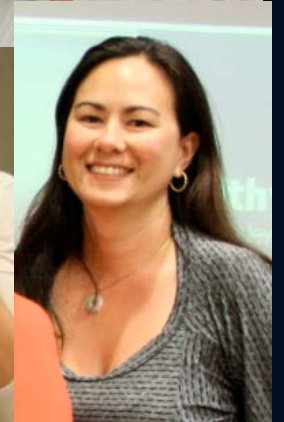


Implementation of an Early Hearing Detection Management and Information System to improve quality and standardisation in Queensland

RACHAEL BESWICK
HEALTHY HEARING PROGRAM

Disclaimer



Rationale

- Ensuring consistent practice and maintaining a high quality program across Queensland
- Streamlining practice
- Compliance of data entry for services post screening
- Increased demands on reporting locally, and at a state and national level
- Seeking local control so adjustments could be made to the system in-house as the Healthy Hearing program develops
- Expanding program that includes services not accommodated in off the shelf products



- Secure web-based browser system
- Available to public (March 2013)
private users (July 2013)

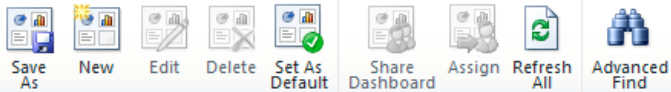
Screening

ocused on automation and speed- minimal handling of records where possible

Task lists- obvious and easy to accomplish

File

Dashboards



Dashboard Management

Action

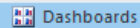
Query

Workplace

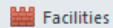


Dashboard: **Screening - In Process/To-Do**

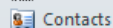
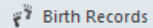
Reporting



Workplace



Children



Referrals: **Screening - Transfers**

Search for records

<input type="checkbox"/>	Primary UR (Chil...	Child	Date Of Birth (C...	To ^	From	Reason	Created On ^	
<input type="checkbox"/>	D0	Cha	3/05/2013	Toowoomba Hosp	Dalby Hospital Sci	Transfer	7/05/2013 2:50 ...	
<input type="checkbox"/>	56	Duq	26/04/2013	Logan Hospital Sc	Mater Misericordi	Transfer	6/05/2013 4:24 ...	
<input type="checkbox"/>	33	Cox	16/04/2013	Gold Coast Hospi	Mater Misericordi	Transfer	6/05/2013 4:21 ...	
<input type="checkbox"/>	T4i	Ger	3/04/2013	Toowoomba Hosp	Mater Misericordi	Other	6/05/2013 4:02 ...	
<input type="checkbox"/>	14	Hua	30/04/2013	Redcliffe Hospital	Royal Brisbane &	Transfer	6/05/2013 1:10 ...	
<input type="checkbox"/>	14	Boc	5/04/2013	Ipswich Hospital	Royal Brisbane &	Transfer	3/05/2013 11:11...	
<input type="checkbox"/>	14	Flay	5/04/2013	Caboolture Hospi	Royal Brisbane &	Transfer	3/05/2013 11:06...	
<input type="checkbox"/>	14	Lov	9/02/2013	Bundaberg Hospi	Royal Brisbane &	Transfer	3/05/2013 10:06...	

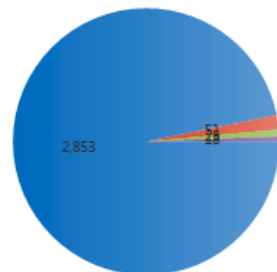
1 - 8 of 22 (0 selected)

