the third cause of years lived with a disability, a measure that now days allows us to know the impact of chronic disorders in the population and not only focus on mortality and morbidity data. (WHO, 2006)

2. METHOD AND MATERIALS

SURVEY OVERVIEW:

The population-based survey of prevalence and causes of deafness and hearing impairment and other ear diseases was created in 1995 and published in 1999 by the Program for Prevention of Deafness and Hearing Impairment at the World Health Organization in Geneva. It provides a protocol for basic collection of data and it can be adapted for a specific country's needs as long as the collection data remains uniform according to the protocol.

This survey aims to provide countries with:

- Accurate information on the size of the problem
- An overview of the main causes of deafness and hearing impairment in the area
- A source of information for prioritization, planning and resource allocation
- Base-line data for future similar studies
- Information that allows the country to compare the cost of the impairment and the costs of impairment prevention
- Standardized information which enables comparison among other countries that have used the same standards.

OBJECTIVES:

GENERAL OBJECTIVE: Contribute to the global burden of disease by generating standardized data that can be compared among countries and regions.

SPECIFIC OBJECTIVE: Provide regional governments, institutions and professionals with local and accurate information on the prevalence of ear and hearing disorders in the Ecuadorian population.

STUDY POPULATION:

Background information:

- The universe population = Ecuador - corresponds to 13.758.611.
- Average of people living in a household is 4.2 (INEC 2001)
- 95% confidence interval

ETHICAL CONSIDERATIONS:

Prior to conduct the national survey the team:

- Shared and understood basic concepts
- Learned the assessment and analysis methods
- Logistics have been arranged
- Staff has been trained

- Pilot data analyzed and used to improve the national survey.

An official signed letter from the Ministry of Health was obtained for identification and information purposes. A letter from the team members explaining the study was also issued to be presented to the households selected. The team members visiting the households received special training in delivering information about the study to subjects and explaining study's objectives. This training included meetings to revise location maps, sample strategy, techniques to approach households, etc. During the household visits the team letter was left with each household to ensure subjects received and understood the study's goals and valuable information to be acquired from its results. Subjects at the households were also explained about their right to decline participation in the study. After interviewers' presentation of the study, families received written information in order to provide informed consent to participate in this research project. All subjects over 18 years of age signed consent forms prior to testing, and legal guardians signed consent forms for children under the age of 18. Names of subjects were recorded in the entry sheet, and a given number was also assigned at this stage for data processing purposes. The survey software used this number to identify subjects in order to omit names and preserve subjects' results confidentiality.

STUDY DESIGN & SAMPLE STRATEGY:

The national hearing survey took place from March to December 2009 including preparation of materials, training, field work, data processing and analysis, results and report revision. The universe population was the population of Ecuador which corresponds to 13.758.611. This study followed a multi-stage sample designed. Kalton G. (1983) described a multi-stage sample study as one that involves a hierarchy of clusters (first large clusters are selected, then some smaller clusters are drawn from the larger clusters, and so on until subjects are selected from the final-stage cluster). In this study, the first stage included a cluster sample design, 30 clusters were selected using population proportional to size method (PPS). The second stage included a random selection of neighborhoods within each population selected, then within the neighborhoods; blocks were selected and within the blocks households were selected following again a random selection according to the strategy planned (APPENDIX 1). All members of the households selected were tested.

Adaptation of the WHO Ear and Hearing Disorders Examination Form - Version 7.1 A (APPENDIX 2) was used, which includes the following areas: collection of demographic information, hearing examination, basic ear assessment, cause of ear disease or hearing impairment and action needed.

Testing procedures included 4 stages: a) Collection of demographic and personal information such as name, age and sex; b) audiometry for subjects older than 4 years

of age included bilateral air conduction thresholds at 1, 2, & 4 KHz. For subjects 3 years 11 months or younger, transient otoacoustic emissions were conducted in both ears, or behavioral responses to sound were recorded. c) Otological examination included otoscopy and wax removal if needed; d) Recommendations were given if medication, additional testing, hearing aids or others were necessary. e) Subjects received an incentive (basket with household items such as toilet paper, napkins, paper towels sponsored by FAMILIA SANCELA) thanking them for their time and participation.

EQUIPMENT:

The equipment used in this study included: 2 screening audiometers: MAICO portable screeners, 1 sound level meter, 2 otoscopes, 2 Front lights, 2 ENT Sets for wax removal, 1 DPOAEs screener, 2 laptops.

TESTING TEAM:

1 Otolaryngologist

1 Speech Therapist with Audiology training

1 Team Visitor

1 Team visitor from the local town (assigned by the local hospital)

1 Team Coordinator

QUALITY CONTROL:

Different procedures were implemented in order to ensure high quality of the study's results:

- Testing manuals describing testing procedure and data collection.
- Family information was checked carefully during the testing days, to ensure that the information given by the families during the field visit was the same as the information given at the testing site during testing days. This precaution was taken in order to reduce the probability that subjects who knew that the study was focused on ear and hearing, might bring to the testing days other family members known to have a hearing problem to be tested instead of those who lived in the house only. This type of family action would have increased the prevalence of hearing impairment and ear pathology.
- Retested 5% of the study group to check accuracy of testing and examination.
- Biologic daily calibration of audiometer

DIAGNOSTIC CRITERIA:***Table IV: WHO Grades for hearing impairment (2008a)***

Disabling hearing impairment is defined as moderate or worse hearing loss in the better ear (41 dB average thresholds or greater in persons 15 yrs or older, 31 dB or greater in children under 15 yrs)

The audiometric ISO values are averages of values at 500, 1000, 2000, 4000 Hz.

Grade of impairment	Corresponding audiometric ISO value	Performance	Recommendations
0 – No impairment	25 dB or better (better ear)	No or very slight hearing problems. Able to hear whispers.	
1 – Slight impairment	26-40 dB (better ear)	Able to hear and repeat words spoken in normal voice at 1 meter.	Counseling. Hearing aids may be needed.
2 - Moderate impairment	41-60 dB (better ear)	Able to hear and repeat words spoken in raised voice at 1 meter.	Hearing aids usually recommended.
3 – Severe impairment	61-80 dB (better ear)	Able to hear some words when shouted into better ear.	Hearing aids needed. If no hearing aids available, lip-reading and signing should be taught.
4 - Profound impairment including deafness	81 dB or greater (better ear)	Unable to hear and understand even a shouted voice.	Hearing aids may help understanding words. Additional rehabilitation needed. Lip-reading and sometimes signing essential.

