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Research that matters to patients

THE ANNUAL REPORT
NATIONAL ORL REGISTRY
HEARING AND OTOLOGY RELATED DISEASE/COCHLEAR IMPANT -VOL 1
(JANUARY 2010 – DECEMBER 2011)

Advisor
Abd Majid Md Nasir

Edited by
Siti Sabzah Mohd Hashim

With contributions from
Norzi Gazali, Zulkiflee Salahuddin, Philip Rajan

Ministry of Health Malaysia

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The electronic version of this report can be downloaded at **https://app.acrm.org.my/ORL**

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    - Hospital Sultan Abdul Halim
    - Hospital Raja Permaisuri Bainun
    - Hospital Sungai Buloh

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FOREWORD

The National ORL Registry -Hearing & Otology Related Disease/Cochlear Implant is honoured to present our first report which comprises data analysis of patients with hearing loss and otology related disease registered in 2010 and 2011

The report is essential in the early stage of our registry to improve our data collecting and registration of hearing loss cases thus expanding our registry. The results are particularly crucial to plan diagnostic and management policies and estimate financial burden for hearing loss cases in years to come.

The data collection as the registry expands will also facilitate preventive and early rehabilitative measures for hearing loss in adults and more importantly in children.

We thank all our Source Data Providers for their contribution to this report. We hope all centres will strive to improve data collection and analysis.

Finally, we would like to extend our special thanks to the CRC Director for the support to this registry. We really hope there will be continuation of support to sustain the registry for many years and maintain it as an evidence-based tool to improve our service to those populations with problems of hearing and ear related disease.

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ABBREVIATIONS

ORL	Otolaryngology
NORL	National Otolaryngology
CRF	Case Report Form
MOH	Ministry of Health
DG	Director General of Health, Ministry of Health, Malaysia
CRC	Clinical Research Centre
CDM	Clinical Database Manager
CDA	Clinical Database Assistant
JPN	Jabatan Pendaftaran Negara
SDP	Source Data Providers
SC	Site Coordinators
IC	Malaysian National Registration Card

INTRODUCTION

The need for the NORL Registry is relevant at the Ministry of Health (MOH) as evidence-based data is needed to plan policies and programs for otorhinolaryngology, audiology and speech rehabilitation services of the country. According to the World Health Organization (WHO), Ear and Hearing Disorder Survey Protocol; WHO/PBD/PDH/99.8(1), epidemiological data concerning otorhinolaryngology diseases; in particular hearing impairment and deafness, is sparse and fragmentary world-wide, but is especially so in developing countries. An estimated figure of moderate to profound hearing loss is 42 million persons over the age of three years. Sensorineural hearing loss has been reported as the predominant reported type of deafness. Nevertheless, there is no reported data in Malaysia regarding any type of hearing loss. The number of people worldwide with all levels of hearing impairment is rising mainly due to a growing global population and longer life expectancies. One of the objectives of this registry is to provide a national database reference of causes of ear disorders and hearing impairment or cochlear implant cases. It will be a project under the National ORL Registry.

Rationale for establishing a National ORL Registry in Malaysia

Patient Care and Education

- Identification of patients with hearing impairment with regards to aetiology, demographic distribution, treatment, rehabilitation and outcome.
- Identification of risk factors among patients with hearing impairment.
- Follow up and tracing of patients with hearing loss.
- Educating patient, family, health care workers and public regarding early detection, prevention of hearing loss and treatment measures.
- Effectiveness of treatment measures and rehabilitation.

Education and Linkage

- Fostering collaboration and creating awareness among other agencies dealing with hearing impaired individuals such as the education department, social and welfare department, road transport department and the national institute of occupational safety and health (NIOSH).

- Focus of audit in terms of outcomes and service delivery according to guidelines set up by expert committees on patient care.

Research

- Provide a more accurate and refined prevalence estimates of hearing impairment in Malaysia e.g. ethnic variations and risk, geographical variations as well as socio-cultural and socio-economic influence.
- Provide evidence to help formulate screening and surveillance strategies that are relevant and cost-effective in the Malaysian setting.
- To emphasize the value of implementing a national universal newborn hearing screening programme.

The objectives of the NORL Registry are to:

- To describe the disease burden of hearing impairment and ear disease in Malaysia.
- To describe the characteristic of hearing loss, and its aetiology.
- To describe the socio demographic variation of hearing loss in Malaysia across different age-groups, ethnicity and gender.
- To determine the prevalence of congenital and acquired hearing loss.
- To determine the risk factors of hearing loss
- To determine surgical and medical management, rehabilitation measures and outcome including cochlear implantation in Malaysia
- To determine the magnitude and possible causes of late detection of hearing loss.
- To evaluate the detection rate and outcome of new born hearing screening.
- To determine the cost burden of hearing loss and cost effectiveness of screening and intervention programmes.
- To stimulate and facilitate research on hearing impairment using the database generated.
- To formulate plan of action against the challenges of hearing impairment in the population.

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CHAPTER 1 PATIENT DETAILS AND DEMOGRAPHIC

1.1 Characteristic of patients

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Gender						
Male	123	55.4	581	51.9	704	52.5
Female	99	44.6	538	48.1	637	47.5
Race						
Malay	165	74.3	767	68.5	932	69.5
Chinese	41	18.5	217	19.4	258	19.2
Indian	9	4.1	112	10.0	121	9.02
Bumiputera Sabah	1	0.5	1	0.1	2	0.15
Bajau	1	0.5	-	-	1	0.07
Others	5	2.3	11	1.0	16	1.19
Kadazan	-	-	1	0.1	1	0.07
Melayu Sarawak	-	-	1	0.1	1	0.07
Orang Asli	-	-	2	0.2	2	0.15
Semenanjung Missing*	-	-	7	0.6	7	0.52
Age Group (Years)						
<19	67	30.2	186	16.6	253	18.9
20-39	32	14.4	130	11.6	162	12.1
40-59	59	26.6	373	33.3	432	32.2
60-79	53	23.9	387	34.6	440	32.8
80-99	8	3.6	30	2.7	38	2.8
100-119	1	0.5	10	0.9	11	0.8

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Missing*	2	0.9	3	0.3	5	0.4
Education Level						
Children						
Nursery / Home Care	18	8.1	36	3.2	54	4.0
Pre School	20	9.0	23	2.1	43	3.2
Primary	19	8.6	36	3.2	55	4.1
Missing	165	74.3	1024	91.5	1189	88.7
Adult						
Primary	22	9.9	151	13.5	173	12.9
Secondary	65	29.3	271	24.2	336	25.1
Tertiary	9	4.1	100	8.9	109	8.1
Others	2	0.9	12	1.1	14	1.0
Not Applicable	54	24.3	166	14.8	220	16.4
Missing*	70	31.5	419	37.4	489	36.5
Household income per month						
≤ RM 999	39	17.6	256	22.9	295	22.0
RM 1000 – RM 2499	51	23.0	294	26.3	345	25.7
RM 2500 – RM4999	24	10.8	99	8.8	123	9.2
RM 5000 – RM 7499	4	1.8	20	1.8	24	1.8
RM 7500 – RM 9999	1	5	5	0.4	6	0.5
≥ RM 10000	-	-	1	0.1	1	0.1

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Missing*	103	46.4	444	39.6	547	40.8

**No data was entered*

Table 1: Characteristic of patients in National ORL Registry

The total number of patients registered with hearing loss has increased from 222 in 2010 to 1119 in 2011. The cases registered for hearing loss showed a slight male predominance (55.4%) as compared to female (44.6%) in 2010. For 2011, the sex distribution is about equal (male 51.9% and female 48.1 %).

The racial distribution showed highest cases registered are among the Malays' (165/74.3% in 2010 and 767/68.5% in 2011). This is followed by Chinese (217/19.4%) and Indians (112/10%) in 2011. This is comparable to the population distribution of 67.4% Malay, 24.6% Chinese, 7.3% Indian based on the 2010 National report.

The highest age group registered is 60-79 (440/32.8%) followed by the 40-59 years old (432/32.2%). These figures may not truly reflect the true age distribution of hearing loss or ear diseases cases, but it is rather more depending on the cases that were registered at random.

The percentage of Bumiputera Sabah, Bajau, Kadazan, Melayu Kadazan is not reflective of the overall population as the 2010 and 2011 data is not inclusive of Source Data Providers in Sabah and Sarawak.

The majority of children in the registry in both 2010 and 2011 are from the nursery/home care children (54/4.0%) and the primary school children (55/4.1%) group. Among adults, majority (336 / 25.1%) have completed secondary education. This correlates with the fact that ear infection is known to commonly affect-nursery goers and school-going age children due to the factors of overcrowding and developing immune status.

(n = 1341)	2010						2011					
	Male (n = 123)		Female (n=99)		Total (n=222)		Male (n=581)		Female (n=538)		Total (n=1119)	
Race	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Malay	86	38.7	79	35.6	165	74.3	406	36.3	361	32.3	767	68.5
Chinese	24	10.8	17	7.7	41	18.5	104	9.3	113	10.1	217	19.4
Indian	6	2.7	3	1.4	9	4.1	58	5.2	54	4.8	112	10.0
Bumiputera Sabah	1	0.5	0	0.0	1	0.5	1	0.1	0	0.0	1	0.1
Bajau	1	0.5	0	0.0	1	0.5	-	-	-	-	-	-
Others	5	2.3	0	0.0	5	2.3	5	0.4	6	0.5	11	1.0
Kadazan	-	-	-	-	-	-	1	0.1	0	0.0	1	0.1
Melayu Sarawak	-	-	-	-	-	-	1	0.1	0	0.0	1	0.1
Orang Asli Semenanjung	-	-	-	-	-	-	1	0.1	1	0.1	2	0.2
Missing	-	-	-	-	-	-	4	0.4	3	0.3	7	0.6

Table 2: Gender Distribution by Race

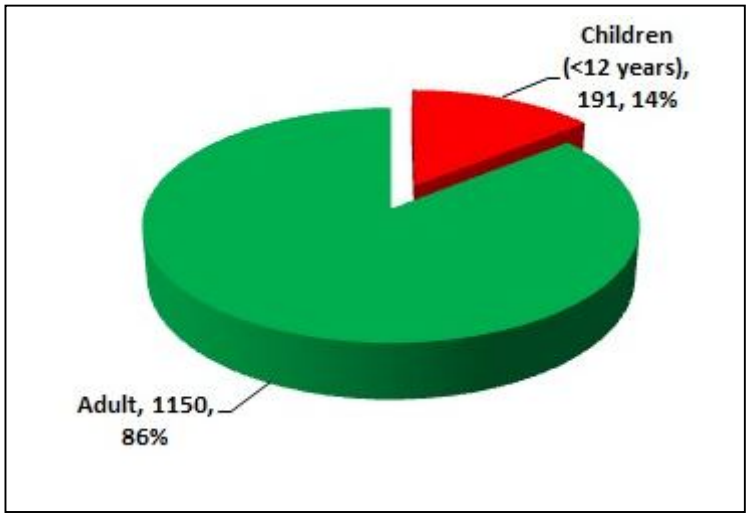

Figure 1: Distribution of children and adult with hearing loss

1.2 HISTOGRAM CHART FOR AGE DISTRIBUTION 2010

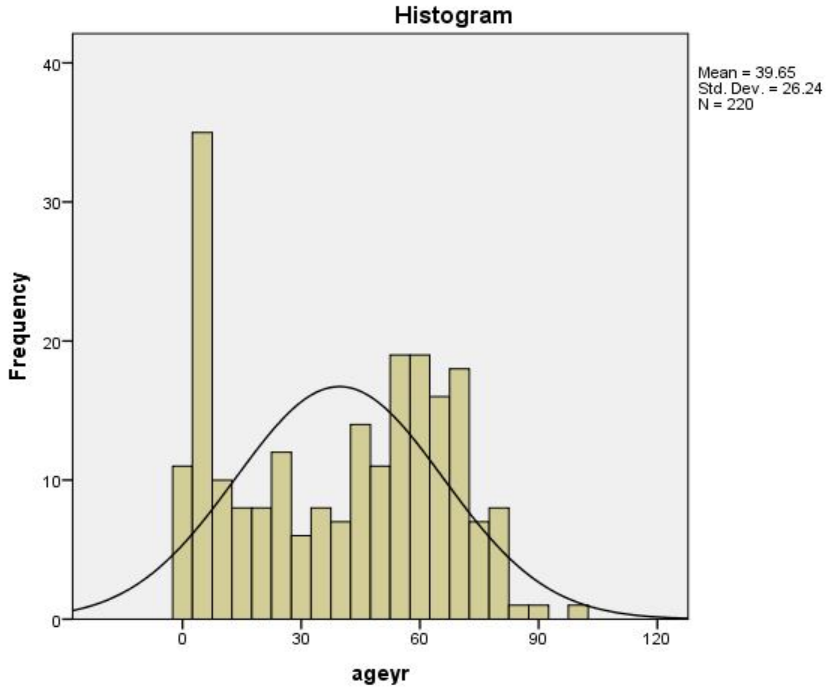

Figure 2: Histogram Chart for Age Distribution 2010

Age was approximately normally distributed with mean 39.65 years old and standard deviation (SD) of 26.24. The range age was wide and the distribution is not steep in the middle. The highest frequency of age group came from less than 20 years old whereas the maximum age was 100 years.

1.3 HISTOGRAM CHART FOR AGE DISTRIBUTION 2011

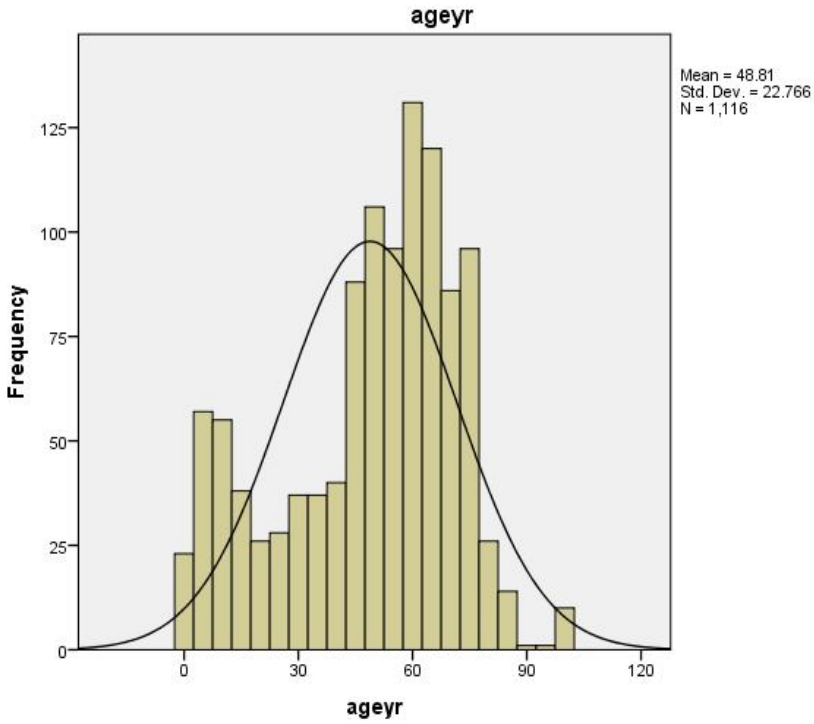

Figure 3: Histogram Chart for Age Distribution 2011

The distribution of age was uneven with a skew to the right. The mean age was 48.81 years old with a standard deviation (SD) of 22.766. The highest frequency of age group came from 60 years old and above whereas the maximum age was 100 years.