Page 1

All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Needs Screening

Screening - Needs Screen



Awaiting AABR1
AABR1 - Refer L

URs: **Screening - All UR Search**

Search for records

<input type="checkbox"/>	UR ID	Facility	Last Name (Child)	First Name (Child)	Date Of Birth (C...	Gender (Child)	Cr...
<input type="checkbox"/>		St Vincent's Hosp	stewart	levi t	25/02/2013	Male	stew
<input type="checkbox"/>		St Vincent's Hosp	stewart	jett t	25/02/2013	Male	stew
<input type="checkbox"/>		Mater Mother's Pl	Mottram	B/O	21/04/2013	Male	Mott
<input type="checkbox"/>		Royal Children's H	Zielke	bian	5/02/2013	Female	Zielk
<input type="checkbox"/>		Mater Mother's Pl	Lavea	b/o	23/04/2013	Male	Lavea
<input type="checkbox"/>		St Vincent's Hosp	MARTIN	JOS	6/05/2013	Female	MAR
<input type="checkbox"/>		Mater Townsville	Kreymborg	Paul	6/05/2013	Male	Kreyn
<input type="checkbox"/>		North West Privat	healey	b/ok	30/04/2013	Male	heale
<input type="checkbox"/>		Wesley Hospital B	MCKEON	BAB	6/05/2013	Male	MCKI
<input type="checkbox"/>		Wesley Hospital B	WILSON	BAB	6/05/2013	Male	WILS
<input type="checkbox"/>		Wesley Hospital B	SZPEVAR	BAB	6/05/2013	Male	SZPE

1 - 11 of 65000+ (0 selected)

Page 1

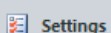
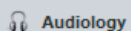
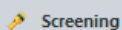
All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Children: **Screening - Too Young**

Search for records

<input type="checkbox"/>	Screening Status	Primary UR	Birth Facility	Last Name ^	First Name	Date Of Birth ^	Gender	Calculated GA (...)	Primary Contact...	
<input type="checkbox"/>	Passed Both - N...		Sunshine Coast Pi		Noah	1/03/2013	Male	7	TWIN WATERS	

Workplace



File Dashboards



Workplace

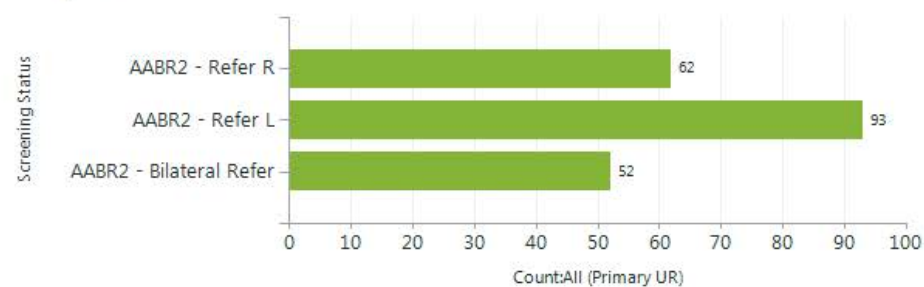


- Reporting
 - Dashboards
- Workplace
 - Facilities
- Children
 - Birth Records
 - Children
 - URs
 - Contacts