WHO Grades for hearing impairment (2008a)

3. RESULTS

SAMPLE POPULATION:

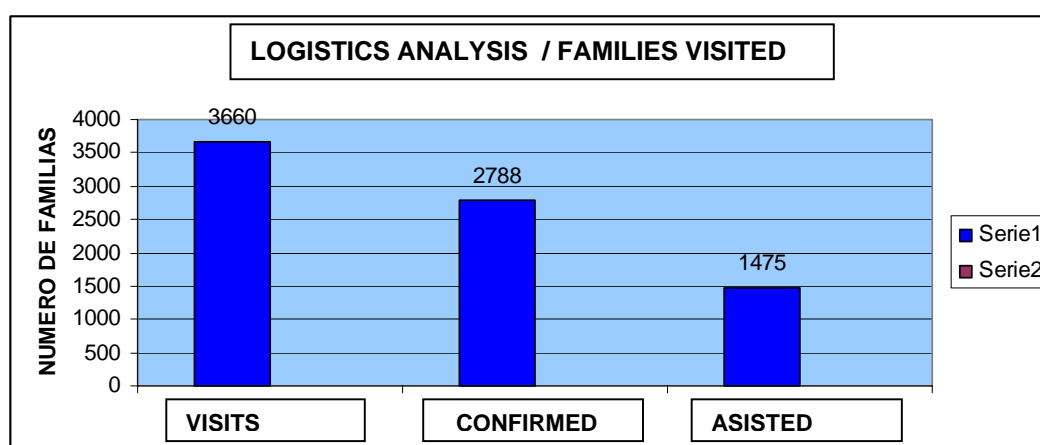
Number of participants: Population number: 7067 subjects in 28 clusters

Participants tested: 5762 subjects:

LOGISTICS ANALYSIS:

Families visited 3660, those who confirmed attendance 2788 (76.20%) and those who finally came for testing 1475 (42.20%).

Figure 1: Comparison of families visited, those confirming attendance, and those who finally attended.



WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

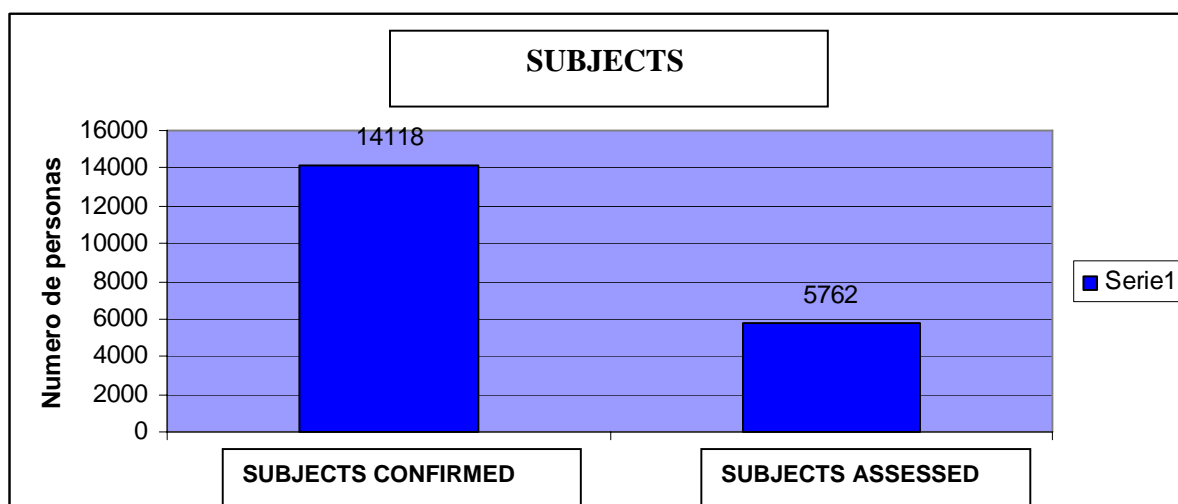
PARTICIPANTS:

Subjects who confirmed attendance: 14118.

Subjects who attended testing days: 5762 (41%)

Team visitors had to invite nearly 3 times the number of subjects that the sample size required.

Figure II: Comparison of subjects confirmed and those who actually attended



WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

Attendance of visited families improved during the national survey by 5%. 36% of the families visited actually attended the testing days during the pilot study, to 41% during the national survey. This might be the result of more experience acquired by the visitor team on how to approach families motivating them to attend.

LOCATIONS BY CLUSTERS:***Table V: Locations selected according to PPS - census 2001 / The last 2 clusters in Guayaquil were cancelled.***

PROVINCIAS Y CANTONES	TOWN	CLUSTER
AZUAY	Cuenca	1
	Chillanes	2
	Mira	3
CHIMBORAZO	Riobamba	4
EL ORO	Machala	5
	Piñas	6
	Quininde	7
GUAYAS	Guayaquil	8, 9, 10, 11, 12
	Duran	13
	Pedro Carbo	14
	Simon Bolivar	15
	Otavalo	16
	Puyango	17
	Quevedo	18
MANABI	Portoviejo	19
	Jipijapa	20
	Rocafuerte	21
	Logroño	22
PICHINCHA	Quito	23,24,25, 26
	Cayambe	27
TUNGURAHUA	Ambato	28
SUCUMBIOS	Lago Agrio	29
	Loreto	30

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

DISTRIBUTION OF SEX AND AGE OF THE SAMPLE POPULATION:***Table VI: Distribution by age and sex***

Age Group	Male	Female	% of Total population tested
[0,4]	47.40%	52.60%	11.30%
[5,14]	47.40%	52.60%	27.60%
[15,65]	39.70%	60.30%	54.50%
[66,.)	38.90%	61.10%	6.60%
% of total population tested	42.60%	57.40%	

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

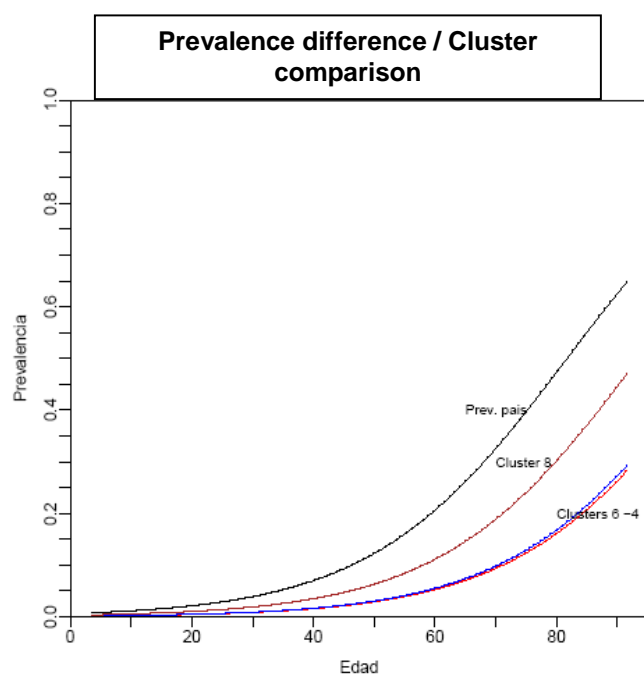
In this table one can notice that the female population tested was higher by almost 15% than the male population, especially in the adult population. The difference found in the attendance rate between men and women might be caused by the assumption that men are more likely to be at work than women.