CHAPTER 2

DIAGNOSIS BASED ON ICD 10 CLASSIFICATIONS

2.1 DIAGNOSIS BASED ON ICD 10 CLASSIFICATIONS

2010 (n=142)		
ICD 10	**N**	**%**
Otitis externa	2	1.4
Nonsuppurative otitis media	7	4.9
Suppurative and unspecified otitis media	23	16.2
Mastoiditis and related conditions	1	0.7
Cholesteatoma of middle ear	2	1.4
Perforation of tympanic membrane	4	2.8
Other disorders of tympanic membrane	1	0.7
Other disorders of middle ear and mastoid	1	0.7
Other diseases of inner ear	2	1.4
Conductive and sensorineural hearing loss	83	58.5
Other hearing loss	7	4.9
Congenital malformations of ear causing impairment of hearing	4	2.8
Other congenital malformations of ear	2	1.4
Cleft palate with cleft lip	1	0.7
Other congenital malformations of skull an face bones	1	0.7
Injury of cranial nerves	1	0.7

Table 3: Diagnosis Based on ICD 10 Classifications 2010

2011 (n=740)		
ICD 10	**N**	**%**
Otitis externa	5	0.7
Other disorders of external ear	1	0.1
Disorders of external ear in diseases classified elsewhere	2	0.3
Nonsuppurative otitis media	46	6.2
Suppurative and unspecified otitis media	68	9.2
Other disorders of Eustachian tube	5	0.7
Mastoiditis and related condition	3	0.4
Cholesteatoma of middle ear	9	1.2
Perforation of tympanic membrane	21	2.8

Other disorders of tympanic membrane	4	0.5
Other disorders of middle ear and mastoid	4	0.5
Otosclerosis	1	0.1
Disorders of vestibular function	12	1.6
Other diseases of inner ear	9	1.2
Conductive and sensorineural hearing loss	395	53.4
Other hearing loss	125	16.9
Other disorders of ear, not elsewhere classified	7	0.9
Other disorders of ear in diseases classified elsewhere	1	0.1
Postprocedural disorders of ear and mastoid process, not elsewhere classified	1	0.1
Congenital malformations of ear causing impairment of hearing	6	0.8
Other congenital malformations of ear	3	0.4
Cleft palate	1	0.1
Cleft palate with cleft lip	2	0.3
Down's syndrome	3	0.4
Fracture of skull and facial bones	2	0.3
Injury of cranial nerves	1	0.1
Intracranial injury	2	0.3
Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system	1	0.1

Table 4: Diagnosis Based on ICD 10 Classifications 2011

In 2010, the most common ICD 10 diagnosis is conductive and sensorineural hearing loss 58.5% and followed by suppurative and unspecified otitis media in 16.2%.In 2011, conductive and sensorineural hearing loss is the commonest 53.4% followed by other hearing loss 16.9% and suppurative and unspecified otitis media in 9.2%.

The trend of infective causes of ear disease causing conductive with or without sensorineural hearing loss is still the leading cause in many countries especially the developed countries apart from sensorineural hearing loss from degenerative/aging or presbycusis. 4.0% (53) of total cases registered suffered from otitis media of the Non-Suppurative Otitis Media on ICD 10 diagnosis for 2010 and 2011

CHAPTER 3

SYSTEMIC COMORBIDITY & RISK FACTOR

3.1 FAMILY HISTORY OF HEARING LOSS

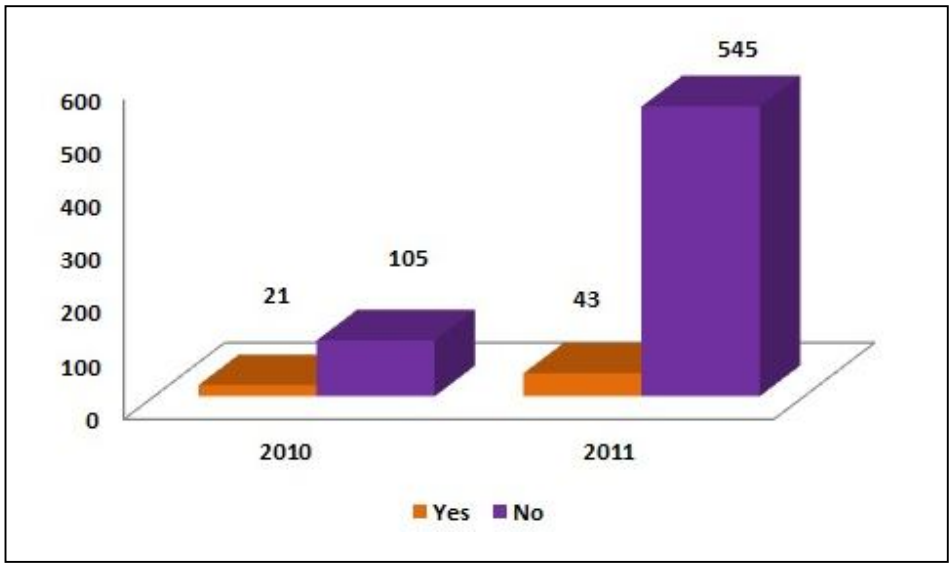

Figure 4: Family history of hearing loss

9.0% of patients had a positive family history of hearing loss in this registry. More than 50% of congenital hearing loss is inherited, in (75-80) which the majority are inherited than recessive genes as reported by *Smith et al in Lancet 2005*.

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Use of tobacco/parental smoking						
Smoker	19	8.6	109	9.7	128	9.5
Non smoker	134	60.4	643	57.5	777	57.9
Missing*	69	31.1	367	32.8	436	32.5

Table 5: Use of tobacco/parental smoking

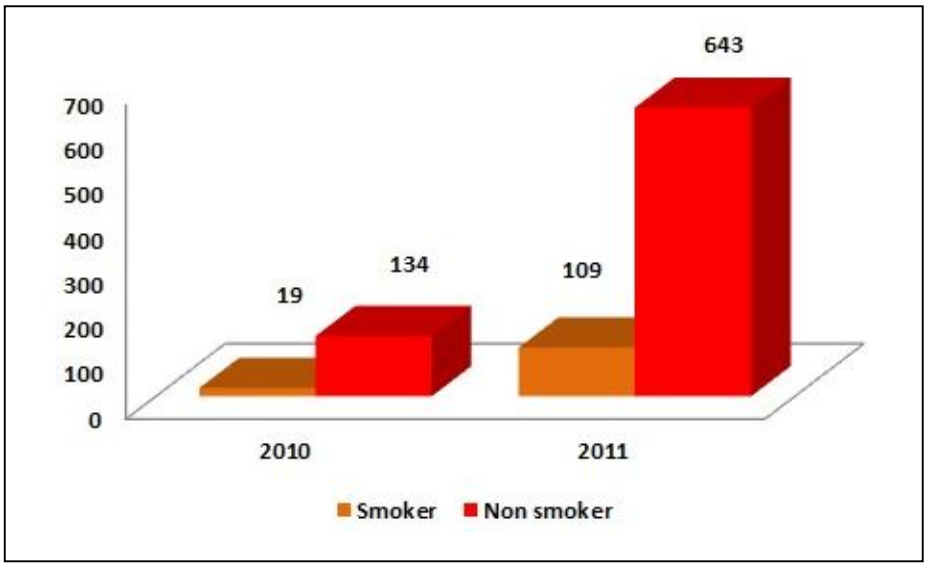

Figure 5: Distribution of smoking / parental smoking status

For both 2010 and 2011, there is more non-smoker/negative history of parental smoking (57.9%) than smokers although in 32.5% no data was acquired.

3.2 COMORBIDITY IN HEARING LOSS PATIENTS

System (n = 1341)	2010	2011	Total	% of total
None	91	365	456	34.0
Hypertension	37	193	230	17.2
Ischaemic Heart Disease	4	43	47	3.5
Diabetes Mellitus	25	107	132	9.8
Renal Failure	1	9	10	0.7
ORL Allergy	5	18	23	1.7
Cerebrovascular accident	1	18	19	1.4
Hyperthyroidism	2	5	7	0.5
Hyperlipidaemia	6	43	52	3.9
Connective Tissue Disease	-	2	2	0.1
Others	21	55	76	5.7

Table 6: Systemic Comorbidity associated with Hearing Loss

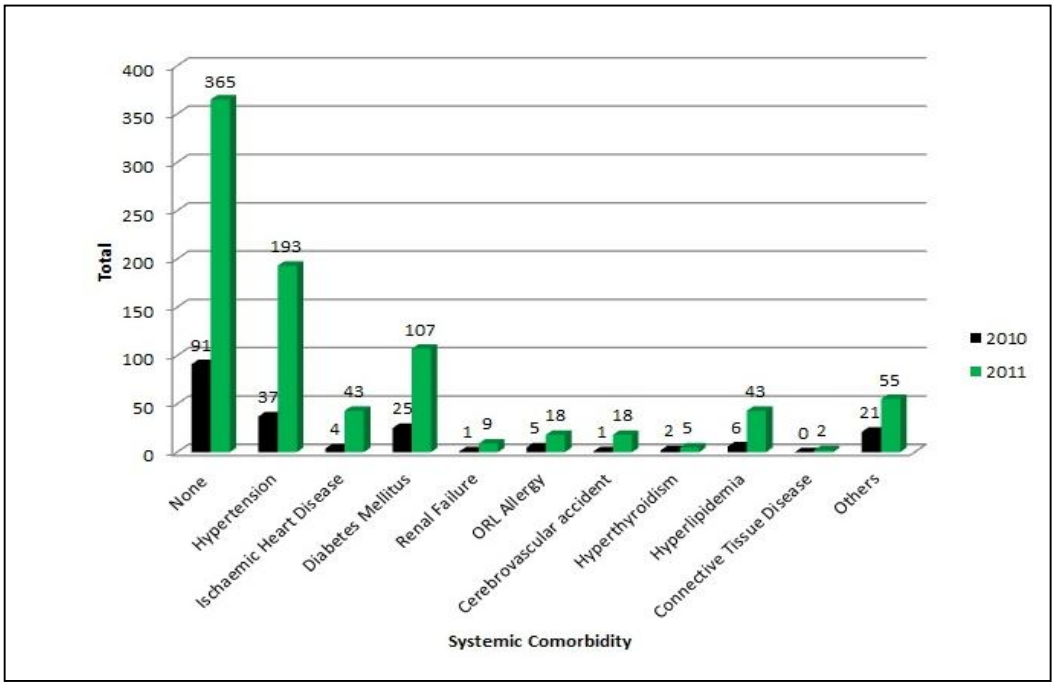

Figure 6: System Comorbidity

Majority (34%) has no associated medical illness. Hypertension is the commonest comorbid condition (17.2%), followed by Diabetes Mellitus (9.8%), hyperlipidaemia (3.9%) and Ischaemic Heart Disease (3.5%). All these diseases or comorbidity may affect hearing through reducing blood microcirculation to the ear from artherosclerosis or microangiopathy

3.3 ONSET OF HEARING LOSS

(n= 1341)	**2010**	**2011**	**Total**	**% of total**
Congenital	42	156	198	14.8
Acquired	130	714	844	62.9
Onset not notified	50	249	299	22.3

Table 7: Onset of Hearing Loss

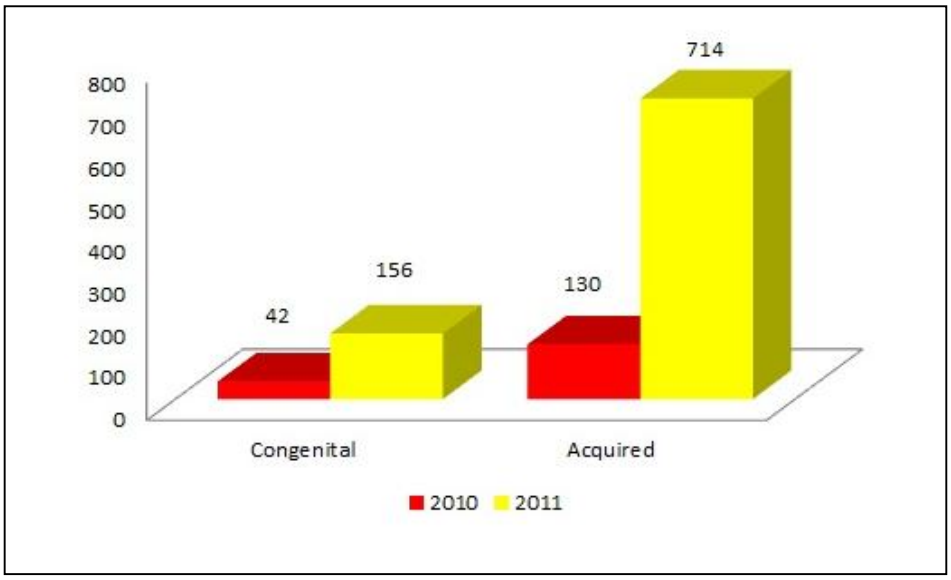

Figure 7: Distribution of congenital and acquired hearing loss

Most cases registered in 2010 and 2011 are those with acquired onset of hearing loss (62.9%) and this correlates with more adult cases registered into the registry. The cases registered show increase in number in 2011 especially for the acquired onset.

3.4 HEARING LOSS AND ASSOCIATED SYMPTOMS

	2010	2011	Total
Ringing in ear/Tinnitus	69	327	396
Fullness	8	87	95
Otorrhoea	35	126	161
Otalgia	11	41	52
Vertigo	20	74	94
Others	6	10	16

Table 8: Hearing loss and associated symptoms

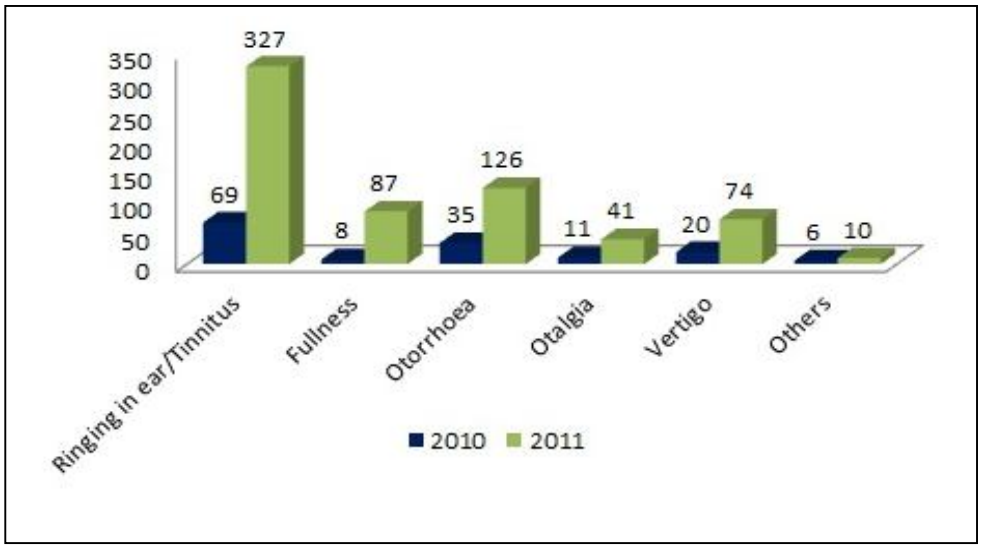

Figure 8: Hearing loss and associated symptoms

Tinnitus is the most common associated symptoms (396 cases) which seems to be a common accompanying symptom of any cause or type of hearing loss , followed by otorrhoea (161 cases) which usually signifies an infective cause, fullness (95 cases) and vertigo (94 cases).

3.5 RISK FACTOR OF HEARING LOSS IN CHILDREN

	2010	2011	Total	% of total
Low birth weight (<1.5 kg)	5	-	5	0.37
Apgar score at 5 min < 3	6	4	10	0.75
Neonatal Jaundice	30	11	41	3.06
Identified Syndrome	4	15	19	1.42

Table 9: Risk Factor in Children

The commonest risk factor of hearing loss in children seen in this registry is neonatal jaundice (3.06%) and identified syndrome (1.42%). It is a known fact that a proportion of children can have hearing loss without having any risk factors.

3.6 IDENTIFIED SYNDROMES RELATED TO HEARING LOSS

	2010	2011	Total	% of total
Treacher Collins Syndrome	-	1	1	5.3
Pierre Robin Sequence	-	2	2	10.5
Velocardiofacial Syndrome	-	2	2	10.5
CHARGE Association	1	-	1	5.3
Waadenburg Syndrome	1	-	1	5.3
Down's Syndrome	2	10	12	63.2
TOTAL	**4**	**15**	**19**	**100**

Table 10: Identified Syndromes related to hearing loss

Down's syndrome is the commonest associated syndrome (63.2%). The usual cause in Down's Syndrome is eustachian tube malfunction from muscle hypotonia producing middle ear effusion and conductive hearing loss.

3.7 OTHER RISK FACTORS

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Risk Factors						
None	69	31.1	420	37.5	489	36.5
Meningitis	0	0	10	0.9	10	0.7
Measles	2	0.9	5	0.4	7	0.6
Mumps	0	0	2	0.2	2	0.1
Viral Infection	2	0.9	10	0.9	12	0.9
Ototoxic Medication	6	2.7	8	0.7	14	1.0
Trauma	5	2.3	24	2.1	29	2.2
- Ear injury	0	0	13	1.2	13	1.0
- Head injury	5	2.3	9	0.8	14	1.0
Noise Exposre	0	0	38	3.4	38	0.1
- Industrial noise	0	0	11	1.0	11	0.8
- Occupational noise	0	0	25	2.2	25	1.9
-Lifestyle/Hobbies	0	0	3	0.3	3	0.2

Table 11: Risk Factor of Hearing Loss

CHAPTER 4

CLINICAL AUDIOLOGICAL & SPEECH RESULT

4.1 ASSESSMENT/DIAGNOSIS

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Ear assessment						
External ear deformity	8	3.6	26	2.3	34	2.5
-Microtia	6	2.7	13	1.2	19	1.4
-Canal atresia/stenosis	5	2.3	12	1.1	17	1.3
Tympanic membrane/middle ear						
Abnormal	114	51.4	644	57.6	758	56.5
Normal	58	26.1	249	22.3	307	22.9

Table 12: Ear assessment

A total of 19 cases (1.4%) have microtia for both 2010 and 2011 and 1.3% canal atresia. 56.5% showed abnormal findings of tympanic membrane / middle ear.