Dashboard: Screening - Referrals

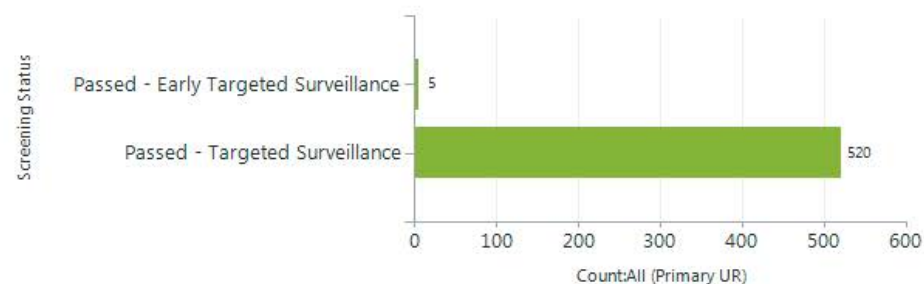
Screening Status

Screening - Direct Referrals



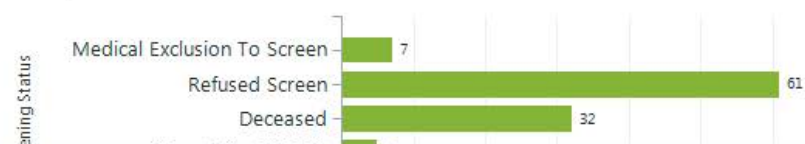
Screening Status

Screening - Risk Factor Referrals



Screening Status

Screening - Not Screened



Workplace

- Screening
- Audiology
- FSS
- CHC
- EI

Screening

focused on automation and speed- minimal handling of records where possible

task lists- obvious and easy to accomplish

plain language indicators for data issues with simple resolutions

File Dashboards

📄 Save As
📄 New
📄 Edit
📄 Delete
📄 Set As Default
📄 Share Dashboard
📄 Assign
📄 Refresh All
🔍 Advanced Find

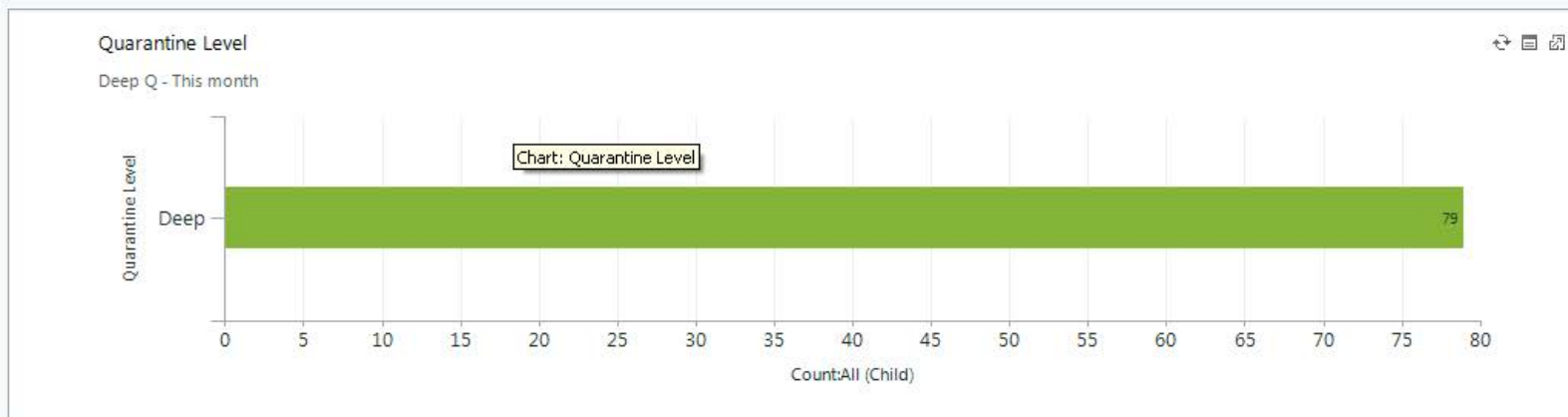
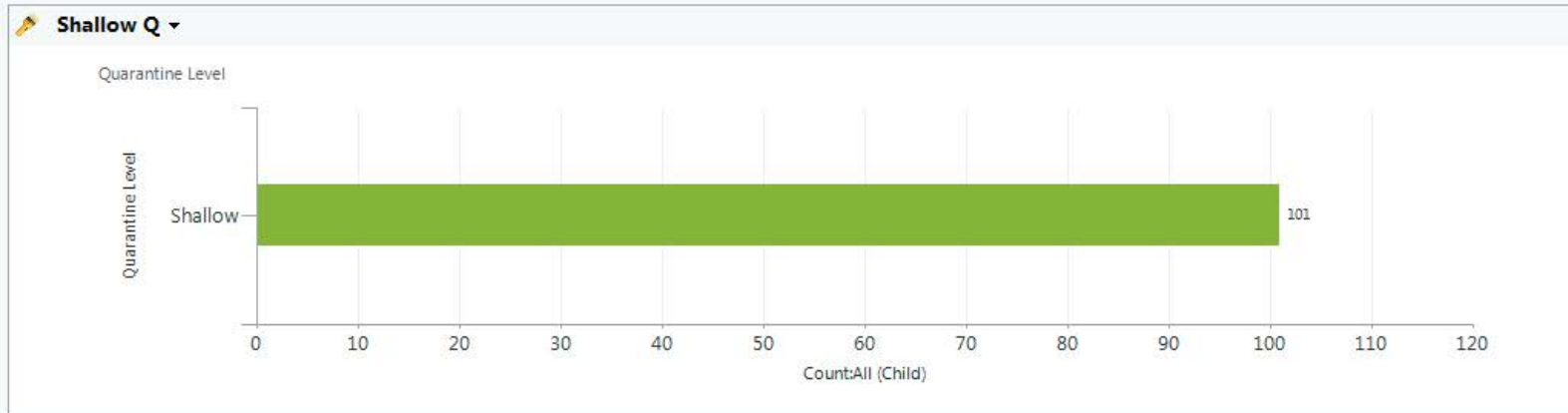
Dashboard Management Action Query