SUBJECT WITH DISABILING HEARING IMPAIRMENT: (Binomial Wald)**Table VII: Prevalence of hearing impairment by age groups**

AGE	No of Observations	Prevalence	Standard of error	95 % CI
6 months to 3 yrs. 11 mths.	575	4.3%	1.8%	0.7 a 7.9%
4 yrs to 14 yrs 11 mths.	1926	1.5%	0.4 %	0.6 a 2.3 %
15 years and older	3179	7%	0.8 %	5.4 to .8.7
15 yrs to 64 yrs	2836	2.6%	0.6 %	1.5 a 3.7%
65 yrs and older	343	40.9 %	5.1 %	30.9 a 50.9%
Total Prevalence	5619	5.0%	0.6%	3.9% a 6.1%

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

The group 6 mths. to 3 yr 11 mths. did not have the hearing levels measured but only a pass/fail test

PREVALENCE OF DISSABILING HEARING IMPAIRMENT BY CLUSTER**FIGURE III: Prevalence difference / Cluster comparison****WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)**

EAR DISEASES FOUND:**Table VIII: Ear disease found according to age group**

CONDICION	6 m a 3 a 11m	4 a 15 yrs	16 a 65 yrs	65 yrs and older
Wax	10.2%	13.7%	8.4%	10.4%
Foreign Body	0.1%	1.2%	0.1%	0.1%
Otitis External	0.5%	1.2%	2.4%	0.6%
Otitis Media Acute	0.0%	0.6%	0.1%	
Otitis Media Chronic Suppurative	0.2%	0.1%	0.7%	2.4%
Otitis Media Serous	0.2 %	0.2%	1.9 %	0.6%
Dry Perforation or Tympanic Disease	0.7%	1.0%	1.7%	2.0%

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

In these 4 tables (VII, VIII, IX, X) above, impacted WAX is the main problem impacting this population. WAX is a preventable cause of hearing and ear diseases and in most cases can be managed at primary health levels. Otitis media results might not reflect the reality of the problem, further information and results comparison with other studies to be discussed in the discussion section.

HEARING IMPAIRMENT vs. OCCUPATION:**Table IX: Hearing impairment detected according to work place**

Occupation	Impaired		Total
	NO	YES	
Farmer	64.5%	35.5%	0.8%
Office W	94.7%	5.3%	2.7%
Manufacture	84.0%	16.0%	2.6%
Student	97.0%	3.0%	37.0%
Other	83.0%	17.1%	43.1%
Unknown	74.8%	25.2%	13.9%
Total	87.2%	12.8%	

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

This table shows the high prevalence of hearing impairment in farmers and manufacturing workers, pointing out another vulnerable group. Targeting manufacture workers, protection policies, how they are implemented, quality controls, brings up an important and vulnerable population in need of assistance.

NEED OF ACTION IN THE TOTAL POPULATION:**Table X: Population in need of ear and hearing services**

Action needed	Frequency	Percentage
YES	1026	14.52 %
NO	6,041	85.48 %
Total	7,067	100.00 %

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

This table shows that 14.52% of the national population is in need of services. This percentage seems high as it takes into account those in need of further testing to confirm diagnosis, especially children detected with a hearing problems during the survey, but who further diagnostic testing.

ACTION NEEDED FOLLOWING THIS SURVEY

Table XI : Distribution of action needed in the population with any ear or hearing disorder

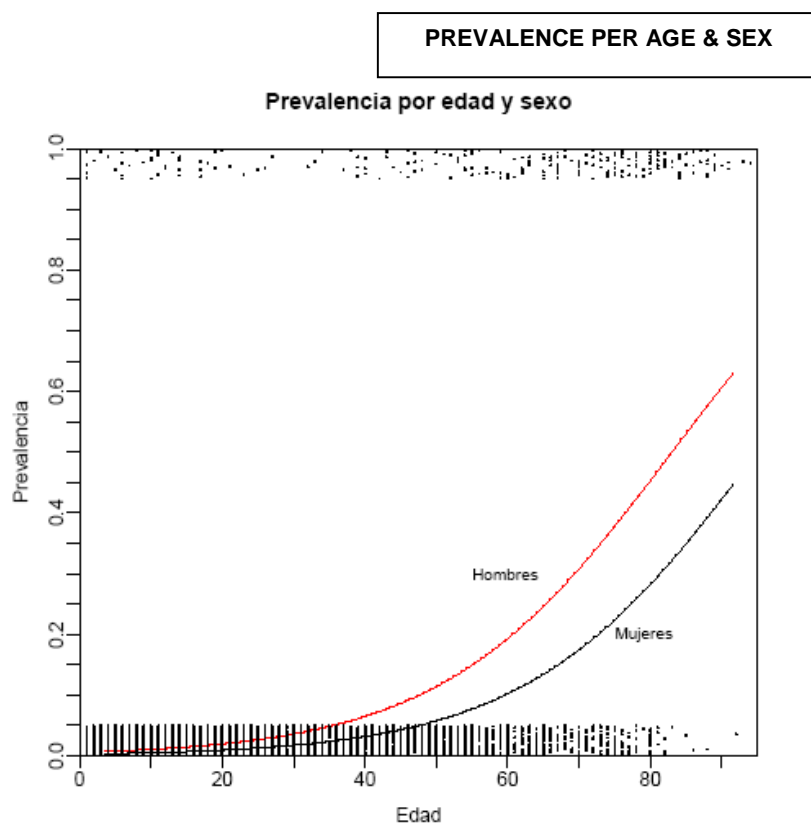
Actions needed	Percentage	Standard of error	LI (95%)	LS (95%)
Medication	21.20%	2.30%	16.60%	25.80%
Hearing Aid	24.00%	2.30%	19.40%	28.50%
Language/Speech rehabilitation	0.50%	0.30%	0.00%	1.20%
Special needs education	2.50%	0.80%	0.90%	4.10%
Vocational Training	0.60%	0.50%	0.00%	1.60%
Surgery referral	0.80%	0.50%	-0.20%	1.80%
Other Action	50.60%	2.60%	45.40%	55.80%

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

This table shows that the population in need of services would benefit from Otological and Audiological services. The “other action” services value reflects the need for Audiological testing followed this survey to confirm diagnosis.