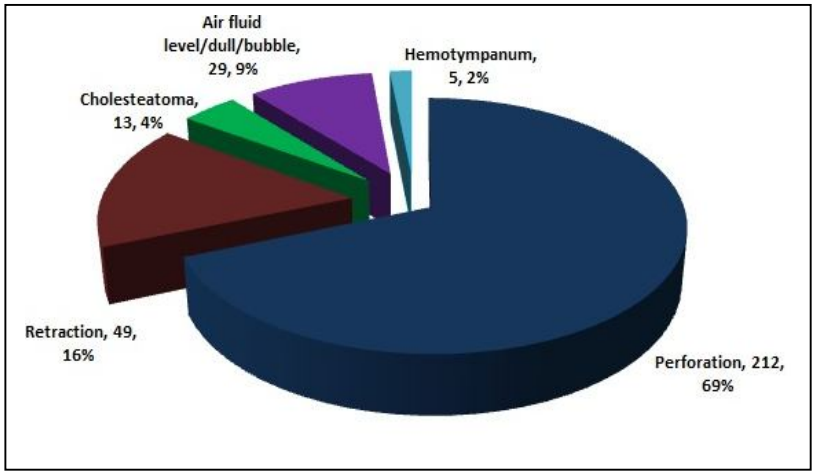

Figure 9: Distribution of tympanic membrane and middle ear findings

69% of ears have perforation of tympanic membrane, 16% retraction, 9% air fluid level/dull/bubble, 4% cholesteatoma and 2% hemotympanum.

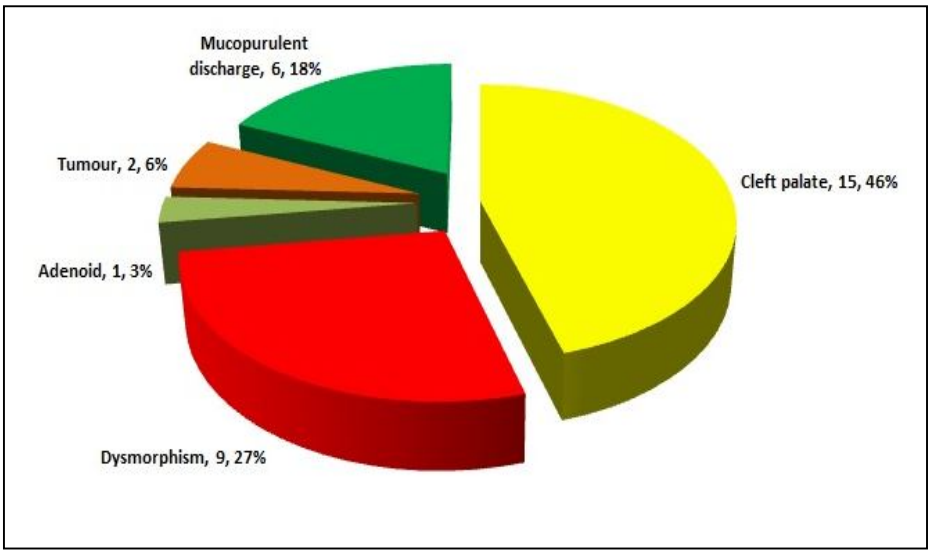

Figure 10: Distribution of Craniofacial/Nose/Nasopharyngeal abnormalities

46% of cases have associated cleft palate, 27% dysmorphism, 18% have mucopurulent discharge, 6% tumour and 3% presence of adenoids.

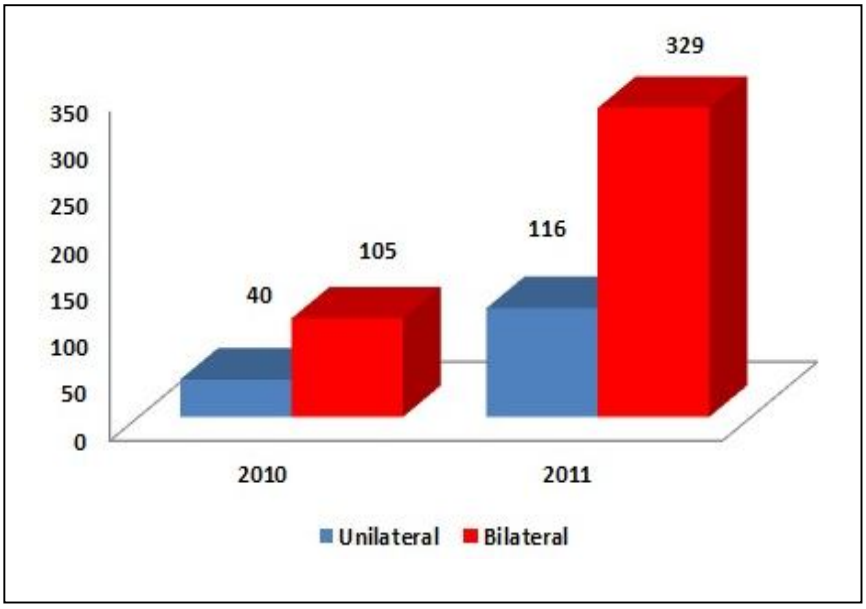

Figure 11: Hearing loss cases according to side if ears involved.

Majority of cases of hearing loss are bilateral 47.3% in 2010 and 24.5% in 2011.

Degree	N= 222 (2010) /Total Ears = 444					
	Ears	%	Right	%	Left	%
Mild	71	19.9	41	22.7	30	17.1
Moderate	109	30.6	55	30.4	54	30.9
Severe	88	24.7	42	23.2	46	26.3
Profound	88	24.7	43	23.6	45	25.7
TOTAL	356	100	181	100	175	100

Table 13: Severity of hearing based on ears 2010

356 ears out of 444 showed bilateral hearing loss

Degree	N=1119 (2011) / Total Ears = 2238					
	Ears	%	Right	%	Left	%
Mild	533	26.9	282	28.2	251	25.5
Moderate	803	40.5	402	40.2	401	40.7
Severe	342	17.2	171	17.1	171	17.4
Profound	306	15.4	145	14.5	161	16.4
TOTAL	1984	100	1000	100	984	100

Table 14: Severity of hearing based on ears 2011

Degree	Bilateral					
	2010	%	2011	%	TOTAL	%
Mild	1	5.0	150	25.1	151	24.4
Moderate	11	55.0	254	42.5	265	42.9
Severe	7	35.0	92	15.4	99	16.0
Profound	1	5.0	102	17.1	103	16.7
TOTAL	20	100	598	100	618	100

Table 15: Bilateral Hearing Loss

There were a total of 1341 individuals that were reported have deafness in this report which totals up to 2682 ears.

Type of HL	N = 222 (2010)					
	Ears	%	Right	%	Left	%
Sensorineural	175	65.8	91	65.9	84	65.6
Auditory neuropathy	0	0	0	0	0	0
Conductive	33	12.4	18	13.0	15	11.7
Mixed	58	21.8	29	21.0	29	22.7
TOTAL	266	100	138	100	128	100

Table 16: Type of Hearing Loss 2010

Type of HL	N=1119 (2011)					
	Ears	%	Right	%	Left	%
Sensorineural	997	67.1	507	68.1	490	66.0
Auditory neuropathy	2	0.13	2	0.27	-	-
Conductive	192	12.9	87	11.7	105	14.2
Mixed	295	19.9	148	19.9	147	19.8
TOTAL	1486	100	744	100	742	100

Table 17: Type of Hearing Loss 2011

The majority of the deaf patients were from the sensorineural hearing loss group (65.6% and 66.0%) for 2010 and 2011 respectively. 22.7% and 19.8% had mixed hearing loss and 11.7% and 14.2 % were from the conductive hearing loss group. Auditory neuropathy were detected in two ears in 2011

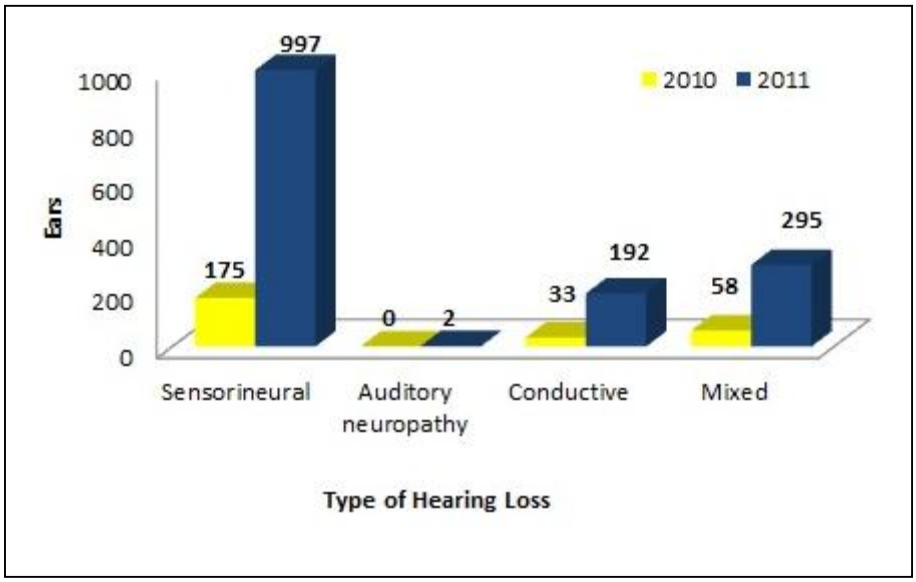

Figure 12: Audiological Diagnosis/Type of Hearing Loss 2010 and 2011

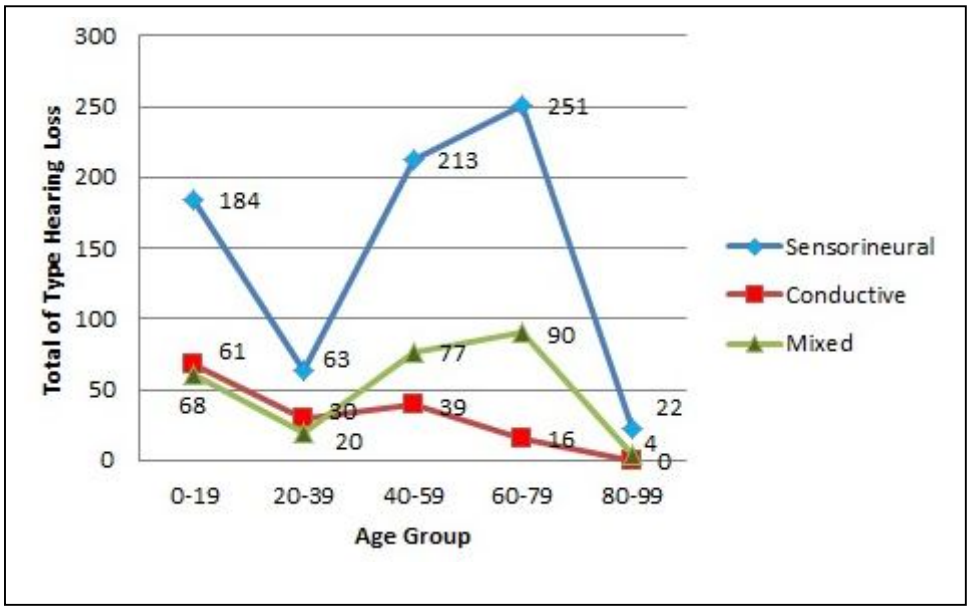

Figure 13: Distribution of Type of Hearing Loss in Age Groups

When the statistics are analysed for the type versus age, all the three types of hearing loss showed initial peak distribution between 0-9 years old. The sensorineural group has a peak in the early age group, decreases in the 20-39 age groups with gradual increase till age around 80 years old. In contrast the conductive hearing loss shows a peak in the younger age groups with gradual decrease towards adulthood and old age. The mixed hearing loss group showed a peak at around 60-79 years old.

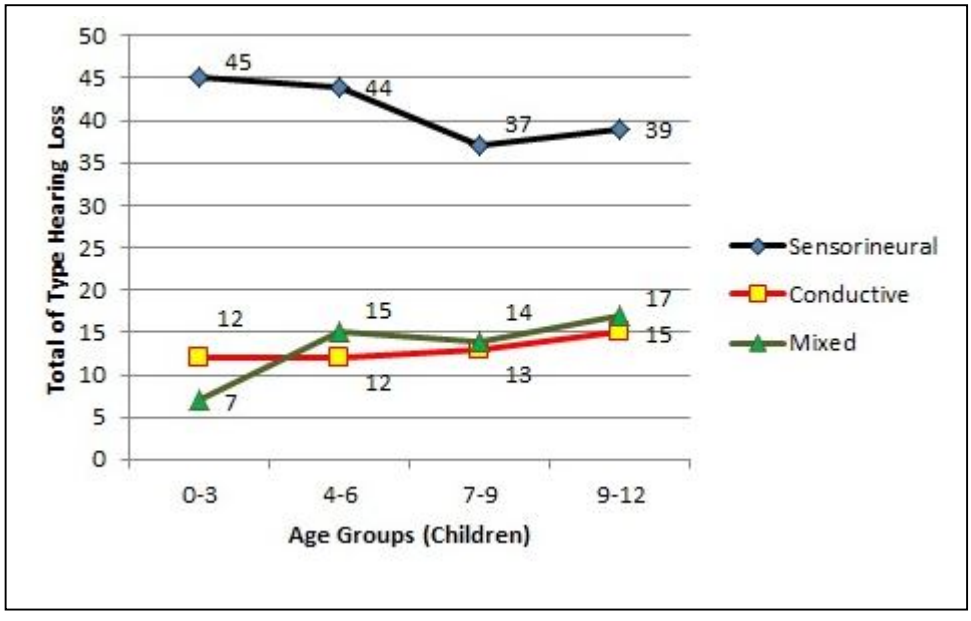

Figure 14: Distribution of Type of Hearing Loss in Children

4.2 IMPEDENCE TEST TYMPANOGRAM 2010

Tympanogram (n=222)	∑	A	As	Ad	B	C	Others	Not Applicable
Right	142	100	10	1	22	6	1	2
Left	143	103	9	1	24	5	-	1

Table 18: Impedence test tympanogram 2010

4.3 IMPEDENCE TEST TYMPANOGRAM 2011

Tympanogram (n=1119)	∑	A	As	Ad	B	C	Others	Not Applicable
Right	866	575	69	17	136	43	3	10
Left	862	544	78	16	146	48	5	11

Table 19: Impedence Test Tympanogram 2011

Impedence test showed majority of ears had type A tympanogram, usually in a purely sensorineural hearing loss followed by type B which is the otitis media effusion group.