Workplace

- Reporting
 - Dashboards
- Workplace
 - Facilities
- Children
 - Birth Records
 - Children
 - URs
 - Contacts

- Workplace
- Screening
- Audiology
- FSS
- CHC
- EI
- Settings

Dashboard: Screening - Data Cleaning & Imports



Screening: Screening - Imported Screens

Search for records

<input type="checkbox"/>	Upload File Na...	Created On	Upload User ID	Local UR	Birth Facility	Last Name	First Name	Date of Birth	Quarantine Level
<input type="checkbox"/>	2013050713295...	7/05/2013 1:30 ...			St Vincent's Hosp		riley		None
<input type="checkbox"/>	2013050713295...	7/05/2013 1:30 ...			St Vincent's Hosp		T1ofDanielle		None
<input type="checkbox"/>	2013050713295...	7/05/2013 1:30 ...			St Vincent's Hosp		william		None
<input type="checkbox"/>	2013050713295...	7/05/2013 1:30 ...			St Vincent's Hosp		michael		None
<input type="checkbox"/>	2013050713295...	7/05/2013 1:30 ...			St Vincent's Hosp		b/o Cyrisse		None

File Screening View Charts Add Customize

New Edit Activate Deactivate Assign Share Copy a Link E-mail a Link Delete

Records Collaborate Process Data

Run Workflow Start Dialog Run Report Import Data Export to Excel Filter Advanced Find