CORRELATION BETWEEN AGE / SEX AND DISABLING HEARING IMPAIRMENT:

Age and sex do have a significant effect on disabling hearing impairment, showing that men at an older age are more likely to have a hearing impairment than women

FIGURE IV: Prevalence of disabling hearing impairment by sex and age

WHO Ear and Hearing Disorders Survey: Ecuador (Ullauri, 2009)

STUDY STRENGTHS AND LIMITATIONS:

- **STRENGTHS:**

- Experienced team supervisors in Otology and Audiology
- Low rotation of professionals, giving the study consistency in its findings
- Hospital base site for testing
- Local visitor with local knowledge of area and people
- Testing days were conducted during weekends to facilitate attendance

- **LIMITATIONS:**

- Due to security issues in Ecuador, difficult to approach households for interview, especially in urban areas.
- 40% of those participants confirmed actually attended the testing day, resulting in more than double the work and resources to recruit families needed in order to complete the sample size required.
- Visual examination of the ear can still have a subjective impact. In this study, although the form is coded and symptoms must be taken into consideration in order to write a diagnosis, it was our experience that this is still a problem as it has a subjective component among ear nose and throat professionals. The results show a very low prevalence of otitis media which do not relate to expected values and need further investigation to rule out an error in its diagnosis.

4. DISCUSSION:

Smith (2008) recognizes that the burden of hearing impairment and disability is currently high and growing, which has a negative impact on individuals, society and on the economies of countries, as it is a cause and consequence of poverty. WHO estimated that 42 million people in the world had disabling hearing impairment in 1985, 120 million in 1995, and 278 million in 2005 (Smith, 2006; Mathers 2006).

In this study, Ecuador presented a 5% prevalence of hearing disability in the general population, which correlates with previous studies conducted in Brazil (Canoas) 7.3%, Nigeria (3 regions) 4.4 to 7.6%, Northern Vietnam 7.8 %. China (Jiangsu) and Southern Vietnam reported a lower prevalence of 4.8 and 4.7% respectively (WHO, 2008b), and it is higher than the 4.2% world's global estimation. We did not find a difference among clusters that could suggest a difference among provinces or regions in Ecuador. Our results do not correlate with the population expected with a hearing disability by CONADIS of 213000, and it does not correlate with the registered number of nearly 35000 people in the country, which number could reflect an under registration of this disability. We could not find the strategy used to calculate the expected number of 213000. According to this year's census 2011, 14.483.499, 5% prevalence will mean 724175 Ecuadorians with a hearing disability, which is almost 3.4 times greater than the CONADIS 2011 expectation.

Otitis media results in this study may need revision as the prevalence is very low considering risk factors commonly found in developing countries. One hypothesis for this low prevalence is that the diagnosis of otitis media was made by visual observation, ear nose and throat specialists had a coding system for symptoms (APPENDIX 3) in order to classify pathologies, having these parameters could help but the final diagnosis was still left to the specialist subjective impression of each case. External otitis media, was found to have a prevalence between 0.5 to 2.4% while other studies show between 3 and 9% (Saffer & Miura, 2007). Acute otitis media 0.0 to 0.6 %, very low considering that children in developing countries are at a higher risk due to lower immune systems and, lack of hygiene, living in crowding households, lower nutritional status, etc (Paradise & Bellizia, 2007). Chronic Suppurative otitis media's prevalence was found between 0.1 to 2.4% in the different age groups. Otitis media serous or with effusion 0.2 to 1.9% prevalence, 0.2% prevalence was found in the age group of 6 to 47 mths, which is known to be the highest risk group, showing in the literature the highest prevalence of this condition between 2 and 5 yrs of age (Caldas, 2007). Aboriginal people in Australia are known for having health problems similar to those living in developing countries, middle ear diseases is one of their main problems as it causes hearing loss from a young age that might last a lifetime, setting people for lower access to education, social interaction and poverty. Surveys conducted on aboriginal people in Australia have found 11% of people presented middle ear diseases, 10 to 54% of chronic middle ear disease, 9 to 36% of perforated eardrums and finally deafness in 10 to 41% (NACCHO, 2001). Considering results found in another surveys, the risk factors for

otitis media in the developing world, a possible error in our results might rely on the visual examination which might have been impacted by subjective analysis of each ENT professional. Pitkaranta (2007) states that in 40% of cases doctors do not have certainty of the diagnosis of otitis media. Pitkaranta highlights some of the obstacles for making a reliable diagnosis of OM: adequate light for visual examination of the tympanic membrane, free of wax external ear canals, wax removal prior to examination, appropriate size of specula. Additionally, she recognizes short periods of training and courses on otitis media in many of the medical residency programs, lack of use of additional tools such as pneumatic otoscopy and tympanometry. As the hearing survey is a population based study, no further tools such as those mentioned before were available to confirm the diagnosis of OM.

Our **action needed** results showed that approximately 14.5% of the population of the country are in need of Otological and Audiological testing and follow up, which can help local health authorities plan strategies to follow up these subjects by networking with local professionals, reporting ear and hearing disorders to a national data base, reinforcing hearing protection in the local farms, factories, and among the community, reinforcing otoscopy and wax management at a general practitioner practice or at the local primary health center within the limits of training of these professionals, following up young children to prevent language delays and development of chronic middle ear pathologies. Strategies for prevention of deafness and hearing impairment can now be analyzed and developed according to the local findings. The WHO has pointed out three main preventable causes of hearing impairment: ototoxic drugs, chronic

otitis media and noise induced hearing loss (WHO 2008c). Our current results show that farmers and manufacturing workers are at a higher risk of acquiring a hearing impairment, in these types of work places noise may be the cause, and this is a preventable cause if well managed. The survey was unable to find ototoxic drugs as a leading cause, but this may be a result of a lack of knowledge of the subjects of the medications used in the past, and a lack of detailed case history that may help to identify ototoxic drugs used previously. As discussed above, otitis media results found in this study show a very low prevalence of OTITIS MEDIA which needs further investigation to rule out an error in the diagnosis.

Between 8.4 and 13.7 % of the population tested was found to have impacted wax in the ear canal. Primary health centers need to address this by providing proper training for otoscopy and wax removal to general practitioners and nurses, and also providing them with information on local ENTs for difficult cases that go beyond their training. The community should also be informed of ways to prevent impacted wax in the ear canals. Training should highlight cases that need to be referred directly to an ENT; such cases might include: tympanic perforation, only one hearing ear, abnormal anatomy due to congenital reasons or post surgical intervention, among others.