4.4 SPEECH LANGUAGE ASSESSMENT

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Speech language assessment	29	13.1	45	4.0	74	5.5
Listening skill						
Auditory awareness achieved	16	0.5	9	0.8	25	1.9
Lind Sound Test-achieved	6	2.7	6	0.5	12	0.9
Auditory memory - achieved	6	0.5	9	0.8	15	1.1
Language use						
First language						
- Malay	11	5.0	24	2.1	35	2.6
- English	-	-	2	0.1	2	0.1
- Mandarin	2	0.9	3	0.3	5	0.4
- Tamil	2	0.9	1	0.1	3	0.2
Second language						
- Malay	4	1.8	4	0.4	8	0.6
- English	3	1.4	11	1.0	14	1.0
- Mandarin	1	0.5	1	0.1	2	0.1
- Tamil	-	-	1	0.1	1	0.1
Third language						
- Malay	-	-	3	0.3	3	0.2
- English	2	0.5	2	0.1	4	0.3
- Mandarin	-	-	1	0.1	1	0.1

	2010 (n = 222)		2011 (n =1119)		Total (n= 1341)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Mode of Communication						
- Verbal	9	4.1	11	1.0	20	1.5
- Signing	10	4.5	9	0.8	19	1.4
- Cued Speech	-	-	1	0.1	1	0.1

Table 20: Speech Language Assessment

CHAPTER 5

DEMOGRAPHY & PREIMPLANTATION ASSESSMENT

5.1 DEMOGRAPHY OF COCHLEAR IMPLANT CASES IN REGISTRY

	2010 (n=19)		2011 (n=43)		Total (n=62)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Gender						
Male	7	36.8	17	39.5	24	38.7
Female	12	63.2	26	60.5	38	61.3
Race						
Malay	14	73.7	31	72.1	45	72.6
Chinese	3	15.8	7	16.3	10	16.1
Indian	1	5.3	4	9.3	5	8.1
Others	1	5.3	1	2.3	2	3.2
Type of HL						
Pre lingual	13	68.4	30	69.8	43	69.4
Post lingual	4	21.1	8	18.6	12	19.4
Cross over	2	10.5	1	2.3	3	4.8
Speech Language Assessment	**14**	**737**	**29**	**67.4**	**43**	**69.4**
Listening skill						
Auditory awareness	12	63.2	20	46.5	32	51.6
Ling Sound Test	7	36.8	11	25.6	18	29.0
Auditory Memory	7	36.8	5	11.6	12	19.4
Language use						
First language						
-Malay	10	52.6	20	46.5	30	48.4
-English	-	-	2	4.7	2	3.2
-Mandarin	3	15.8	3	7	6	9.7

	2010 (n=19)		2011 (n=43)		Total (n=62)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
-Tamil	-	-	1	2.3	1	1.6
Second Language						
-Malay	3	15.8	3	7.0	6	9.7
-English	3	15.8	12	27.9	15	24.2
-Mandarin	-	-	1	2.3	1	1.6
-Others, specify	-	-	2	4.7	2	3.2
*Hokkien	-	-	1	4.3	1	1.6
*Punjabi	-	-	1	4.3	1	1.6
Third Language						
-Malay	-	-	3	7.0	3	4.8
-English	2	10.5	2	4.7	4	6.5
-Mandarin	-	-	1	2.3	1	1.6
Mode of Communication						
Verbal	7	36.8	14	32.6	21	33.9
Signing	5	26.3	5	11.6	10	16.1
Others	2	10.5	7	16.3	9	14.5
*Missing	5	26.3	17	39.5	22	35.5
Associated Disorder						
None	9	47.4	16	37.2	25	40.3
Learning Disorder	1	5.3	-	-	1	1.6
ADHD	-	-	4	9.3	4	6.5
Others – GDD	-	-	1	2.3	1	1.6

	2010 (n=19)		2011 (n=43)		Total (n=62)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Co-operation						
Parent						
-Fair	1	5.3	5	11.6	6	9.7
-Good	13	68.4	18	41.9	31	50.0
*Missing	5	26.3	20	46.5	25	40.3
Patient						
-Poor	-	-	4	9.3	4	6.5
-Fair	5	26.3	6	14.0	11	17.7
-Good	9	47.4	16	37.2	25	40.3
*Missing	5	26.3	17	39.5	22	35.5
CI Implant	**19**	**100**	**38**	**88.4**	**57**	**91.9**
*Missing	-	-	5	11.6	5	8.1
Model						
MED-EL	1	5.3	2	4.7	3	4.8
Advance Bionic Corp	-	-	-	-	-	-
Cochlear	14	73.7	36	83.7	50	80.6
*Missing	4	21.1	5	11.6	9	14.5
Angular depth						
Single array	4	21.1	8	18.6	12	19.4
Double array	-	-	3	7.0	3	4.8
Straight	-	-	-	-	-	-
Advance Contour	11	57.9	24	55.8	35	56.5

	2010 (n=19)		2011 (n=43)		Total (n=62)	
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
CT Scan						
Middle Ear	15	78.9	22	51.2	37	59.7
-Yes	1	5.26	0	0	1	1.61
-No	14	73.7	22	51.2	36	58.1
Mastoid Bone	15	78.9	22	51.2	37	59.7
-Well pneumatized	14	73.7	21	48.8	35	56.5
-Poorly pneumatized	1	5.3	-	-	1	1.6
Inner Ear	15	78.9	24	55.8	39	62.9
-Cochlear	15	78.9	20	46.5	35	56.5
-> normal	14	73.7	19	44.2	33	53.2
-> incomplete partition(mondini)	1	5.3	-	-	1	1.6
-> Labyrinthine Ossificans	-	-	1	2.3	1	1.6
-Labyrinthe (Normal)	14	73.7	21	48.8	35	56.5
-Aqueduct (Normal)	15	78.9	20	46.5	35	56.5.
Finding Intraop						
Normal anatomy	11	57.9	17	39.5	28	45.2
Abnormal anatomy	2	10.5	3	7.0	5	8.1
Unnotified anatomy status	6	31.6	23	53.5	29	46.8
Complication of surgery	3	15.8	1	2.3	4	6.5

Table 21: Demography and Pre Implantation Assessment

Majority of implantees are female 63.2% in 2010 and 60.5% in 2011. For both 2010 and 2011, 69.4% of implantees are prelingual cases, 19.4% postlingual and 4.8% cross over cases. 51.6% of implantees show auditory awareness, implant (from the registered cases). Ling Sound test 29.0% and auditory memory is 19.4%. 33.9% of implantees achieved verbal mode of communication.

Among the preimplantees prior to cochlear implantation, 40.3% has no associated disorder, 6.5% had ADHD. 59.7% notified on parental cooperation. Out of which 83.8% showed good cooperation while the rest are fair. 80.6% of implantees were implanted with cochlear implant model COCHLEAR, 4.8% MEDEL, and in 14.5% model was not stated. Advance contour type of electrode was used in majority of cases (56.5%). Most cases showed normal middle ear and well pneumatized mastoid bone on CT scan.

Inner ear finding showed mondini in 1.6% and labyrinthine ossification in 1.6% of cases. Majority had normal intraoperative anatomy. All cases in this report were funded by Ministry of Health Cochlear Implant Grant.

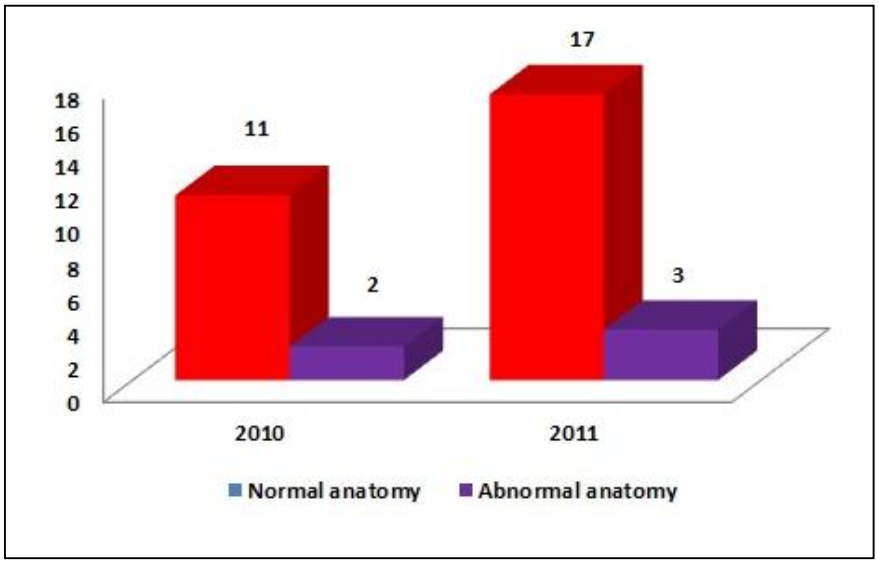

Figure 15: Intraop Cochlear Implantation Anatomical Findings

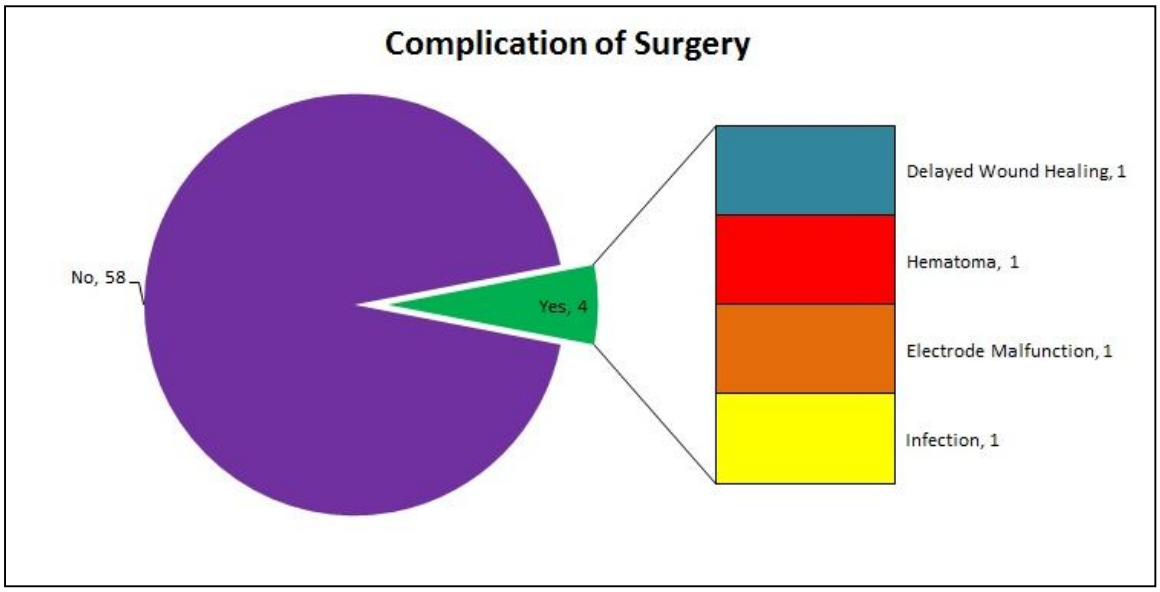

Figure 16: Complication of cochlear implant surgery in registry

Majority of surgeries were uncomplicated with only one case having delayed wound healing, one case self-limiting hematoma and one self-limiting wound infection. One case had electrode malfunction and was explanted followed by reimplantation

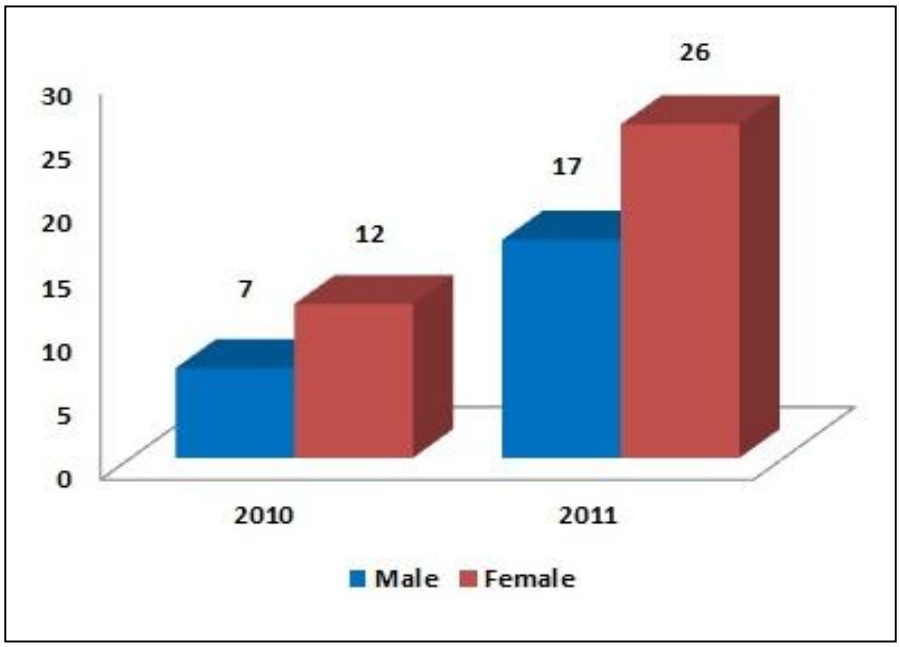

Figure 17: Sex Distribution of Cochlear Implant patients.

Most implantees are female (26 in 2011, 12 in 2010)

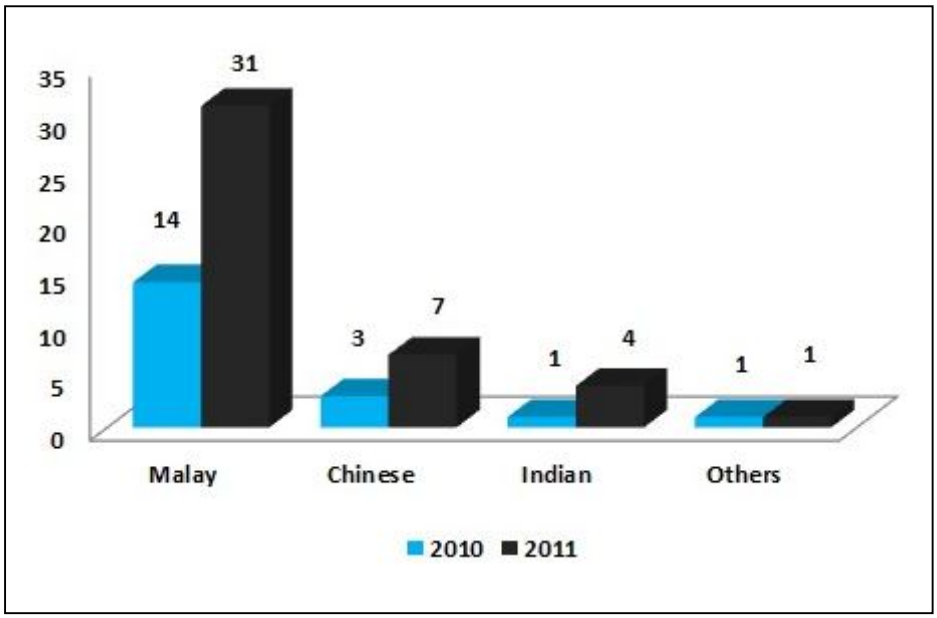

Figure 18: Racial Distribution on Cochlear Implant patients

The Malays were the majority among the cochlear implant implantess (31 cases in 2011) which correlates with the local population statistics

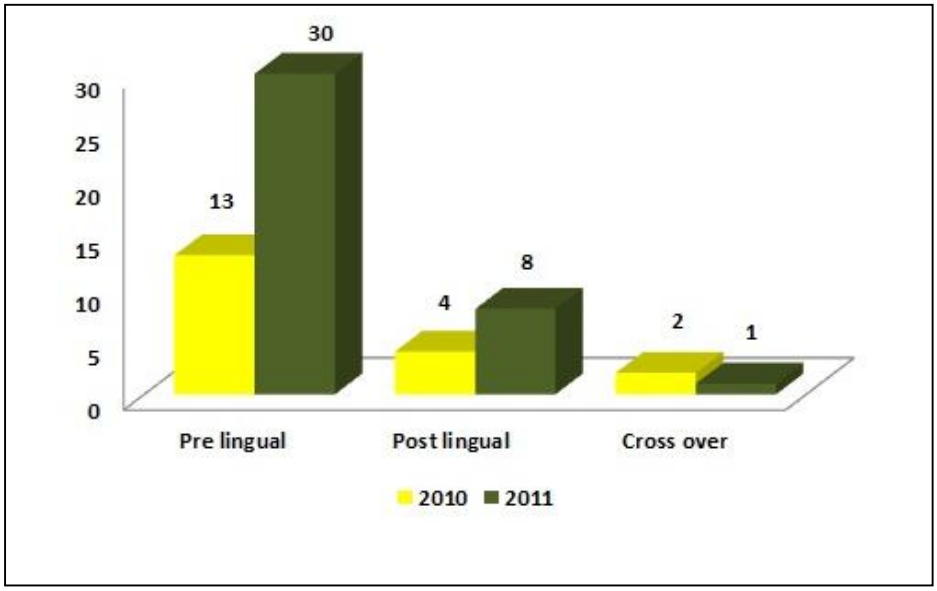

Figure 19: Type of hearing loss pre implant

Majority of cases implanted were pre lingual (30 in 2011, 13 in 2010) i.e. children with hearing loss before the development of speech