Screening: **Shallow Q**

<input type="checkbox"/>	Errors	Quarantine Type	Local UR	Last Name	First Name	Gender	Date of Birth	Right Ear
<input type="checkbox"/>	Screener not found.	Data Quality				Male	25/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Female	29/04/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Female	29/04/2013	Pass
<input type="checkbox"/>	More than 5 Risk Factors are UnKnown.	Data Quality				Female	22/04/2013	Refer
<input type="checkbox"/>	Child not found.	Data Quality				Male	22/04/2013	Pass
<input type="checkbox"/>	Gender on Screening record and associated Child do not match.	Data Quality				Male	24/04/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Male	24/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Male	11/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Female	15/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Female	17/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Female	17/04/2013	N/A
<input type="checkbox"/>	More than 5 Risk Factors are UnKnown.	Data Quality				Male	19/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Male	14/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Male	11/04/2013	Pass
<input type="checkbox"/>	More than 5 Risk Factors are UnKnown.	Data Quality				Female	11/04/2013	Pass
<input type="checkbox"/>	More than 5 Risk Factors are UnKnown.	Data Quality				Female	7/04/2013	Pass
<input type="checkbox"/>	Gender on Screening record and associated Child do not match.	Data Quality				Female	8/04/2013	Pass
<input type="checkbox"/>	Time of screen is blank. Screener not found. Both results are N/A. GA is blank.	Data Quality				Male	20/04/2013	N/A
<input type="checkbox"/>	Child not found.	Data Quality				Female	18/04/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Female	17/03/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Female	23/04/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Female	10/03/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Male	11/12/2012	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Female	5/04/2013	Pass
<input type="checkbox"/>	Gender on Screening record and associated Child do not match.	Data Quality				Female	15/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Male	14/04/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Male	5/04/2013	Pass
<input type="checkbox"/>	Date of screen is earlier than date of birth.	Data Quality				Male	12/04/2013	Pass
<input type="checkbox"/>	More than 5 Risk Factors are UnKnown.	Data Quality				Male	17/04/2013	Pass
<input type="checkbox"/>	Screener not found.	Data Quality				Female	15/04/2013	Pass
<input type="checkbox"/>	Second pass/pass for the same child.	Data Quality				Male	3/04/2013	Pass
<input type="checkbox"/>	Gender on Screening record and associated Child do not match.	Data Quality				Female	3/04/2013	Pass
<input type="checkbox"/>	Birth Facility on Screening record and associated Child do not match.	Data Quality				Male	7/04/2013	Pass
<input type="checkbox"/>	Child not found.	Data Quality				Female	2/04/2013	Pass

1 - 101 of 101 (0 selected)

Page 1

All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Click here to view the chart.

Screening

focused on automation and speed- minimal handling of records where possible

Task lists- obvious and easy to accomplish

Plain language indicators for data issues with simple resolutions

Allow screening data to be imported and resolved fast with 3 levels of users possible
screener (import only), site co-ordinator, area co-ordinator

Vastly improved program management– can audit all aspects of screening practice

Screening View Charts Add Customize

[Edit](#)
[Activate](#)
[Deactivate](#)
[Delete](#)
[Assign](#)
[Share](#)
[Copy a Link](#)
[E-mail a Link](#)
[Run Workflow](#)
[Start Dialog](#)
[Run Report](#)
[Import Data](#)
[Export to Excel](#)
[Filter](#)
[Advanced Find](#)