Hearing aid fitting was found to be a need for 24% of the population in need of services. This highlights the importance and the need to have sustainable programs for hearing aid fitting. This does not only mean fitting, but selection of those who would benefit from, selection of the right type of amplification, and monitoring

services. Brosch et al (2005) studied rehabilitation through hearing aid fitting in sensory neural hearing losses. He found that the majority of people who did not wear his hearing aids did not perceive a benefit from them. The study included 197 patients, 108 who wore their hearing aids all the time, 57 wore them rarely, and 32 never wore them, due to inappropriate fitting. This means that 46% of those who had hearing aids did not wear them. Hearing aid fitting is not only a matter of amplification, it is about the right amplification for the right person. Budgeting cannot be performed with the expectation that 46% of those who receive hearing aids will not wear them. A recent study of 6027 hearing aid users conducted by Bertoli and colleagues (2010) showed that bilateral amplification (for bilateral losses) and advanced signal processing features in hearing aids may contribute to successful hearing aid fitting. Wong and colleagues (2009) found that hearing aid performance was the most important element in determining satisfaction. The right selection of hearing aids and the most appropriate fitting contribute to rehabilitation programs that are successful, which in the long run contribute to supporting sustainable hearing aid programs for the population.

Otological clinical services are highly needed, and 22% of those who need further action are in need of medication. Many pathologies of the external and middle ear can be treated by trained primary and secondary health care professionals. Otolaryngologists are concentrated mainly in the cities, and the population in need of these services may not necessarily live in the bigger cities, or have access to ENT services. This is a very important highlight of the study, because it points out the

need of primary health workers to become involve in preventing ear and hearing disorders.

5. CONCLUSIONS

- The prevalence of hearing impairment in Ecuador is similar to the prevalence found in other countries who have applied the same protocol.
- The prevalence of 5% is higher than the global estimate of 4.2% (Mathers, 2006), and higher than the local estimation by CONADIS
- Need for action to target ear pathologies and hearing impairment found may now be better planned in this area to reduce the impact of preventable ear diseases, such as impacted wax, and noise induced hearing loss.
- Otitis media prevalence needs to be further investigated in this population, the use of additional tools such as pneumatic otoscopy and tympanometry are highly recommended to decrease the degree of error due to subjective visual examination only.
- Wax in the ear canal is a preventable cause of future external ear canal pathologies and conductive hearing impairment. Between 8.4 and 13.7% of the population tested was found to have impacted wax in the ear canal, being this the highest prevalence of ear disease among the population studied.
- Based on the action needed results, 14.52% of the population of this area might be in need of Otological and Audiological testing and follow up.

6. RECOMMENDATIONS

This study's results can be used to improve the services we provide at the moment in the area of ear and hearing. Starting for analyzing the local infrastructure, professional network and equipment could help us define what percentage of the population identified in this study can receive services at the moment, how organize such services, prioritize, otological appointments, medication for middle ear, hearing assessment for all ages and hearing aid services. Once this local assessment is done professional and institutions can also identify areas for growth in this field.

Three main areas of work are explained:

PROMOTION / PREVENTION

1. **PREVENT NOISE INDUCE HEARING IMPAIRMENT:** Work on national strategies to promote hearing protection at different levels such as families, schools, industries. Review noise protection government policies, investigate their application among different industries, inform employers and employees of their responsibilities preventing hearing impairment. Informing, applying and regulating noise policies in the community and work places will support national strategies. The National Institute on Deafness and other Communicative disorders has helped create "IT's a noisy planet, protect their hearing" <http://www.noisyplanet.nidcd.nih.gov>. This website has a very

interesting initiative, it provides information for parents, schools, adolescents and the community on how noisy our surroundings can be and what we can do about it. They have developed a section of this website in Spanish and are present at most professional meetings providing information on what kind of activities one can conduct according to his/her work site, age group, etc.

PRIMARY SERVICES:

- 2. PRIMARY EAR HEALTH CARE:** 8.4 to 13.7% of the population has impacted ear wax in the ear canal, a problem that can be resolved at primary health care level. A community based approach is recommended. Initially the implementation of a training program for primary health care doctors and nurses at the local health centers to remove wax will help establishing professional networks and reference centers . Such training must focus on ear wax removal in normal eras and highlight those cases that need to be referred to a specialist such as: only hearing ear, operated ear, middle ear prosthesis, perforated ear drums, discharging ears, etc. The WHO has developed a manual for primary ear and hearing care manual, which is available at the WHO webpage for download. This three level set of manuals can be used to train health workers, nurses and general practitioner in common ear and hearing disorders, how to identify, otitis media, remove impacted wax, detect hearing problems, explain options to patients and families, refer at time appropriate to specialize centers, This is a very friendly user manual that can

be used at an entry level for community member such as parents and teachers, to a more advance level such as nurses, health workers pediatricians and general practitioners. Remote areas such as the Galapagos islands, the rainforest, where the population not always have access to ear nose and throat specialist, community workers could be trained on primary ear health and manage the problem locally so they can work on stopping ear diseases to become chronic and hearing losses disabling by acting at an appropriate time and manner.

SECONDARY SERVICES

3. **PROFESSIONAL NETWORK:** As 14.52% of the population in this area needs further testing or follow up, it is recommended to start developing a network to assist this population at a primary, secondary or tertiary level depending upon professional training, infrastructure and equipment available.
 - a. **PRIMARY HEARING SERVICES:** Health centers, mobile units could assist with: wax removal services, otitis media diagnosis and medication, referral services for further testing, hearing screening for babies under the age of 12 months. For this type of services, trained personnel with basic equipment for wax removal, otoscopes and portable oto-acoustic emissions could assist this population.

- b. **DIAGNOSTIC HEARING SERVICES:** These services could be provided from the public and private sector depending the locations in order to cope with the population referred by the primary services provided, as well as those who are on ongoing treatment, etc.