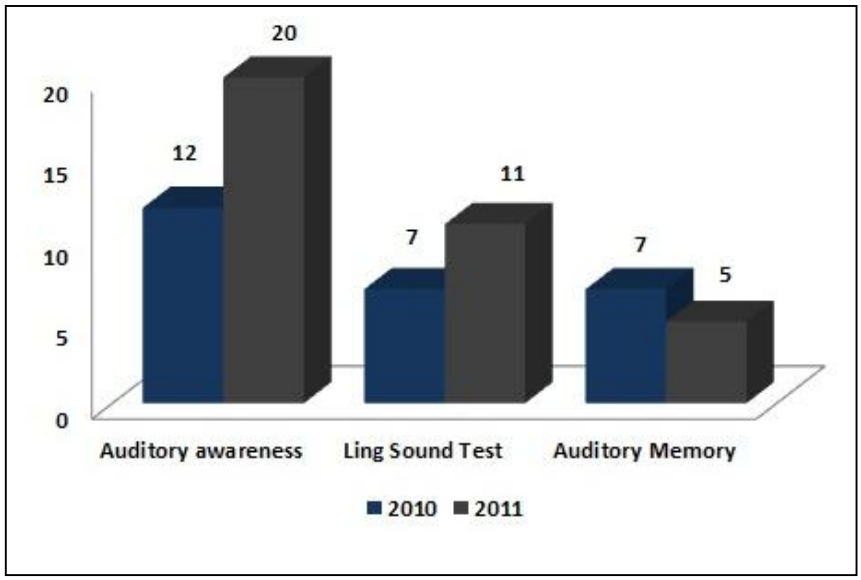

Figure 20: Speech language assessment of pre cochlear implant patients

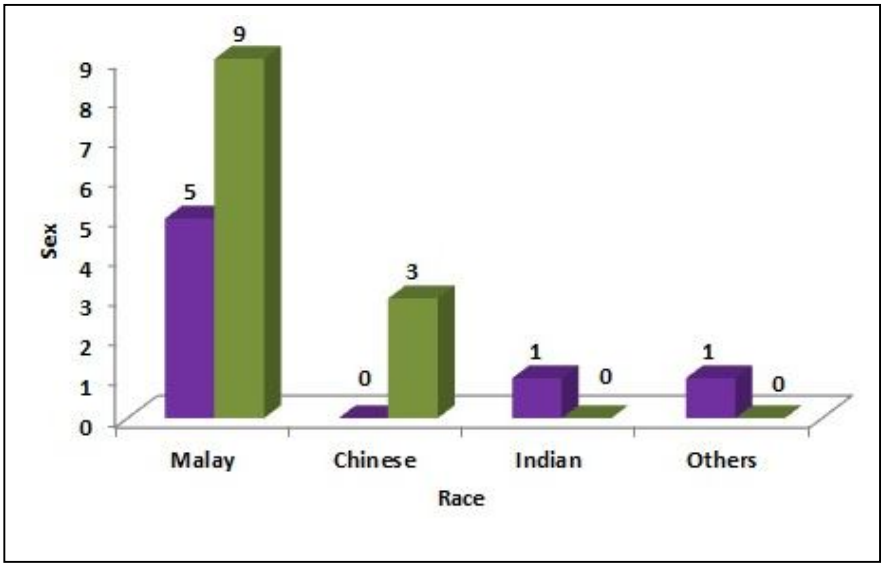

Figure 21: Sex and Race Cross tabulation

5.2 SPEECH LANGUAGE ASSESSMENT AMONG REGISTERED CASES 2010

Speech Language Assessment	0-6 months	6-12 months	12-18 months	18-24 months	24-30 months	30-36 months	36-42 months	42-48 months	48-54 months	54-60 months	60-66 months	66-72 months	Missing
Receptive Language Skill	2 (10.5%)	-	1 (5.3%)	1 (5.3%)	1 (5.3%)	1 (5.3%)	1 (5.3%)	2 (10.5%)	-	-	-	-	10 (52.6%)
Expressive Language Skill	2 (10.5%)	1 (5.3%)	3 (15.8%)	2 (10.5%)	-	-	1 (5.3%)	1 (5.3%)	-	-	-	-	9 (47.4%)
Speech	2 (10.5%)	2 (10.5%)	2 (10.5%)	2 (10.5%)	-	-	2 (10.5%)	-	-	-	-	-	9 (42.4%)
Cognition Level	1 (5.3%)	-	1 (5.3%)	-	1 (5.3%)	2 (10.5%)	1 (5.3%)	-	2 (10.5%)	1 (5.3%)	-	1 (5.3%)	9 (47.4%)

Table 22: Speech Language Assessment among Registered Cases 2010 (Cochlear Implant)

5.3 SPEECH LANGUAGE ASSESSMENT AMONG REGISTERED CASES 2011

Speech Language Assessment	0-6 months	6-12 months	12-18 months	18-24 months	24-30 months	30-36 months	36-42 months	42-48 months	48-54 months	54-60 months	60-66 months	66-72 months	Missing
Receptive Language Skill	11 (25.6%)	2 (4.7%)	1 (2.3%)	2 (4.7%)	1 (2.3%)	2 (4.7%)	-	-	-	-	-	3 (7.0%)	21 (48.8%)
Expressive Language Skill	16 (37.2%)	-	-	1 (2.3%)	1 (2.3%)	1 (2.3%)	-	-	-	-	-	3 (7.0%)	21 (48.8%)
Speech	16 (37.2%)	-	-	1 (2.3%)	1 (2.3%)	1 (2.3%)	-	-	-	-	-	3 (7.0%)	21 (48.8%)
Cognition Level	5 (11.6%)	2 (4.7%)	-	-	2 (4.7%)	4 (9.3%)	1 (2.3%)	1 (2.3%)	-	1 (2.3%)	-	3 (7.0%)	24 (55.8%)

Table 23: Speech Language Assessment among Registered Cases 2011 (Cochlear Implant)

CONCLUSION

The following is a summary of the key findings from the registry; total numbers of patients were 1341. Malays were the predominant group (69.5%). 86% were adults. Majority of patients were between the ages 40 -79 (67%). Almost half (47.7%) came from households with an average income of less than RM2500.00. Otitis media and conductive and sensorineural hearing loss were commonest diagnoses. 14.8% of hearing loss was congenital. Hypertension (17.2%) and diabetes mellitus (9.8%) were the commonest comorbidities associated with hearing loss. Sensorineural hearing loss accounted for almost two-thirds of the patients. There were 62 cochlear implant cases, of which about 70% were children. Details on outcome are still in progress.

This report is the first in Malaysia to provide an overview of hearing related and otologic diseases/cochlear implant. There are limitations as the study was limited to data from 9 hospitals (source data providers). There were no SDP's from East Malaysia. Data entry was inconsistent and incomplete at times. This varied between the SDP's.

A number of steps were taken during the study period to improve data collections. Meetings were conducted with members of the SDP's to identify problems and improve compliance. The format of the questionnaire was revised and simplified to encourage reporting. In addition a 'Quick Reference' guide on ICD 10 disease classification was devised. To encourage data reporting, certificates of appreciation was given to the top three data providers. A monthly audit on the numbers of reported cases was sent to all SDP's to keep track of their progress. Members of the primary centre also made visits to the SDP's to provide training and support.

Future Direction:

The outcome from the registry has been quite encouraging. Data regarding otologic disease will assist planning services and intervention. Complete data on the National Cochlear Implant Programme is available. More SDP's will be encouraged to participate in the register. This will provide a more accurate picture of hearing related disease and disabilities in the country. Other intervention programmes such as universal new born hearing screening and hearing awareness programmes are in various stages of implementation.

Data from the registry has been presented at various national and international meetings. The following is a list of presentations from the registry:

Type of Presentation (Oral/Poster)	Topic	Conference
Poster	National Hearing Registry of Hearing Loss and Otology Related Disease in Hospital Sultanah Bahiyah: Aetiology, Risk Factor and Type of Hearing Loss	5th National Conference for Clinical Research (NCCR) 2011
Poster	National Hearing Registry of Hearing Loss and Otology Related Disease in Malaysia A Demography Perspective	5th National Conference for Clinical Research (NCCR) 2011
Poster	Demographic Pattern, Indication and Outcome of Cochlear Implant in Seven Data Source Data Providers in MOH Hospitals in Malaysia	5th National Conference for Clinical Research (NCCR) 2011
Poster	National Cochlear Implant Programme : Outcome of 20 Implantees of Hospital Sultanah Bahiyah Satellite Centre	6th National Conference for Clinical Research (NCCR) 2012
Presentation	Cochlear Implant Dr Siti Sabzah Mohd Hashim Hospital Sultanah Bahiyah	International ORL/Head/Neck Conference Nexus Karambunai, Kota Kinabalu, Sabah 3 – 5 Jun 2010
Presentation	Cochlear Implant Dr Siti Sabzah Mohd Hashim Hospital Sultanah Bahiyah	International ORL/Head/Neck Conference PICC Kuala Lumpur 2012
Presentation	Cochlear Implant Dr Zulkiflee Salahuddin Hospital Raja Perempuan Zainab II	14th Asean ORL Head and Neck Congress Borneo Convention Centre, Kuching , Sarawak 12 – 14 May 2011

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iii.* Date of Notification (dd/mm/yyyy): / / iv.* Date first consultation (dd/mm/yyyy): / /

v. Reporter name: _____
(Auto based on login)

SECTION 1 : PATIENT DETAILS & DEMOGRAPHICS

1. Name : *

2. NRIC : *

MyKad/ MyKid: - - Other ID document No:

Specify document type (if others): ◯ Old IC ◯ Army ◯ Police ◯ Mother's IC ◯ Father's IC ◯ Work Permit ◯ Passport ◯ Birth Certificate ◯ Pension Card ◯ Others: _____

3. Parents details :

☐ Father → Name: I/C No : - -

☐ Mother → Name: I/C No : - -

☐ Not applicable (Autofill as NA if the age >12)

4. Address :

Postcode: Town / City:

State : ◯ Johor Darul Takzim ◯ Kedah Darul Aman ◯ Kelantan Darul Naim ◯ Melaka ◯ Negeri Sembilan Darul Khusus ◯ Pahang Darul Makmur ◯ Perak Darul Ridzuan ◯ Perlis Indera Kayangan ◯ Pulau Pinang ◯ Sabah ◯ Sarawak ◯ Selangor Darul Ehsan ◯ Terengganu Darul Iman ◯ Wilayah Persekutuan Kuala Lumpur ◯ Wilayah Persekutuan Labuan ◯ Wilayah Persekutuan Putrajaya ◯ Not applicable - Foreign

5. Contact number : Homephone: - H/P: -

6. Email address :

7. Gender : * ◯ Male ◯ Female ◯ Ambiguous

8. Date of Birth : * (dd/mm/yyyy) / / ☐ Estimated/presumed year (autofill if MyKad is available)
(If the exact date is not known, please enter 01/07/yyyy & check the estimated / presumed year box)

9. Age : (Autocalculate) year(s) month(s) day(s)

10. Ethnic group : *

◯ Malay ◯ Chinese ◯ Indian ◯ Bumiputera Sabah ◯ Bajau ◯ Dusun ◯ Kadazan ◯ Murut ◯ Bumiputera Sabah Lain ◯ Bumiputera Sarawak ◯ Melayu Sarawak ◯ Melanau ◯ Kedayan ◯ Iban ◯ Bidayuh ◯ Bumiputera Sarawak Lain ◯ Orang Asli Semenanjung ◯ Others: _____

11. Nationality : ◯ Citizen ◯ Permanent Resident ◯ Non-Citizen, specify country: _____

SECTION 2 : EDUCATION LEVEL & HOUSEHOLD INCOME

1. Education level :

a. Children : ◯ Nursery / Home Care ◯ Pre School ◯ Primary ◯ Not applicable (Autofill as NA if the age > 12)

b. Adult : ◯ Nil ◯ Primary ◯ Secondary ◯ Tertiary ◯ Others, specify: _____ ◯ Not applicable (Autofill as NA if the age ≤ 12)

2. Household income per month : ◯ ≤ RM 999 ◯ RM1000 - RM2499 ◯ RM2500 - RM4999 ◯ RM5000 - RM7499 ◯ RM7500 - RM9999 ◯ ≥ RM10000

SECTION 3 : USE OF TOBACCO/ PARENTAL SMOKING HISTORY

1. Use of tobacco / parental smoking : ◯ Smoker ◯ Non smoker ◯ Unknown

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i. Patient name and NRIC number : _____ *(Patient identifier for paper CRF)* **ii. Centre Code:** ☐☐

SECTION 4 : MEDICAL HISTORY

1. Onset of * hearing loss : ◯ Congenital → ◯ At birth ◯ Delayed ◯ Acquired → ◯ Post lingual ◯ Pre lingual

2. Duration of hearing * loss : ☐☐ year(s) ☐☐ month(s) ☐☐ day(s)

3. Age of onset : * (Autocalculate) ☐☐ year(s) ☐☐ month(s) ☐☐ day(s)

4. Progression of * hearing loss : ◯ Sudden ◯ Gradual ◯ Not applicable

5. Laterality : ◯ Unilateral ◯ Bilateral

6. Family history of hearing loss : ◯ Yes → ◯ No ◯ Unknown

- ☐ 1st degree → ☐ Mother ☐ Father ☐ Daughter ☐ Son ☐ Full sister ☐ Full brother ☐ Others, specify: _____
- ☐ 2nd degree → ☐ Grandmother ☐ Granddaughter ☐ Aunt ☐ Niece ☐ Half sister ☐ Others, specify: _____ ☐ Grandfather ☐ Grandson ☐ Uncle ☐ Nephew ☐ Half brother
- ☐ 3rd degree → ☐ Great grandmother ☐ Great granddaughter ☐ Great aunt ☐ First female cousin ☐ Grand Niece ☐ Others, specify: _____ ☐ Great grandfather ☐ Great grandson ☐ Great uncle ☐ First male cousin ☐ Grand Nephew
- ☐ Others, specify: _____

7. Systemic comorbidity : ☐ None ☐ Hypertension ☐ Ischaemic heart disease ☐ Diabetes mellitus ☐ Renal failure ☐ ORL allergy ☐ Cerebrovascular accident ☐ Hyperthyroidism ☐ Hyperlipidemia ☐ Conective tissue disease ☐ Others, specify: _____ ☐ Unknown

8. Associated symptoms : ◯ Yes → ◯ No

- ☐ Ringing in ears/Tinnitus → ☐ Right ☐ Left
- ☐ Fullness → ☐ Right ☐ Left
- ☐ Otorrhoea → ☐ Right ☐ Left
- ☐ Otalgia → ☐ Right ☐ Left
- ☐ Vertigo
- ☐ Others, specify: _____

9. Speech development : ◯ Normal ◯ Delayed ◯ Not applicable (Autofill as NA if the age >12)

SECTION 5 : RISK FACTOR OF HEARING LOSS

1. Low birth weight (< 1.5 kg) : (Children) ◯ Yes ◯ No ◯ Not applicable (Autofill as NA if the age >12)

2. Apgar score at 5 min ≤ 3 : (Children) ◯ Yes ◯ No ◯ Not applicable (Autofill as NA if the age >12)

3. Neonatal jaundice : (Children) ◯ Yes → ◯ No ◯ Not applicable (Autofill as NA if the age >12)

◯ Phototherapy ◯ Exchange transfusion ◯ No treatment

4. Immunization : (Children) ◯ Complete ◯ No information ◯ Incomplete ◯ Not applicable (Autofill as NA if the age >12)

5. Prematurity : (Children) ◯ Yes → ☐☐ week(s) ◯ No ◯ Not applicable (Autofill as NA if the age >12)

6. Maternal illness: (Children) ◯ Yes → ◯ No ◯ Not applicable (Autofill as NA if the age >12)

- ☐ TORCHES → ☐ Toxoplasma ☐ Syphilis ☐ Rubella ☐ Herpes ☐ Cytomegalovirus
- ☐ Ototoxic ☐ Measles ☐ Mumps ☐ Other viral infection

7. Hereditary illness : (Adult) ◯ Syndromic → ◯ Non syndromic

◯ Treacher Collins syndrome ◯ Pierre Robin sequence ◯ Apert Syndrome ◯ Crouzon Syndrome ◯ Velocardiofacial Syndrome ◯ Congenital cytomegalo virus ◯ Usher syndrome ◯ Branchio-oto-renal syndrome ◯ Pendred syndrome ◯ CHARGE Association ◯ Neurofibromatosis type II ◯ Waardenburg syndrome ◯ Freeman-Sheldon syndrome ◯ Down's syndrome ◯ Alport Syndrome

8. Parents consanguinity marriage : (Adult) ◯ Yes ◯ No

9. Other risk factors : (Adult)

- ☐ None ☐ Meningtis ☐ Measles
- ☐ Mumps ☐ Viral infection ☐ Ototoxic medication
- ☐ Trauma → ☐ Ear injury ☐ Head injury ☐ Barotrauma
- ☐ Noise exposure → ☐ Industrial noise ☐ Occupational noise ☐ Lifestyle/Hobbies
- ☐ Prolonged ventilation
- ☐ Others, specify: _____
- ☐ Unknown

SECTION 6 : CLINICAL EXAMINATION

1. Ear assessment

a. External ear deformity : ◯ Yes → ◯ No

- ☐ Microtia → ☐ Right ☐ Left
- ☐ Canal atresia/stenosis → ☐ Right ☐ Left

b. Tympanic membrane/ middle ear : ◯ Abnormal → ◯ Normal ◯ Not visualized

- ☐ Perforation → ☐ Right ☐ Left
- ☐ Retraction → ☐ Right ☐ Left
- ☐ Cholesteatoma → ☐ Right ☐ Left
- ☐ Air fluid level/dull/bubble → ☐ Right ☐ Left
- ☐ Hemotympanum → ☐ Right ☐ Left
- ☐ Others, specify: _____

2. Craniofacial/Nose/Nasopharyngeal abnormalities: ☐ Cleft palate/Submucous cleft ☐ Dysmorphism ☐ Adenoid ☐ Tumour ☐ Mucopurulent discharge ☐ Others, specify: _____ ☐ None

3. Radiological investigation :

a. CT : ◯ Normal ◯ Abnormal ◯ Not available ◯ Not applicable

b. MRI: ◯ Normal ◯ Abnormal ◯ Not available ◯ Not applicable

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SECTION 6 : CLINICAL EXAMINATION (cont.)