Records Collaborate Process Data

Screening

Screening

Children

Screening

Screening

Screening

Screening

Screening

Screening

Screening

Screening

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Screening

Screening

Screening

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Screening

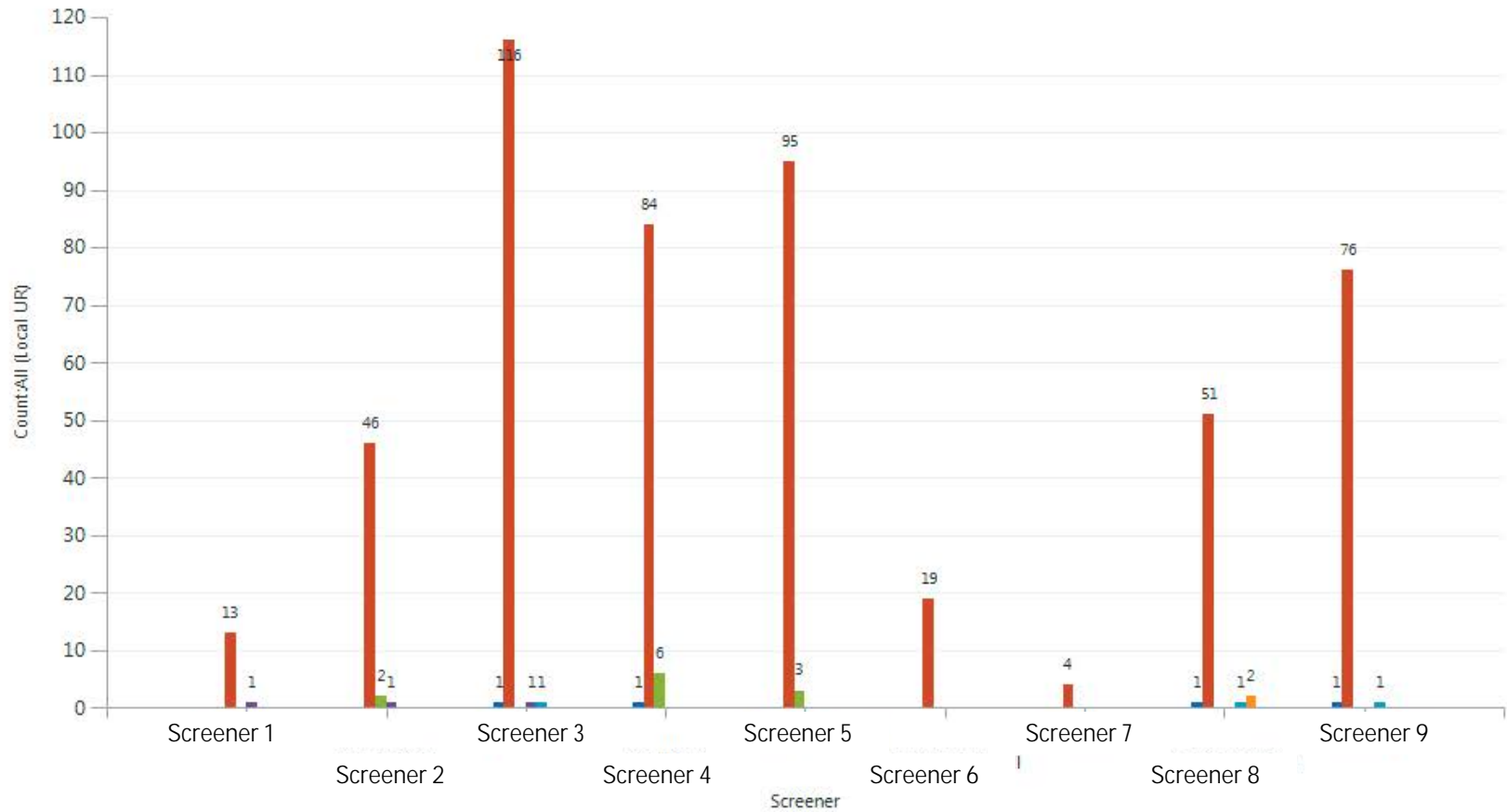
Screening

Screening: Active Screening_with Scr Fac

Search for records

Screeener and Screening Status (Child)

Screening: Active Screening_with Scr Fac



■ AABR2 - Bilateral Refer
 ■ Passed - Targeted Surveillance
 ■ AABR1 - Refer L
 ■ AABR1 - Bilateral Refer
 ■ Passed Both - No Risk Factors
 ■ Passed - Early Targeted Surveillance

Audiology

- Fast and efficient data entry

Add Customize

Save & New

Deactivate

Delete



Sharing

Copy a Link

E-mail a Link



Run Workflow

Start Dialog

Run Report

Collaborate

Process

Data

Test
PTA

Tests

General

Name

PTA

Test Date

9/04/2013



Equipment

Audiologist



Remote



Comments

Test Reportable



Audiology Assessment - Pure tone Audiometry/Play Audiometry

Right Ear

Transducer Head Phone

250 Hz

500 Hz

1000 Hz

2000 Hz

=

=

=

=

=

=

=

=

Masked ☐Masked ☐Masked ☐Masked ☐

4FA (500,1,2,4)

Right Ear Bone Conductor

500 Hz

1000 Hz

=

=

=

=

Masked ☐Masked ☐

4FA (500,1,2,4)

Left Ear

Transducer Head Phone

250 Hz

500 Hz

1000 Hz

2000 Hz

=

=

=

=

=

=

=

=

Masked ☐Masked ☐Masked ☐Masked ☐

4FA (500,1,2,4)