- c. **PEDIATRIC HEARING SERVICES:** The diagnosis of hearing impairment in children, requires academic training, experience, on going education as diagnosis of children is not straight forward in many cases, there are pathologies that we do not fully understand its physiology yet and have different rehabilitative approaches, rehabilitative options are in constant development in order to offer children a better reception of sound. Considering that an accurate diagnosis will help to direct a child to better options for treatment and rehabilitation, the experience of the personnel working with young babies and children is highly needed. If one considers that the time and accuracy of the diagnosis make an enormous impact on the speech development on children, which will allow them to: access education, work later in life, and fully develop as active members of society; when institutions acknowledge the responsibility a child brings among professionals then they will understand and improve pediatric services. Having specialized pediatric diagnostic centers is basic for the success and sustainably of such programs, as well assessed babies and children will be better rehabilitated, showing spoken language development at a later stage

and the capacity to cope with regular schooling, etc. Having poorly trained pediatric hearing professionals is one of the main reasons why such programs fail as results are not seen after intervention. The lack of the professionals in the field is a downside in this topic, Audiology and Otology does not exist as a career in Ecuador. Speech Therapists are usually trained in basic audiology services, but have no training and/or academic education to diagnose and treat hearing impaired children, apply differential diagnosis, and provide best rehabilitative options available.

- d. REHABILITATION SERVICES: Hearing aid provision and cochlear implant programs for hearing impaired and deaf people are developing in our country in the public sector and have been established prior to the public experience in the private sector. Hearing aids and cochlear implant technology develops everyday for one main reason: we are still far from what a normal ear can do, we still do not fully understand part of the physiology of the normal ear and auditory central pathways. Considering this technology continues to develop everyday to offer hard of hearing people better opportunities to hear better in order to understand what has been said to them. This brings us to another pillar in rehabilitation that is therapeutic resources, ongoing speech and aural rehabilitation allow patients to use technology effectively. If one goes back to the physiology of hearing, we hear with our brains, hearing aids

and cochlear implants allow hearing, but speech and aural rehabilitation allow understanding of what has been heard, without understanding, hearing makes no difference. The essence of therapeutic services rely on the combination of technology (better technology every time to improve signal to noise ratio to facilitate understanding) and speech and aural professionals to optimize technology use for understanding purposes. When rehabilitative services are provided in isolation specially in the pediatric population the results are limited and definitely not what the institution, parents, and patients expected. Governments could work on strategies to provide services that will have an impact on peoples' life and that will improve their activity within society. The creation of rehab units for hearing impaired people that are accessible to them on regular basis is the main key. Rehab services should not be provided at hospital based centers, as these services are ongoing services and should be separated from hospital / disease association.

4. **HEARING AID PROVISION:** Hearing aid programs are highly needed; this study shows that 24% of those in need of services need hearing aid fitting. The highest prevalence of disabling hearing impairment is found in those 65 year of age or older, being men at a greater risk. This information may help to improve hearing aid provision for those in need, and also to target the elderly population. Public health policies among the world have helped to increase the life expectancy of the population, which brings up another responsibility

which is to help people grow older but also have a quality of life. The way the population age is changing around the world, makes hearing services highly needed as the population gets older and has the highest prevalence of disabling hearing impairment.

5. **RESEARCH NEEDS:** This study may help identify areas for further research:
 - a. Middle ear diseases in the population
 - b. Current management of middle ear disease in children
 - c. Noise induce hearing impairment in the Ecuadorian population
 - d. Effectiveness of current rehabilitative services: pros and cons

CASE STUDY

Conducting a survey at a national scale was a very rewarding experience. The first initiative came up in 2005 after the very first emails with Dr Andrew Smith, at that point in time Main Officer for the prevention of deafness and blindness at the WHO. In 2006, Dr Smith put us in contact with CBM in Ecuador to start analyzing the possibility of applying the WHO hearing survey in Ecuador. CBM representatives and Audiovital met in various occasions to discuss the initial needs a project like this would have in Ecuador. In 2007, the first draft for the study proposal was presented in Colombia by Alejandra Ullauri (Audiovital) and Mauricio Espinel (USFQ) during a meeting hosted by WHO and CBM.

The project was accepted and the initial funds were transferred for the pilot study which was conducted in 2008. The results of this pilot study were presented at the Pan-American / Ecuadorian Ear Nose and Throat Conference in June 2008, winning the first price for best research study. The pilot study was run with funds from CBM and Audiovital.

With the results of the pilot study we were able to readjust the budget for the national study. Our next step was to discuss the study with the Ministry of Health in Ecuador and come to the agreement that subjects could be tested in public hospitals in the locations selected for this study. In March 2009 we were able to start the national study in Ecuador.

Things to consider in project that involves NGOs, Private sector, Universities, Public sector and Independent professionals:

Commitment: When studies are conducted over a period of time, let's say a year. Participants will drop for different reasons. One needs to have a backup plan always in place for staff dropping.

Equipment: Looking after equipment when travelling is involved, might be a problem when it comes to staff handling equipment. We found that having a study/research place was helpful; equipment was picked up and dropped at the same location, one person was in charge of overseeing equipment conditions, cleaning, infection control, etc and getting things ready for next team trip.

Administrative Management: Having a person dedicated only for logistics was extremely helpful, running study at a national scale involves: hotels, transport, meals, equipment coming and going, staff cancelling trips, funds, invoices, disposable materials, etc. This is a full time job to manage the logistics of 30 trips, 4 people groups per trip, 30 locations over a 9 month period.

Public Sector participation: Even though the public sector may have an interest in research and supporting local projects, it is difficult to know who will be assigned to each project, I do not think one can judge the public sector by each person that works

in it. We had a wonderful experience working with public personnel in remote provinces where people are delighted by specialists arriving to offer services that in other way would never be found in their locations. Many of this local public staff contributed not only with the job assigned to them (introduce us to the community) but they were eager to cooperate. Many hospitals directors help the team with cars to pick us up drop us of, facilitate specific facilities and local people to help us, etc. We have great appreciation for those that went out of their ways to make the teams' work easier and quicker resulting in more benefit for the population. But there were also people, same case, employed by the public sector, who thought taking advantage of the study was a good way to contribute. Advantage may be taken by: trying to involve themselves in a study that they did not work at all, trying to get family members tested which were not part of the sample taken, stopping the services provided by the study for permit restrictions, stopping for good the study for personal believes.

Unfortunately we were meant to run 30 clusters, but could only do 28, as the study was stopped by the Director of Health from the Ministry of Health. The reasons to stop the study were:

1. We were providing services inside public hospitals: wax removal and medication for otitis media, at no charge, we had a saying "no service no survey", this means people need to benefit from the survey, as well as researchers benefit from the information.

2. We gave participants a present (bag with toilet paper, napkins) a donation from Familia Sancela, to thank participants, at no charge. People had to commute with their families on weekend days to be tested, it was a way to say thank you for your time.
3. We declined services to family members of one member of staff in Hospital Icaza Bustamante.
4. We had brochures of the entities supporting the study.

It is our believe that the public sector cannot be defined as three people's mind, as there are many who believe in research, believe in helping its population and believe in improving services.