4. Hearing assessment

a. Undergone hearing screening : ◯ Yes → ◯ No

- **i. Age of screening :** (dd/mm/yyyy) ☐☐ day(s) ☐☐ month(s)
- **ii. Result of hearing screening :** ☐ Right → ◯ Pass ◯ Fail; ☐ Left → ◯ Pass ◯ Fail
- **iii. Risk :** ◯ High risk ◯ Universal ◯ Unknown

b. At diagnosis:

- **i. Date of diagnosis confirmed :** ☐☐ / ☐☐ / ☐☐☐☐ *(dd/mm/yyyy)*
- **ii. Age:** (Autocalculate) ☐☐ year(s) ☐☐ month(s) ☐☐ day(s)
- **iii. Duration of confirmation:** ☐☐ (Autocalculate) day(s)

c. Audiological Test :

- **i. Test :** ◯ PTA ◯ Play ◯ VRA ◯ SSEP
- **ii. Right :**

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz
Air conduction threshold :							
Bone conduction threshold :							

- **iii. Left :**

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz
Air conduction threshold :							
Bone conduction threshold :							

- **iv. BSER :** **a. Right:** ☐☐☐ (dBnHL) ☐ NA **b. Left:** ☐☐☐ (dBnHL) ☐ NA
- **v. OAE :** ☐ Right → ☐ Pass ☐ Refer; ☐ Left → ☐ Pass ☐ Refer ☐ NA

d. Degree :

- ☐ Mild → ☐ Right ☐ Left
- ☐ Moderate → ☐ Right ☐ Left
- ☐ Severe → ☐ Right ☐ Left
- ☐ Profound → ☐ Right ☐ Left

e. Type of hearing loss :

- ☐ Sensorineural → ☐ Right ☐ Left
- ☐ Auditory neuropathy → ☐ Right ☐ Left
- ☐ Conductive → ☐ Right ☐ Left
- ☐ Mixed → ☐ Right ☐ Left

5. Impedance test :

a. Tympanogram : ◯ Yes → ◯ No

- ☐ Right → ◯ A ◯ As ◯ Ad ◯ B ◯ C ◯ Others, specify: _____ ◯ Not applicable
- ☐ Left → ◯ A ◯ As ◯ Ad ◯ B ◯ C ◯ Others, specify: _____ ◯ Not applicable

6. Speech-language assessment : ◯ Yes → ◯ No

a. Listening skill :

- **i. Auditory awareness – achieved:** ◯ Yes ◯ No
- **ii. Ling Sound Test – achieved:** ◯ Yes ◯ No
- **iii. Auditory memory – achieved:** ◯ Yes ◯ No

b. Language use:

- **i. First language:** ◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: _____
- **ii. Second language:** ◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: _____
- **iii. Third language:** ◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: _____

c. Speech & language skill :

- **i. Preverbal skills – achieved:** ◯ Yes ◯ No
- **ii. Receptive language skill:** ◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
- **iii. Expressive language skill:** ◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
- **iv. Speech:** ◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months

d. Mode of Communication : ◯ Verbal ◯ Signing ◯ Cued speech ◯ Others, specify: _____

e. Cognition level : ◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months

f. Associated disorder : *(only once in the assessment)* ☐ None ☐ Learning disorder ☐ Autism spectrum disorder ☐ ADHD ☐ Others, specify: _____

g. Co-operation :

- **i. Parent:** ◯ Poor ◯ Fair ◯ Good
- **ii. Patient:** ◯ Poor ◯ Fair ◯ Good

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SECTION 7 : DIAGNOSIS

ICD 10 Diagnosis Code	ICD 10 Diagnosis (Specify)	ICD 10 Code	ICD 10 (Specify)
		.	ADD
		.	ADD
		.	ADD

SECTION 8 : INTERVENTION

SECTION 8A : MEDICAL

1. Date of start medication : / / (dd/mm/yy)

2. Medication :

- ☐ Antibiotics
- ☐ Antiviral agents
- ☐ Rheologic agents
- ☐ Systemic
- ☐ Anti inflammatory agents
- ☐ Diuretics
- ☐ Complementary/traditional medicine
- ☐ Otic solution
- ☐ Vasodilators
- ☐ Hyperbaric oxygen
- ☐ Sinonasal
- ☐ Others, specify: .....

SECTION 8B : SURGICAL

1. Date of surgery : / / (dd/mm/yy)

2. Date of discharge/ Date of death : / / (dd/mm/yy)

3. Date of admission : / / (dd/mm/yy)

4. Length of hospital stay : day(s) (Autocalculate)

5. Surgical :

- ☐ Canal surgery
- ☐ BAHA
- ☐ Grommet
- ☐ Lateral skull base surgery
- ☐ Mastoidectomy
  - ☐ Atticotomy
  - ☐ Modified radical
  - ☐ Cortical
  - ☐ Radical
- ☐ Myringoplasty / Tympanoplasty
- ☐ Fenestration surgery
- ☐ Middle ear implant
- ☐ Cochlear implant *(Please complete page 6 & 7)*

SECTION 8C : AUDIOLOGICAL

1. Amplification : ◉ Yes → ◉ No → ☐ Hearing monitoring ☐ Auditory training ☐ Others, specify: .....

ai. Type of amplification :

- ☐ ACHA → ☐ BTE ☐ ITC ☐ ITE ☐ CIC ☐ CRT ☐ Body Worn
- ☐ BCHA → ☐ BAHA ☐ Conversional
- ☐ None

aii. Side:	aiii. Date of fitting	aiv. Age of fitting (Autocalculate)	av. Date of prescription	avi. Duration of procurement (Autocalculate)
☐ Right	/ / (dd/mm/yy)	year(s) month(s) day(s)	/ / (dd/mm/yy)	year(s) month(s) day(s)
☐ Left	/ / (dd/mm/yy)	year(s) month(s) day(s)	/ / (dd/mm/yy)	year(s) month(s) day(s)

avii. Side	aviii. Price (RM/unit)
☐ Right	◉ 500 – 1000 ◉ 1001 – 1500 ◉ 1501 – 2000 ◉ 2001 – 2500 ◉ 2501 – 3000 ◉ 3001 – 3500 ◉ > 3500
☐ Left	◉ 500 – 1000 ◉ 1001 – 1500 ◉ 1501 – 2000 ◉ 2001 – 2500 ◉ 2501 – 3000 ◉ 3001 – 3500 ◉ > 3500

b. FM fitting : ◉ Yes → ◉ No ◉ Not applicable

bi. Side:	bii. Date of fitting
☐ Right	/ / (dd/mm/yy)
☐ Left	/ / (dd/mm/yy)

2. Benefit of amplifications : ◉ Yes → ◉ No

a. Aided test :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz	Unit:
i. Right :								◉ dBHL ◉ dBSPL
ii. Left :								◉ dBHL ◉ dBSPL
iii. Binaural :								◉ dBHL ◉ dBSPL

b. HINT score : (BINAURAL) **di. Quiet :** (dB) **dii. Noise front:** (dB) **diii. Noise left :** (dB) **div. Noise right:** (dB)

c. Listening stage : (for prelingual) ☐ Detection ☐ Discrimination ☐ Identification ☐ Comprehension

d. Refer to speech therapist : ◉ Yes ◉ No

3. Source of funding :

- ☐ Public → ☐ MOH ☐ University ☐ JPA ☐ Baitulmal ☐ SOCSO ☐ NGO ☐ Welfare Department ☐ Others : .....
- ☐ Private → ☐ Out-of-pocket (OOP) ☐ Employer ☐ Medical Insurance ☐ Others : .....

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SECTION 8 : INTERVENTION (cont)

SECTION 8D : SPEECH THERAPY

1. Speech-language assessment :	◯ Yes → ◯ No		
	a. Listening skill :	**i. Auditory awareness – achieved:**	◯ Yes ◯ No **ii. Ling Sound Test – achieved:** ◯ Yes ◯ No
		iii. Auditory memory – achieved:	◯ Yes ◯ No
	b. Language use:	**i. First language:**	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: .....
		ii. Second language:	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: .....
		iii. Third language:	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: .....
	c. Speech & language skill :	**i. Preverbal skills – achieved:**	◯ Yes ◯ No
		ii. Receptive language skill:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
		iii. Expressive language skill:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
		iv. Speech:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
	d. Mode of Communication :		◯ Verbal ◯ Signing ◯ Cued speech ◯ Others, specify: .....
	e. Cognition level :		◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
	f. Associated disorder : *(only once in the assessment)*		☐ None ☐ Learning disorder ☐ Autism spectrum disorder ☐ ADHD ☐ Others, specify: .....
	g. Co-operation :	**i. Parent:**	◯ Poor ◯ Fair ◯ Good **ii. Patient:** ◯ Poor ◯ Fair ◯ Good

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i. Patient name and NRIC number : _____ *(Patient identifier for paper CRF)*

ii. Centre Code:

SECTION 9 : COCHLEAR IMPLANT / BRAIN STEM IMPLANT

SECTION 9A : COCHLEAR IMPLANT / BRAIN STEM IMPLANT

1. Type of Implant :		◯ Cochlear Implant ◯ Brain Stem Implant	
2. Type of hearing loss : *		☐ Prelingual ☐ Post lingual ☐ Cross over	
3. Speech-language assessment :		◯ Yes → ◯ No	
	a. Listening skill :	**i. Auditory awareness – achieved:**	◯ Yes ◯ No
		ii. Ling Sound Test – achieved:	◯ Yes ◯ No
		iii. Auditory memory – achieved:	◯ Yes ◯ No
	b. Language use:	**i. First language:**	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: .....
		ii. Second language:	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: .....
		iii. Third language:	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: .....
	c. Speech & language skill :	**i. Preverbal skills – achieved:**	◯ Yes ◯ No
		ii. Receptive language skill:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
		iii. Expressive language skill:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
		iv. Speech:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
	d. Mode of Communication :		◯ Verbal ◯ Signing ◯ Cued speech ◯ Others, specify: .....
	e. Cognition level :		◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months
	f. Associated disorder : *(only once in the assessment)*		☐ None ☐ Learning disorder ☐ Autism spectrum disorder ☐ ADHD ☐ Others, specify: .....
	g. Co-operation :	**i. Parent:**	◯ Poor ◯ Fair ◯ Good
		ii. Patient:	◯ Poor ◯ Fair ◯ Good
4. Implant :		◯ *First* ◯ *Second* →	
	a. Date of implant : *		__ __ / __ __ / __ __ *(dd/mm/yy)*
	b. Date of switch on cochlear implant :		__ __ / __ __ / __ __ (dd/mm/yy)
	c. Age at implant : (Autocalculate)		__ __ . __ __
	d. Hearing age : (Autocalculate) (date of hearing aid fitted to date of implant)		__ __ year(s) __ __ month(s) __ __ day(s)
5. Type of implant :	**a. Model :**		◯ MED-EL ◯ Advance Bionic Corp. ◯ Cochlear ◯ Others, specify: .....

(If more than 1 implant) ADD PAGE

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ii. Centre Code: ☐☐

SECTION 9 : COCHLEAR IMPLANT / BRAIN STEM IMPLANT (cont)

SECTION 9A : COCHLEAR IMPLANT / BRAIN STEM IMPLANT (cont)

6. Angular depth - number of electrodes inserted :

a. No of electrode : ☐☐ ☐ Not applicable

☐ Single array ☐ Double array ☐ Straight ☐ Advance contour ☐ Others, specify: _____

7a. CT scan :

- ☐ Middle ear → i. Effusion : ◉ Yes ◉ No
- ☐ Mastoid bone → ☐ Well pneumatized ☐ Poorly pneumatized
- ☐ Inner ear →
  - ☐ Cochlear → ☐ Normal ☐ Labyrinthine ossificans ☐ Others, specify: _____ ☐ Incomplete partition (Mondini) ☐ Common cavity
  - ☐ Labyrinthe → ◉ Normal ◉ Abnormal
  - ☐ Aqueduct → ◉ Normal ◉ Enlarge ◉ Patent

7b. MRI scan :

☐ Cochlear nerve → ◉ Normal ◉ Abnormal ☐ Brain → ◉ Normal ◉ Abnormal

8. Finding intraop :

◉ Normal anatomy
◉ Abnormal anatomy → ☐ LSCC ☐ VII ☐ Cochlear → ☐ Gusher ☐ Ossification ☐ Mondini ☐ Middle ear effusion

9. Source of funding :

- ☐ Public → ☐ MOH ☐ University ☐ JPA ☐ Welfare Department ☐ Baitulmal ☐ SOCSO ☐ NGO ☐ Others, specify : _____
- ☐ Private → ☐ Out-of-pocket (OOP) ☐ Employer ☐ Medical Insurance ☐ Others, specify : _____

SECTION 9B : SURGICAL OUTCOME

1. Complication of surgery :

◉ Yes → ◉ No

☐ Device migration or extrusion ☐ Infection ☐ Facial nerve injury ☐ Unwanted facial nerve stimulation ☐ Chronic pain ☐ Electrode dislocations
☐ Wound ☐ Intraoperative bleeding ☐ Facial palsy ☐ Implant loss ☐ Delayed wound healing ☐ Vertigo ☐ Cholesteatoma ☐ Others, specify: _____

SECTION 9C : PROBLEMS/ADVERSE INCIDENT REPORT

1. Problems :

◉ Yes → ◉ No

a. Date of incident: ☐☐ / ☐☐ / ☐☐ (dd/mm/yy)

b. Component involved: ☐ Implant ☐ Speech processor ☐ Accessory

c. Action taken: ☐ Explant → Date of explant : ☐☐ / ☐☐ / ☐☐ (dd/mm/yy) ☐ Others, specify: _____

d.i. Device failure details: ☐ Loss output from device ☐ Change in electrode function ☐ Loss of telemetry ☐ Others, specify: _____

d.ii. Patient factors: (If any, please provide further details)

◉ Patient suffered from infection
◉ Patient suffered impact to head or device area
◉ Others, specify: _____

→ Please provide any additional details about the accident, or factors which may have contributed to the problem :

e.i. Has the patient been re-implanted? ◉ Yes ◉ No (please complete a separate page of section 9)

e.ii. Date of re-implantation: ☐☐ / ☐☐ / ☐☐ (dd/mm/yy)

(If more than 1 incident) ADD

(If more than 1 implant) ADD PAGE

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III.*Date of assessment / visit / follow up : __ __ / __ __ / __ __ (dd/mm/yy)

iV. Follow up years : ◯ 1 year ◯ 2 years ◯ 3 years

V. Estimated date of next follow-up: (autofill) (dd/mm/yyyy)

SECTION 1 : PATIENT STATUS

1. Mode of rehabilitation: ☐ Hearing aid ☐ Cochlear implant ☐ BAHA ☐ Middle ear implant ☐ Others, specify : _____

2. Status : *

- ◯ Alive
- ◯ Death →
  - **a. Date of death:** * __ __ / __ __ / __ __ __ __ (dd/mm/yyyy) ☐ Unknown
  - **b. Cause of death :**
- ◯ Transfer to a new centre →
  - **a. Date of transfer:** __ __ / __ __ / __ __ __ __ (dd/mm/yyyy) ☐ Unknown
  - **b. Centre name:**
- ◯ Discharge →
  - **a. Date of discharge:** __ __ / __ __ / __ __ __ __ (dd/mm/yyyy) ☐ Unknown
- ◯ Lost to follow-up →
  - **a. Date of last visit:** __ __ / __ __ / __ __ __ __ (dd/mm/yyyy) ☐ Unknown
- ◯ Others, specify: →