Right Ear

3000 Hz

4000 Hz

6000 Hz

8000 Hz

=

=

=

=

=

=

=

=

Masked ☐Masked ☐Masked ☐Masked ☐

Right Ear Bone Conductor

2000 Hz

4000 Hz

=

=

=

=

Masked ☐Masked ☐

Left Ear

3000 Hz

4000 Hz

6000 Hz

8000 Hz

=

=

=

=

=

=

=

=

Masked ☐Masked ☐Masked ☐Masked ☐

Status

Active

Audiology

- Fast and efficient data entry
- Main objective: compliance with data entry

AUDIOLOGY ASSESSMENT

Date of Test 9/04/2013

Unit Record No.

Surname

Given Name(s)

DOB

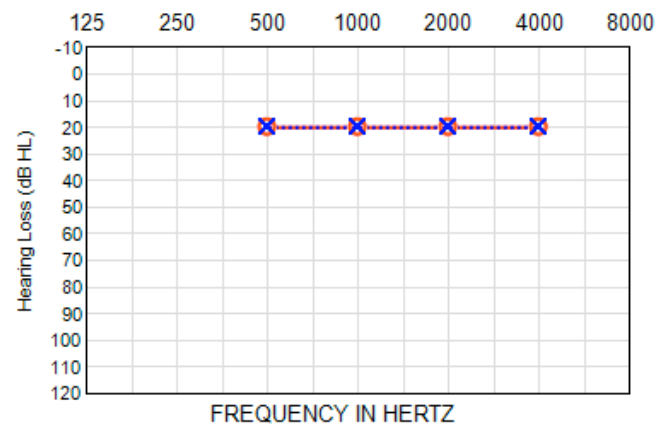
7/12/2009

Sex

Male



PURE TONE AUDIOGRAM



Key	Right	Unspecified	Left
AC unmasked	○		×
AC masked	●		×
BC unmasked	<		>
BC masked	[]
Soundfield		□	

IMPEDANCE AUDIOMETRY

TYMPANOMETRY		
	R. EAR	L. EAR
S.C	0.24	0.28
M.E.P	-58	16
E.C.V	0.38	0.45
TYPE	As	As

TRANSIENT EVOKED OTOACOUSTIC EMISSIONS (TEOAEs)

Ear (kHz)	1	1.5	2	3	4
Right	x	12.8	15.4	8.0	12.3
Left	x	8.7	9.5	7.6	10.7

Audiology

- Fast and efficient data entry
- Main objective: compliance with data entry
- Standardize practice across Queensland



Queensland
Government
Royal Children's Hospital

AUDIOLOGY ASSESSMENT

Unit Record No. 0000000
Surname Bell Given Names: DANIEL
DOB 07/12/2009
Address 1 Temple St, Templetown 4100

Mother's name:	Mrs Jane Bell	Referred by:	Mater Mother's Public Hospital
Hospital of birth:	Mater Mother's Public Hospital	Hospital of birth UR:	123456
Neonatal hearing Screen results:	AABR 1: 10/12/2009 Left: Pass Right: Refer AABR 2: 09/02/2010 Left: Pass Right: Pass	Healthy Hearing risk factors:	Nil
Childhood identified risk factors:	Nil		

Case History:

Daniel was referred to Royal Children's Hospital under the Healthy Hearing Targeted Surveillance Program in view of the above risk factor/s identified at birth. Previous results obtained on 24/02/2012 indicated functionally normal hearing in both ears.

Results of today's assessment (09/04/2013) are outlined below.

Tympanometry (226 Hz):

Both ears: Normal middle ear pressure and mobility.

Transient Evoked Otoacoustic Emissions (TEOAEs):

Both ears: Emissions were present (from 1.0/1.5 to 4kHz), consistent with normal peripheral auditory function up to and including the outer hair cells of the cochlea.