Funds: Funds are not always available or might be available once they have been spent and have receipts for it. It makes things easier to have a local support that can finance the study in between international transfers, that way, the study does not stop for lack of resources.

I believe it was a wonderful experience, a wonderful way to see Ecuador, its nature, people and reality of hearing and ear disorders, and services available.

Alejandra Ullauri, Au.D.

MPH Candidate

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APPENDIX

- APPENDIX 1 Training Manual sampling strategy and data collection
- APPENDIX 2 WHO Ear and Hearing Disorders Examination Form (Version 7.1 A)
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ESTUDIO DE PREVALENCIA DE HIPOACUSIA Y PATOLOGIA DE OIDO

DESCRIPCION DE:

- **ESTRATEGIA DE MUESTREO**
- **COLECCIÓN DE DATOS PREVIO A LA ATENCION**
 - **SISTEMA DE CITAS**

**ORGANIZACIÓN MUNDIAL DE LA SALUD
UNIVERSIDAD SAN FRANCISCO DE QUITO
GRUPO VIENNATONE
CHRISTOPHER BLIND MISSION**

Quito 3 de Marzo, 2008

Quito 3 de Marzo, 2008

Estimado COLABORADOR Y ENCUESTADOR:

Gracias por participar en este estudio que será de mucha utilidad para mejorar los servicios para las personas con hipoacusias en el país. Este es solo el primer paso en el camino hacia la detección temprana de hipoacusias y la intervención adecuada y oportuna de pacientes con este tipo de deficiencia, la misma que afecta su desarrollo personal, educacional y social limitando su integración al resto de la sociedad.

INTRODUCCION:

El presente proyecto es el PRIMER estudio de hipoacusia o sordera en Latinoamérica avalado por la Organización Mundial de la Salud (OMS). La hipoacusia conocida comúnmente como sordera es un problema que aqueja a una gran parte de la población, la OMS estima que un 10% de la población tiene algún tipo de sordera. Este problema afecta a los niños en el desarrollo de lenguaje y consiguiente en su aprendizaje y educación, y a los adultos en su desempeño profesional y social, causando aislamiento, depresión, etc.

OBJETIVO:

Este estudio busca conocer el TIPO Y SEVERIDAD de hipoacusias y/o patologías de oído en la población del AEREA 14 (Cumbayá, Tumbaco, Puembo, Yaruqui), este es el piloto de un estudio a realizarse a nivel nacional. El estudio esta respaldado por entidades reconocidas como: Organización Mundial de la Salud, Universidad San Francisco de Quito, Grupo Viennatone y Christopher Blind Misión – CBM.

DESCRIPCION DEL ESTUDIO:

El estudio comprende un examen de Otorrinolaringología – Audiología a la familia completa, es decir a todos los miembros que habiten en una casa, si un miembro falta, la familia no puede ser evaluada, ya que se debe cumplir con las normas de muestreo del estudio.

El estudio involucra los siguientes pasos:

1. Aplicar la estrategia de muestreo para seleccionar las familias a visitar
2. Escoger la familia, informarle del estudio, sus beneficios y requerimientos
3. Si la familia esta de acuerdo en participar se toma los datos de TODAS las personas que habitan en esa casa (Para el propósito de este estudio, el termino HABITAR se entiende como todas las personas que duermen en esa casa determinada de lunes a viernes).
4. Los datos incluyen número de personas, sexo y edad.
5. El encuestador asigna una hora para que la **familia completa** visite el Hospital para los exámenes correspondientes.
6. El encuestador pide teléfono para confirmar asistencia el día anterior a la cita.

ESTRATEGIA DE MUESTREO:

Los encuestadores serán entregados 4 mapas de la zona en ejemplo: CUMBAYA, TUMBACO, PUEMBO y YARUQUI

Los encuestadores asignaran citas a 96 familias total, es decir tendrán que CONCRETAR citas de atención para 48 familias que serán atendidas el 8 y 9 de Marzo, y 48 familias que serán atendidas el 15 y 16 de Marzo.

CRONOGRAMA:

FECHA	ATENCION	# de Familias atendidas por HR	Hora de Inicio	Hora de finalización
5 y 6 Marzo	Visitar familias y asignar citas a 48 familias		9 AM	
8 de marzo	Atención a 24 familias	3	9 AM	
9 de marzo	Atención a 24 familias	3	8 AM	5 PM
12 y 13 de Marzo	Visitar familias y asignar citas para 48 familias		9 AM	
15 de Marzo	Atención a 24 familias	3	8 AM	5 PM
16 de Marzo	Atención a 24 familias	3	8 AM	5 PM

Numero de Familias	ZONA
24	CUMBAYA
24	TUMBACO
48	TOTAL
ATENCION	8 y 9 de Marzo

Numero de Familias	ZONA
24	YARUQUI
24	PUEMBO
48	TOTAL
ATENCION	15 y 16 de Marzo

Con cada mapa los encuestadores visitaran las familias que estén dentro de la siguiente descripción:

La selección se realizara:

El 5 y 6 de Marzo para las familias que recibirán atención el 8 y 9 de Marzo

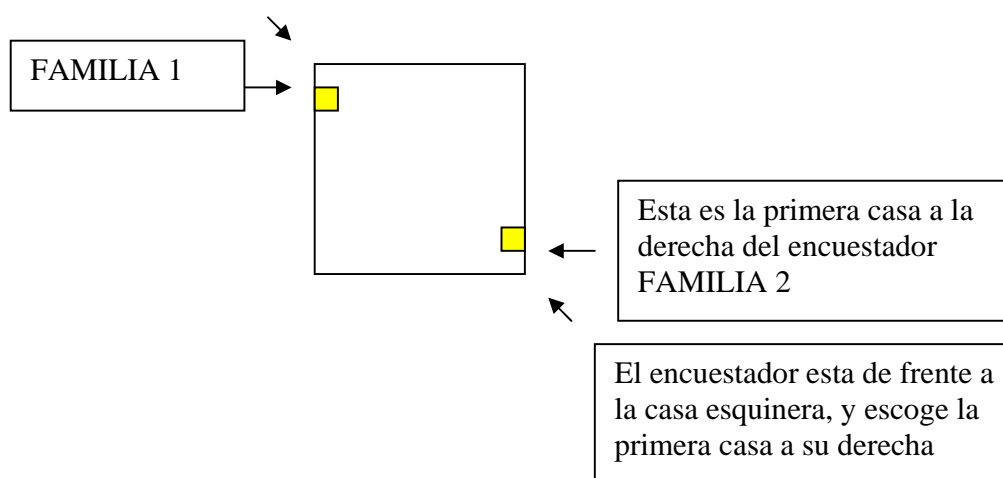
El 12 y 13 de Marzo para las familias que recibirán atención el 15 y 16 de Marzo