SECTION 2 : SOCIAL AND EDUCATION

1. School:

- ☐ Mainstream → ☐ Normal school ☐ Inclusive ☐ Integrated
- ☐ Special school → ☐ Hearing impairment ☐ Learning disability ☐ Visual impairment
- ☐ Others → ☐ Cued speech school ☐ Others, specify : _____
- ☐ Not applicable ☐ NIL

2. Education Achievement :

- ◯ Improve academic position in class/study ◯ Passed ◯ Not achievement
- ◯ Progress to sit for → ◯ UPSR ◯ PMR ◯ SPM ◯ STPM ◯ Diploma ◯ Degree ◯ Others, specify: _____

3. Patient/parents support group : ◯ Involved ◯ Not involved ◯ Committee

4. Social Interaction:

a. Able to converse :

- ◯ Yes →
  - ☐ Face to face (life) → ◯ Silence ◯ Noise
  - ☐ Phone → ◯ Silence ◯ Noise
  - ☐ Electric device → ◯ Silence ◯ Noise
  - ☐ Meeting/conference/school assembly
  - ☐ Appreciation to music
- ◯ No

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SECTION 3 : REHAB OUTCOME

1a.Number of expected speech session		**1b. Number of speech session attendance:**		**1c. Percentage of compliance speech:**	%
2. NRT results:	◯ Obtained → Number of active electrodes:		◯ Not obtained		
3. Attend auditory training:	◯ Yes → Frequency of session: ◯ Weekly ◯ 2 Weekly ◯ Monthly ◯ Others, specify: _____ ◯ No				
4. X-ray : (if indicated)	◯ Yes → ◯ Normal ◯ Abnormal ◯ No				
5. Number of mapping:		**6. Duration of usage :**	year(s)	month(s)	

7. Audiological test : *(Unaided hearing test)*

a. Right :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz
Air conduction threshold :							
Bone conduction threshold :							

b. Left :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz
Air conduction threshold :							
Bone conduction threshold :							

8. Aided test :

a. Right : ◯ CI ◯ HA → ◯ None

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz

Unit: ◯ dBHL ◯ dBSPL

b. Left : ◯ CI ◯ HA → ◯ None

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz

Unit: ◯ dBHL ◯ dBSPL

c. Binaural :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz

Unit: ◯ dBHL ◯ dBSPL

9. Any significant changes for Audiological test: (Autocalculate)

a. Right :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz
Air conduction threshold :							
Bone conduction threshold :							

b. Left :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz
Air conduction threshold :							
Bone conduction threshold :							

10. Any significant changes for Aided test: (Autocalculate) (dBSPL)

a. Right :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz

b. Left :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz

c. Binaural :

	0.25 kHz	0.5 kHz	1.0 kHz	2.0 kHz	3.0 kHz	4.0 kHz	8.0 kHz

11. HINT score :	**i. Quiet :**	(dB)	**ii. Noise front :**	(dB)	**iii. Noise left :**	(dB)	**iv. Noise right:** (dB)
12. Rehab commitment :	◯ Good	◯ Fair	◯ Poor				

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SECTION 4 : SPEECH OUTCOME

1. Speech-language assessment : ◯ Yes → ◯ No

a. Listening skill :	**i. Auditory awareness – achieved:**	◯ Yes ◯ No	**ii. Ling Sound Test – achieved:**	◯ Yes ◯ No	
	iii. Auditory memory – achieved:	◯ Yes ◯ No			
b. Language use:	**i. First language:**	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: ----------			
	ii. Second language:	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: ----------			
	iii. Third language:	◯ Malay ◯ English ◯ Mandarin ◯ Tamil ◯ Others, specify: ----------			
c. Speech & language skill :	**i. Preverbal skills – achieved:**	◯ Yes ◯ No			
	ii. Receptive language skill:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months			
	iii. Expressive language skill:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months			
	iv. Speech:	◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months			
d. Mode of Communication :		◯ Verbal ◯ Signing ◯ Cued speech ◯ Others, specify: ----------			
e. Cognition level :		◯ 0-6 months ◯ 6-12 months ◯ 12-18 months ◯ 18-24 months ◯ 24-30 months ◯ 30-36 months ◯ 36-42 months ◯ 42-48 months ◯ 48-54 months ◯ 54-60 months ◯ 60-66 months ◯ 66-72 months			
f. Associated disorder : *(only once in the assessment)*		☐ None ☐ Learning disorder ☐ Autism spectrum disorder ☐ ADHD ☐ Others, specify: ----------			
g. Co-operation :	**i. Parent:**	◯ Poor ◯ Fair ◯ Good	**ii. Patient:**	◯ Poor ◯ Fair ◯ Good	

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APPENDIX : DIAGNOSIS ICD10

Code	Diagnosis ICD 10	Code	ICD 10
Diseases Of External Ear (H60-H62)			
H60	Otitis externa	H60.0	Abscess of external ear
			Boil of auricle or external auditory canal
			Carbuncle of auricle or external auditory canal
			Furuncle of auricle or external auditory canal
		H60.1	Cellulitis of external ear
			Cellulitis of auricle
			Cellulitis of external auditory canal
		H60.2	Malignant otitis externa
		H60.3	Other infective otitis externa
			Otitis externa diffuse
			Otitis externa haemorrhagic
			Swimmer's ear
		H60.4	Cholesteatoma of external ear
			Keratosis obturans of external ear (canal)
		H60.5	Acute otitis externa, noninfective
			Acute otitis externa NOS
			Acute otitis externa actinic
			Acute otitis externa chemical
			Acute otitis externa contact
			Acute otitis externa eczematoid
			Acute otitis externa reactive
		H60.8	Other otitis externa
			Chronic otitis externa NOS
		H60.9	Otitis externa, unspecified
H61	Other disorders of external ear	H61.0	Perichondritis of external ear
			Chondrodermatitis nodularis chronica helicis
			Perichondritis of auricle
			Perichondritis of pinna
		H61.1	Noninfective disorders of pinna
			Acquired deformity of auricle
			Acquired deformity of pinna
			Excludes: cauliflower ear (M95.1)
		H61.2	Impacted cerumen
			Wax in ear
		H61.3	Acquired stenosis of external ear canal
			Collapse of external ear canal
		H61.8	Other specified disorders of external ear
			Exostosis of external canal
		H61.9	Disorder of external ear, unspecified
H62*	Disorders of external ear in diseases classified elsewhere	H62.0*	Otitis externa in bacterial diseases classified elsewhere
			Otitis externa in erysipelas (A46+)
		H62.1*	Otitis externa in viral diseases classified elsewhere
			Otitis externa in herpesviral [herpes simplex] infection (B00.1+)
			Otitis externa in zoster (B02.8+)
		H62.2*	Otitis externa in mycoses
			Otitis externa in aspergillosis (B44.8+)
			Otitis externa in candidiasis (B37.2+)
			Otomycosis NOS (B36.9+)
		H62.3*	Otitis externa in other infectious and parasitic diseases classified elsewhere
		H62.4*	Otitis externa in other diseases classified elsewhere
			Otitis externa in impetigo (L01.-+)
		H62.8*	Other disorders of external ear in diseases classified elsewhere
Diseases Of Middle Ear And Mastoid (H65 - H75)			
H65	Nonsuppurative otitis media	☐	*Includes: with myringitis*
		H65.0	Acute serous otitis media
			Acute and subacute secretory otitis media
		H65.1	Other acute nonsuppurative otitis media
			Otitis media, acute and subacute allergic (mucoid) (sanguineous)(serous)
			Otitis media, acute and subacute mucoid
			Otitis media, acute and subacute nonsuppurative NOS
			Otitis media, acute and subacute sanguinous
			Otitis media, acute and subacute seromucinous
			Excludes: otitic barotrauma (T70.0)
			Excludes: otitis media (acute) NOS (H66.9)
		H65.2	Chronic serous otitis media
			Chronic tubotympanal catarrh
		H65.3	Chronic mucoid otitis media
			Glue ear
			Otitis media, chronic mucinous
			Otitis media, chronic secretory
			Otitis media, chronic transudative
			Excludes: adhesive middle ear disease (H74.1)
		H65.4	Other chronic nonsuppurative otitis media
			Otitis media, chronic allergic
			Otitis media, chronic exudative
			Otitis media, chronic nonsuppurative NOS
			Otitis media, chronic seromucinous
			Otitis media, chronic with effusion (nonpurulent)

Code	Diagnosis ICD 10	Code	ICD 10
Diseases Of Middle Ear And Mastoid (H65 - H75) (cont.)			
H65	Nonsuppurative otitis media (con.t)	H65.9	Nonsuppurative otitis media, unspecified
			Otitis media allergic
			Otitis media catarrhal
			Otitis media exudative
			Otitis media mucoid
			Otitis media secretory
			Otitis media seromucinous
			Otitis media serous
			Otitis media transudative
			Otitis media with effusion (nonpurulent)
H66	Suppurative and unspecified otitis media	☐	*Includes: with myringitis*
		H66.0	Acute suppurative otitis media
		H66.1	Chronic tubotympanic suppurative otitis media
			Benign chronic suppurative otitis media
			Chronic tubotympanic disease
		H66.2	Chronic atticoantral suppurative otitis media
			Chronic atticoantral disease
		H66.3	Other chronic suppurative otitis media
			Chronic suppurative otitis media NOS
		H66.4	Suppurative otitis media, unspecified
			Purulent otitis media NOS
		H66.9	Otitis media, unspecified
			Otitis media NOS
			Otitis media acute NOS
			Otitis media chronic NOS
H67*	Otitis media in diseases classified elsewhere	H67.0*	Otitis media in bacterial diseases classified elsewhere
			Otitis media in scarlet fever (A38+)
			Otitis media in tuberculosis (A18.6+)
		H67.1*	Otitis media in viral diseases classified elsewhere
			Otitis media in influenza (J10–J11+)
			Otitis media in measles (B05.3+)
		H67.8*	Otitis media in other diseases classified elsewhere
H68	Eustachian salpingitis and obstruction	H68.0	Eustachian salpingitis
		H68.1	Obstruction of Eustachian tube
			Compression of Eustachian tube
			Stenosis of Eustachian tube
			Stricture of Eustachian tube
H69	Other disorders of Eustachian tube	H69.0	Patulous Eustachian tube
		H69.8	Other specified disorders of Eustachian tube
		H69.9	Eustachian tube disorder, unspecified
H70	Mastoiditis and related conditions	H70.0	Acute mastoiditis
			Abscess of mastoid
			Empyema of mastoid
		H70.1	Chronic mastoiditis
			Caries of mastoid
			Fistula of mastoid
		H70.2	Petrositis
			Inflammation of petrous bone (acute)(chronic)
		H70.8	Other mastoiditis and related conditions
		H70.9	Mastoiditis, unspecified
H71	Cholesteatoma of middle ear - Cholesteatoma tympani		
	Excludes : cholestoma of external ear (H60.4)		
	Excludes : recurrent cholesteatoma of postmastoidectomy cavity (H95.0)		
H72	Perforation of tympanic membrane	☐	*Includes: perforation of ear drum persistent post-traumatic*
		☐	*Includes: perforation of ear drum postinflammatory*
		☐	*Excludes: traumatic rupture of ear drum (S09.2)*
		H72.0	Central perforation of tympanic membrane
		H72.1	Attic perforation of tympanic membrane
			Perforation of pars flaccida
		H72.2	Other marginal perforations of tympanic membrane
		H72.8	Other perforations of tympanic membrane
			Perforation(s) multiple of tympanic membrane
			Perforation(s) total of tympanic membrane
		H72.9	Perforation of tympanic membrane, unspecified
H73	Other disorders of tympanic membrane	H73.0	Acute myringitis
			Acute tympanitis
			Bullous myringitis
			Excludes: with otitis media (H65–H66)
		H73.1	Chronic myringitis
			Chronic tympanitis
			Excludes: with otitis media (H65–H66)
		H73.8	Other specified disorders of tympanic membrane
		H73.9	Disorder of tympanic membrane, unspecified
H74	Other disorders of middle ear and mastoid	H74.0	Tympanosclerosis
		H74.1	Adhesive middle ear disease
			Adhesive otitis
			Excludes: glue ear (H65.3)
		H74.2	Discontinuity and dislocation of ear ossicles

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APPENDIX : DIAGNOSIS ICD10

Code	Diagnosis ICD 10	Code	ICD 10
Diseases Of Middle Ear And Mastoid (H65 - H75) (cont.)			
H74	Other disorders of middle ear and mastoid (cont.)	H74.3	Other acquired abnormalities of ear ossicles
			Ankylosis of ear ossicles
			Partial loss of ear ossicles
		H74.4	Polyp of middle ear
		H74.8	Other specified disorders of middle ear and mastoid
		H74.9	Disorder of middle ear and mastoid, unspecified
H75*	Other disorders of middle ear and mastoid in diseases classified elsewhere	H75.0*	Mastoiditis in infectious and parasitic diseases classified elsewhere
			Tuberculous mastoiditis (A18.0+)
		H75.8*	Other specified disorders of middle ear and mastoid in diseases classified elsewhere
Diseases Of Inner Ear (H80 - H83)			
H80	Otosclerosis		*Includes: otospongiosis*
		H80.0	Otosclerosis involving oval window, nonobliterative
		H80.1	Otosclerosis involving oval window, obliterative
		H80.2	Cochlear otosclerosis
			Otosclerosis involving otic capsule
			Otosclerosis involving round window
		H80.8	Other otosclerosis
		H80.9	Otosclerosis, unspecified
H81	Disorders of vestibular function		*Excludes: vertigo NOS (R42)*
			Excludes: vertigo epidemic (A88.1)
		H81.0	OMénière's disease
			Labyrinthine hydrops
			Ménière's syndrome or vertigo
		H81.1	Benign paroxysmal vertigo
		H81.2	Vestibular neuronitis
		H81.3	Other peripheral vertigo
			Lermoyez' syndrome
			Vertigo aural
			Vertigo otogenic
			Vertigo peripheral NOS
		H81.4	Vertigo of central origin
			Central positional nystagmus
		H81.8	Other disorders of vestibular function
		H81.9	Disorder of vestibular function, unspecified
			Vertiginous syndrome NOS
H82*	Vertiginous syndromes in diseases classified elsewhere		
H83	Other diseases of inner ear	H83.0	Labyrinthitis
		H83.1	Labyrinthine fistula
		H83.2	Labyrinthine dysfunction
			Hypersensitivity of labyrinth
			Hypofunction of labyrinth
			Loss of function of labyrinth
		H83.3	Noise effects on inner ear
			Acoustic trauma
			Noise-induced hearing loss
		H83.8	Other specified diseases of inner ear
		H83.9	Disease of inner ear, unspecified
Other Disorders Of Ear (H90 - H95)			
H90	Conductive and sensorineural hearing loss		*Includes: congenital deafness*
			Excludes: deaf mutism NEC (H91.3)
			Excludes: deafness NOS (H91.9)
			Excludes: hearing loss NOS (H91.9)
			Excludes: hearing loss noise-induced (H83.3)
			Excludes: hearing loss ototoxic (H91.0)
			Excludes: hearing loss sudden (idiopathic) (H91.2)
		H90.0	Conductive hearing loss, bilateral
		H90.1	Conductive hearing loss, unilateral with unrestricted hearing on the contralateral side
		H90.2	Conductive hearing loss, unspecified
			Conductive deafness NOS
		H90.3	Sensorineural hearing loss, bilateral
		H90.4	Sensorineural hearing loss, unilateral with unrestricted hearing on the contralateral side
		H90.5	Sensorineural hearing loss, unspecified
			Congenital deafness NOS
			Hearing loss central NOS
			Hearing loss neural NOS
			Hearing loss perceptive NOS
			Hearing loss sensory NOS
			Sensorineural deafness NOS
		H90.6	Mixed conductive and sensorineural hearing loss, bilateral
		H90.7	Mixed conductive and sensorineural hearing loss, unilateral with unrestricted hearing on the contralateral side
		H90.8	Mixed conductive and sensorineural hearing loss, unspecified
H91	Other hearing loss		*Excludes: abnormal auditory perception (H93.2)*
			Excludes: hearing loss as classified in H90.-
			Excludes: impacted cerumen (H61.2)

Code	Diagnosis ICD 10	Code	ICD 10
Other Disorders Of Ear (H90 - H95) (cont.)			
H91	Other hearing loss (cont.)		*Excludes: noise-induced hearing loss (H83.3)*
			Excludes: psychogenic deafness (F44.6)
			Excludes: transient ischaemic deafness (H93.0)
		H91.0	Ototoxic hearing loss
		H91.1	Presbycusis
			Presbyacusia
		H91.2	Sudden idiopathic hearing loss
			Sudden hearing loss NOS
		H91.3	Deaf mutism, not elsewhere classified
		H91.8	Other specified hearing loss
		H91.9	Hearing loss, unspecified
			Deafness NOS
			Deafness high frequency
			Deafness low frequency
H92	Otalgia and effusion of ear	H92.0	Otalgia
		H92.1	Otorrhoea
			Excludes: leakage of cerebrospinal fluid through ear (G96.0)
		H92.2	Otorrhagia
			Excludes: traumatic otorrhagia – code by type of injury.
H93	Other disorders of ear, not elsewhere classified	H93.0	Degenerative and vascular disorders of ear
			Transient ischaemic deafness
			Excludes: presbycusis (H91.1)
		H93.1	Tinnitus
		H93.2	Other abnormal auditory perceptions
			Auditory recruitment
			Diplacusis
			Hyperacusis
			Temporary auditory threshold shift
			Excludes: auditory hallucinations (R44.0)
		H93.3	Disorders of acoustic nerve
			Disorder of 8th cranial nerve
		H93.8	Other specified disorders of ear
		H93.9	Disorder of ear, unspecified
H94*	Other disorders of ear in diseases classified elsewhere	H94.0*	Acoustic neuritis in infectious and parasitic diseases classified elsewhere
			Acoustic neuritis in syphilis (A52.1+)
		H94.8*	Other specified disorders of ear in diseases classified elsewhere
H95	Postprocedural disorders of ear and mastoid process, not elsewhere classified	H95.0	Recurrent cholesteatoma of postmastoidectomy cavity
		H95.1	Other disorders following mastoidectomy
			Chronic inflammation of postmastoidectomy cavity
			Granulation of postmastoidectomy cavity
			Mucosal cyst of postmastoidectomy cavity
		H95.8	Other postprocedural disorders of ear and mastoid process
		H95.9	Postprocedural disorder of ear and mastoid process, unspecified
Q03	Congenital hydrocephalus		
Q04	Other congenital malformations of brain		*Excludes: cyclopia (Q87.0)*
			Excludes: macrocephaly (Q75.3)
		Q04.0	Congenital malformations of corpus callosum
			Agenesis of corpus callosum
		Q04.1	Arhinencephaly
		Q04.2	Holoprosencephaly
		Q04.3	Other reduction deformities of brain
			Absence of part of brain
			Agenesis of part of brain
			Aplasia of part of brain
			Hypoplasia of part of brain
			Agyria
			Hydranencephaly
			Lissencephaly
			Microgyria
			Pachygyria
			Excludes:congenital malformations of corpus callosum (Q04.0)
		Q04.4	Septo-optic dysplasia
		Q04.5	Megalencephaly
		Q04.6	Congenital cerebral cysts
			Porencephaly
			Schizencephaly
			Excludes: acquired porencephalic cyst (G93.0)
		Q04.8	Other specified congenital malformations of brain
			Macrogyria
		Q04.9	Congenital malformation of brain, unspecified
			Congenital anomaly NOS of brain
			Congenital deformity NOS of brain
			Congenital disease or lesion NOS of brain
			Congenital multiple anomalies NOS of brain
Q16	Congenital malformations of ear causing impairment of hearing		*Excludes: congenital deafness (H90.-)*
		Q16.0	Congenital absence of (ear) auricle
		Q16.1	Congenital absence, atresia and stricture of auditory canal (external)
			Atresia or stricture of osseous meatus

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APPENDIX : DIAGNOSIS ICD10

Code	Diagnosis ICD 10	Code	ICD 10
Q16	Congenital malformations of ear causing impairment of hearing (cont.)	Q16.2	Absence of eustachian tube
		Q16.3	Congenital malformation of ear ossicles
			Fusion of ear ossicles
		Q16.4	Other congenital malformations of middle ear
			Congenital malformation of middle ear NOS
		Q16.5	Congenital malformation of inner ear
			Anomaly membranous labyrinth
			Anomaly organ of Corti
		Q16.9	Congenital malformation of ear causing impairment of hearing, unspecified
			Congenital absence of ear NOS
Q17	Other congenital malformations of ear		*Excludes: preauricular sinus (Q18.1)*
		Q17.0	Accessory auricle
			Accessory tragus
			Polyotia
			Preauricular appendage or tag
			Supernumerary ear
			Supernumerary lobule
		Q17.1	Macrotia
		Q17.2	Microtia
		Q17.3	Other misshapen ear
			Pointed ear
		Q17.4	Misplaced ear
			Low-set ears
			Excludes: cervical auricle (Q18.2)
		Q17.5	Prominent ear
			Bat ear
		Q17.8	Other specified congenital malformations of ear
			Congenital absence of lobe of ear
		Q17.9	Congenital malformation of ear, unspecified
			Congenital anomaly of ear NOS
Cleft lip and cleft palate (Q35 - Q37)			
Q35	Cleft palate		*Excludes:Robin's syndrome (Q87.0)*
			Includes: fissure of palate
			Includes: palatoschisis
			Excludes: cleft palate with cleft lip (Q37.-)
		Q35.1	Cleft hard palate
		Q35.3	Cleft soft palate
		Q35.5	Cleft hard palate with cleft soft palate
		Q35.7	Cleft uvula
		Q35.9	Cleft palate, unspecified
Q37	Cleft palate with cleft lip	Q37.0	Cleft hard palate with bilateral cleft lip
		Q37.1	Cleft hard palate with unilateral cleft lip
			Cleft hard palate with cleft lip NOS
		Q37.2	Cleft soft palate with bilateral cleft lip
		Q37.3	Cleft soft palate with unilateral cleft lip
			Cleft soft palate with cleft lip NOS
		Q37.4	Cleft hard and soft palate with bilateral cleft lip
		Q37.5	Cleft hard and soft palate with unilateral cleft lip
			Cleft hard and soft palate with cleft lip NOS
		Q37.8	Unspecified cleft palate with bilateral cleft lip
		Q37.9	Unspecified cleft palate with unilateral cleft lip
Q75	Other congenital malformations of skull and face bones		*Excludes: congenital malformation of face NOS (Q18.-)*
			Excludes: congenital malformation syndromes classified to (Q87.-)
			Excludes: dentofacial anomalies [including malocclusion] (K07.-)
			Excludes: musculoskeletal deformities of head and face (Q67.0–Q67.4)
			Excludes: skull defects associated with congenital anomalies of brain such as anencephaly (Q00.0)
			Excludes: skull defects associated with congenital anomalies of brain such as encephalocele (Q01.-)
			Excludes: skull defects associated with congenital anomalies of brain such as hydrocephalus (Q03.-)
			Excludes: skull defects associated with congenital anomalies of brain such as microcephaly (Q02)
		Q75.0	Craniosynostosis
			Acrocephaly
			Imperfect fusion of skull
			Oxycephaly
			Trigonocephaly
		Q75.1	Craniofacial dysostosis
			Crouzon's disease
		Q75.2	Hypertelorism
		Q75.3	Macrocephaly
		Q75.4	Mandibulofacial dysostosis
			Syndrome Franceschetti
			Syndrome Treacher-Collins
		Q75.5	Oculomandibular dysostosis

Code	Diagnosis ICD 10	Code	ICD 10
Cleft lip and cleft palate (Q35 - Q37) (cont.)			
Q75	Other congenital malformations of skull and face bones (cont.)	Q75.8	Other specified congenital malformations of skull and face bones
			Absence of skull bone, congenital
			Congenital deformity of forehead
			Platybasia
		Q75.9	Congenital malformation of skull and face bones, unspecified
			Congenital anomaly of face bones NOS
			Congenital anomaly of skull NOS
Q85	Phakomatoses, not elsewhere classified		*Excludes: ataxia telangiectasia [Louis-Bar] (G11.3)*
			Excludes: familial dysautonomia [Riley-Day] (G90.1)
		Q85.0	Neurofibromatosis (nonmalignant)
			Von Recklinghausen's disease
		Q85.1	Tuberous sclerosis
			Bourneville's disease
			Epiloia
		Q85.8	Other phakomatoses, not elsewhere classified
			Syndrome Peutz-Jeghers
			Syndrome Sturge-Weber(-Dimitri)
			Syndrome von Hippel-Lindau
			Excludes:Meckel-Gruber syndrome (Q61.9)
		Q85.9	Phakomatosis, unspecified
			Hamartosis NOS
Chromosomal abnormalities, not elsewhere classified (Q90 - Q99)			
Q90	Down's syndrome	Q90.0	Trisomy 21, meiotic nondisjunction
		Q90.1	Trisomy 21, mosaicism (mitotic nondisjunction)
		Q90.2	Trisomy 21, translocation
		Q90.9	Down's syndrome, unspecified
			Trisomy 21 NOS
Q96	Turner's syndrome		
Q97	Other sex chromosome abnormalities, female phenotype, not elsewhere classified		
Q98	Other sex chromosome abnormalities, male phenotype, not elsewhere classified	Q98.0	Klinefelter's syndrome karyotype 47,XXY
S00	Superficial injury of head	S00.0	Superficial injury of scalp
		S00.4	Superficial injury of ear
S01	Open wound of head	S01.3	Open wound of ear
S02	Fracture of skull and facial bones	S02.1	Fracture of base of skull
			Fossa anterior
			Fossa middle
			Fossa posterior
			Occiput
			Orbital roof
			Sinus ethmoid
			Sinus frontal
			Sphenoid
			Temporal bone
			Excludes: orbit NOS (S02.8)
			Excludes: orbital floor (S02.3)
S04	Injury of cranial nerves	S04.5	Injury of facial nerve
			7th cranial nerve
		S04.6	Injury of acoustic nerve
			Auditory nerve
S06	Intracranial injury	S06.0	Concussion
			Commotio cerebri
		S06.1	Traumatic cerebral oedema
		S06.2	Diffuse brain injury
			Cerebral contusion NOS
			Cerebral laceration NOS
			Traumatic compression of brain NOS
		S06.3	Focal brain injury
			Focal cerebral contusion
			Focal cerebral laceration
			Focal traumatic intracerebral haemorrhage
		S06.4	Epidural haemorrhage
			Extradural haemorrhage (traumatic)
		S06.5	Traumatic subdural haemorrhage
		S06.6	Traumatic subarachnoid haemorrhage
		S06.7	Intracranial injury with prolonged coma
		S06.8	Other intracranial injuries
			Traumatic haemorrhage cerebellar
			Traumatic haemorrhage intracranial NOS
		S06.9	Intracranial injury, unspecified
			Brain injury NOS
			Excludes: head injury NOS (S09.9)
C72	Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system	C72.4	Acoustic nerve

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APPENDIX : DIAGNOSIS ICD10

Code	Diagnosis ICD 10	Code	ICD 10
F80	Specific developmental disorders of speech and	F80.0	Specific speech articulation disorder
			Phonological disorder
			Speech articulation disorder
			Dyslalia
			Functional speech articulation disorder
			Lalling
			Excludes: aphasia NOS (R47.0)
			Excludes: apraxia (R48.2)
			Excludes: hearing loss (H90–H91)
			Excludes: mental retardation (F70–F79)
			Excludes: with language developmental disorder: expressive (F80.1)
			Excludes: with language developmental disorder: receptive (F80.2)
		F80.1	Expressive language disorder
			Dysphasia or aphasia expressive type
			Excludes: acquired aphasia with epilepsy [Landau-Kleffner] (F80.3)
			Excludes: developmental dysphasia or aphasia, receptive type (F80.2)
			Excludes: dysphasia and aphasia NOS (R47.0)
			Excludes: elective mutism (F94.0)
			Excludes: mental retardation (F70–F79)
			Excludes: pervasive developmental disorders (F84.-)
		F80.2	Receptive language disorder
			Dysphasia or aphasia, receptive type
			Wernicke's aphasia
			Word deafness
			Excludes: acquired aphasia with epilepsy [Landau-Kleffner] (F80.3)
			Excludes: autism (F84.0–F84.1)
			Excludes: dysphasia and aphasia: NOS (R47.0)
			Excludes: dysphasia and aphasia: expressive type (F80.1)
			Excludes: elective mutism (F94.0)
			Excludes: language delay due to deafness (H90–H91)
			Excludes: mental retardation (F70–F79)
		F80.3	Acquired aphasia with epilepsy [Landau-Kleffner]
			Excludes: aphasia (due to): NOS (R47.0)
			Excludes: aphasia (due to): autism (F84.0–F84.1)
			Excludes: aphasia (due to): disintegrative disorders of childhood (F84.2–F84.3)
		F80.8	Other developmental disorders of speech and language
			Lisping
		F80.9	Developmental disorder of speech and language, unspecified
			Language disorder NOS
F81	Specific developmental disorders of scholastic skills	F81.0	Specific reading disorder
			Backward reading
			Dyslexia
			Specific reading retardation
			Excludes: alexia NOS (R48.0)
			Excludes: dyslexia NOS (R48.0)
			Excludes: reading difficulties secondary to emotional disorders (F93.-)
		F81.1	Specific spelling disorder
			Specific spelling retardation (without reading disorder)
			Excludes: agraphia NOS (R48.8)
			Excludes: spelling difficulties: associated with a reading disorder (F81.0)
			Excludes: spelling difficulties: due to inadequate teaching (Z55.8)
		F81.2	Specific disorder of arithmetical skills
			Acalculia
			Arithmetical disorder
			Gerstmann's syndrome
			Excludes: acalculia NOS (R48.8)
			Excludes: arithmetical difficulties: associated with a reading or spelling disorder (F81.3)
			Excludes: arithmetical difficulties: due to inadequate teaching (Z55.8)
		F81.3	Mixed disorder of scholastic skills
			Excludes: disorder of arithmetical skills (F81.2)
			Excludes: reading disorder (F81.0)
			Excludes: spelling disorder (F81.1)
		F81.8	Other developmental disorders of scholastic skills
			Developmental expressive writing disorder
		F81.9	Developmental disorder of scholastic skills, unspecified
			Knowledge acquisition disability NOS
			Learning: disability NOS
			Learning: disorder NOS
F82	Specific developmental disorder of motor function Coordination disorder Ddyspraxia Excludes: abnormalities of gait and mobility (R26.-) Excludes: lack of coordination (R27.-) Excludes: secondary to mental retardation (F70–F79)		

Code	Diagnosis ICD 10	Code	ICD 10
F83	Mixed specific developmental disorders		
F84	Pervasive developmental disorders	F84.0	Childhood autism
			Autistic disorder
			Infantile Autism
			Infantile Psychosis
			Kanner's syndrome
			Excludes: autistic psychopathy (F84.5)
		F84.1	Atypical autism
			Atypical childhood psychosis
			Mental retardation with autistic features
			Use additional code (F70–F79), if desired, to identify mental retardation
		F84.2	Rett's syndrome
		F84.3	Other childhood disintegrative disorder
			Dementia infantilis
			Disintegrative psychosis
			Heller's syndrome
			Symbiotic psychosis
			Use additional code, if desired, to identify any associated neurological condition
			Excludes: Rett's syndrome (F84.2)
		F84.4	Overactive disorder associated with mental retardation and stereotyped movements
		F84.5	Asperger's syndrome
			Autistic psychopathy
			Schizoid disorder of childhood
		F84.8	Other pervasive developmental disorders
		F84.9	Pervasive developmental disorder, unspecified
F88	Other disorders of psychological development Developmental agnosia		
F89	Unspecified disorder of psychological development Developmental disorder NOS		
Q87	Other specified congenital malformation syndromes affecting multiple	Q87.0	Congenital malformation syndromes predominantly affecting facial appearance
			Acrocephalopolysyndactyly
			Acrocephalosyndactyly [Apert]
			Cryptophthalmos syndrome
			Cyclopia
			Goldenhar
			Moebius
			oro-facial-digital
			Robin
			Whistling face
		Q87.1	Congenital malformation syndromes predominantly associated with short stature
			Aarskog
			Cockayne
			De Lange
			Dubowitz
			Noonan
			Prader-Willi
			Robinow-Silverman-Smith
			Russell-Silver
			Seckel
			Smith-Lemli-Opitz
			Excludes: Ellis-van Creveld syndrome (Q77.6)
		Q87.2	Congenital malformation syndromes predominantly involving limbs
			Holt-Oram
			Klippel-Trénaunay-Weber
			nail patella
			Rubinstein-Taybi
			sirenomelia
			Thrombocytopenia with absent radius [TAR]
			VATER
		Q87.3	Congenital malformation syndromes involving early overgrowth
			Beckwith-Wiedemann
			Sotos
			Weaver
		Q87.4	Marfan's syndrome
		Q87.5	Other congenital malformation syndromes with other skeletal changes
		Q87.8	Other specified congenital malformation syndromes, not elsewhere classified
			Alport
			Laurence-Moon(-Bardet)-Biedl
			Zellweger