- Se escogen aleatoriamente (utilizando tabla) **12 manzanas por zona y dos familias por manzana:**

ZONA	MANAZANAS	FAMILIAS
CUMBAYA	1	2
	2	2
	3	2
	.	2
	.	2
	12	2
ZONA	MANAZANAS	FAMILIAS
TUMBACO	1	2
	2	2
	3	2
	.	2
	.	2
	12	2
ZONA	MANAZANAS	FAMILIAS
PUEMBO	1	2
	2	2
	3	2
	.	2
	.	2
	12	2
ZONA	MANAZANAS	FAMILIAS
PUEMBO	1	2
	2	2
	3	2
	.	2
	.	2
	12	2

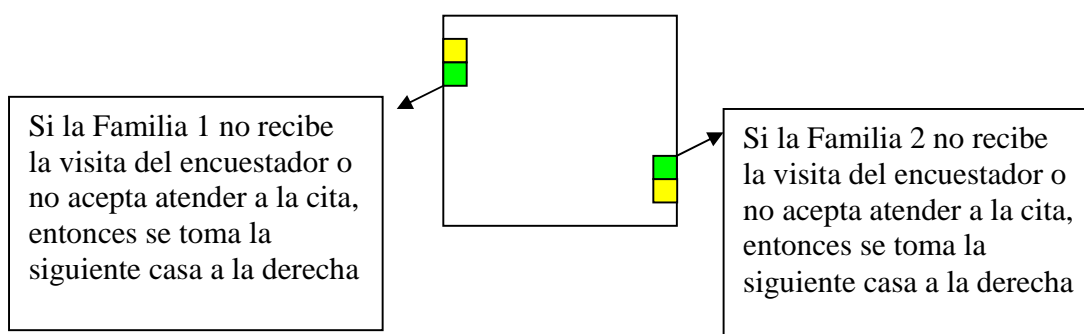
- En cada manzana se deberán escoger 2 familias de la siguiente forma:
 - Tomando cualquier esquina de la manzana, el encuestador esta mirando la esquina, tomara la primera casa a la derecha de la casa esquinera.
 - Si esta familia acepta y cumple los requerimientos y se otorga las citas, el encuestador se cruza a la esquina opuesta y realiza el mismo proceso (escoge la casa a la derecha de la casa esquinera).
 - (Ver Figura 1)

FIGURA 1



- Si la primera familia seleccionada de cada esquina NO acepta la visita del encuestador o NO acepta atender al estudio, se tomará la siguiente casa a la derecha de la casa visitada, a la derecha del encuestador mirando la casa. Esta estrategia se aplica hasta que se confirme dos familias por manzana, (ver figura 2)

FIGURA 2



Según el INEC, en promedio habitan 4 personas en cada hogar, así que el volumen de pacientes que esperamos es 176 en dos días de atención.

- El formato para control de numero de visitas es el siguiente: EJEMPLO

ZONA	MANZANA	FAMILIA o CASA	SI ACCEPTO	NO ACCEPTO	No. de MIEMBROS
CUMBAYA	1	1		1	
		2	1		3
		3		1	
		4		1	
		5	1		
CUMBAYA	2	1	1		
		2	1		
etc.	etc.	etc.			

Solo las familias que aceptan deben decir cuantos miembros habitan en su casa/hogar.

- EL formato para citas es el siguiente EJEMPLO

ZONA	MANZANA	FAMILIA	# de HAB	DIA CITA	HORA CITA
TUMBACO	3	García	5	Sábado 8	8 AM

Se citaran 3 familias por hora,
24 familias el sábado 8 de Marzo,
24 familias el domingo 9 de marzo,
48 familias para el primer fin de semana.

24 familias el 15 de Marzo
Y 24 familias el 16 de Marzo

48 familias en el segundo fin de semana

Las familias tendrán opción escoger el día y la hora que mas les convenga mientras haya espacio.

El formato por familia citada es el siguiente: EJEMPLO

ZONA	MANZANA	FAMILIA	# de HAB	Edades	Sexo
TUMBACO	3	García	1	40	M
			2	35	F
			3	5	F

Una vez concretadas las 48 citas para el 8 y 9 de Marzo, y las 48 familias para el 15 y 16 de Marzo, encuestadores regresaran a la base para digitar toda la información. El listado de visitas y el listado de citas deben ser entregados el viernes 7 de marzo a las 9 AM.

**TU COLABORACION Y COMPROMISO
SERAN LA CLAVE PARA EL ÉXITO DE ESTE ESTUDIO!**

Atentamente,

Alejandra Ullauri
Master en Audiología

Adjunto documentos, cualquier inquietud por favor comuníquese con Alejandra Ullauri al 096330382.

Según el INEC, en promedio habitan 4 personas en cada hogar, así que el volumen de pacientes que esperamos alrededor de 87 en cada día de atención.

FORMATO PARA CITAS**SABADO 8 de MARZO 2008**

ZONA	MANZANA	FAMILIA	# de HAB	DIA CITA	HORA CITA
					8 AM
					8 AM
					8 AM
					9 AM
					9 AM
					9 AM
					10 AM
					10 AM
					10 AM
					11 AM
					11 AM
					11 AM
					12 PM
					12 PM
					1 PM
					1 PM
					1 PM
					2 PM
					2 PM
					3 PM
					3 PM
					3 PM

					4 PM
					4 PM

Según el INEC, en promedio habitan 4 personas en cada hogar, así que el volumen de pacientes que esperamos alrededor de 87 en cada día de atención.

FORMATO PARA CITAS

DOMINGO 9 de MARZO 2008

ZONA	MANZANA	FAMILIA	# de HAB	DIA CITA	HORA CITA
					8 AM
					8 AM
					8 AM
					9 AM
					9 AM
					9 AM
					10 AM
					10 AM
					10 AM
					11 AM
					11 AM
					11 AM
					12 PM
					12 PM
					1 PM
					1 PM
					1 PM
					2 PM
					2 PM

APPENDIX 2 WHO Ear and Hearing Disorders Examination Form (Version 7.1 A)

APPENDIX 3 WHO Ear and Hearing Disorders Survey Protocol (Part 3, Coding
Instructions for EAR EXAM FORM 7.1A

APPENDIX 2 WHO Ear and Hearing Disorders Examination Form (Version 7.1 A)

APPENDIX 3 WHO Ear and Hearing Disorders Survey Protocol (Part 3, Coding Instructions
for EAR EXAM FORM 7.1A