Play Audiometry:

Both ears: Hearing within normal limits.

Summary:

Overall, results obtained today suggest **adequate hearing** for the development of speech and language.

Plan:

In view of the normal results obtained, Daniel is discharged from the Healthy Hearing Program. No additional audiological assessments are planned. However, we would be happy to retest upon medical referral.

Audiology

- Fast and efficient data entry
- Main objective: compliance with data entry
- Standardize practice across Queensland
- Easy reporting on case loads for departments

Delete
 Set As Default
 Share Dashboard
 Assign
 Refresh All
 Advanced Find

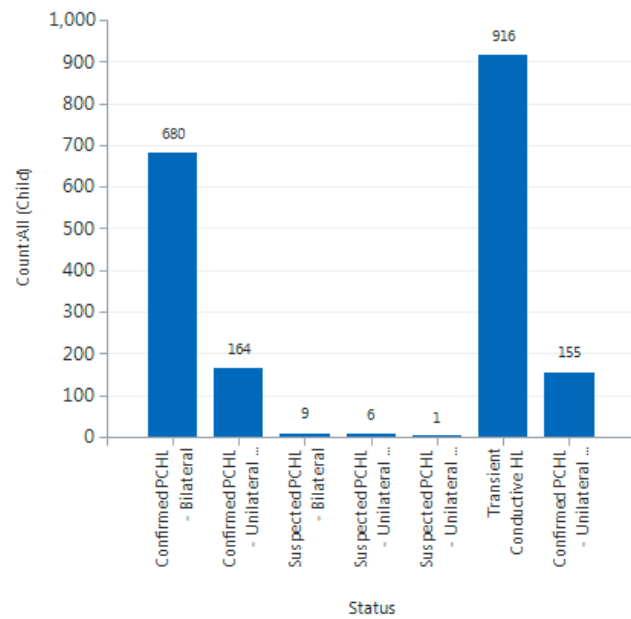
Action

 Query

Dashboard: **Audiology - Outcomes**

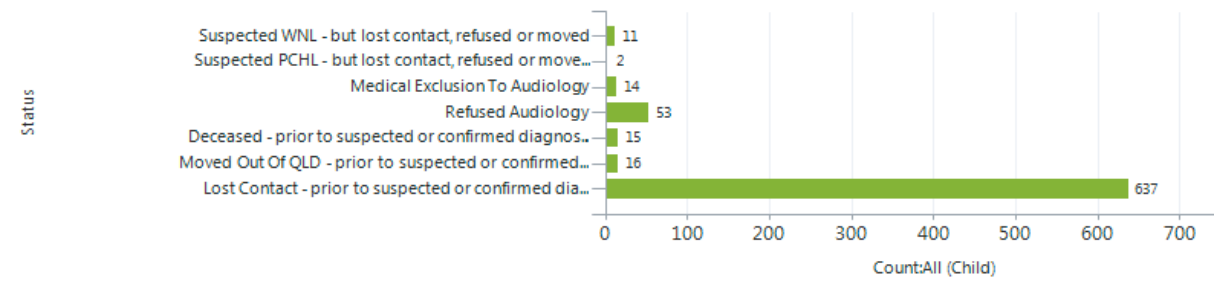
Audiology Status

Active Audiology - Hearing Losses



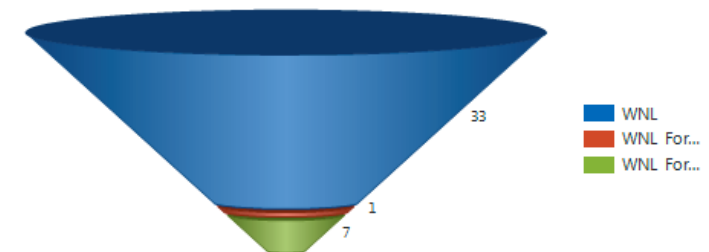
No Result

Active Audiology - No Result



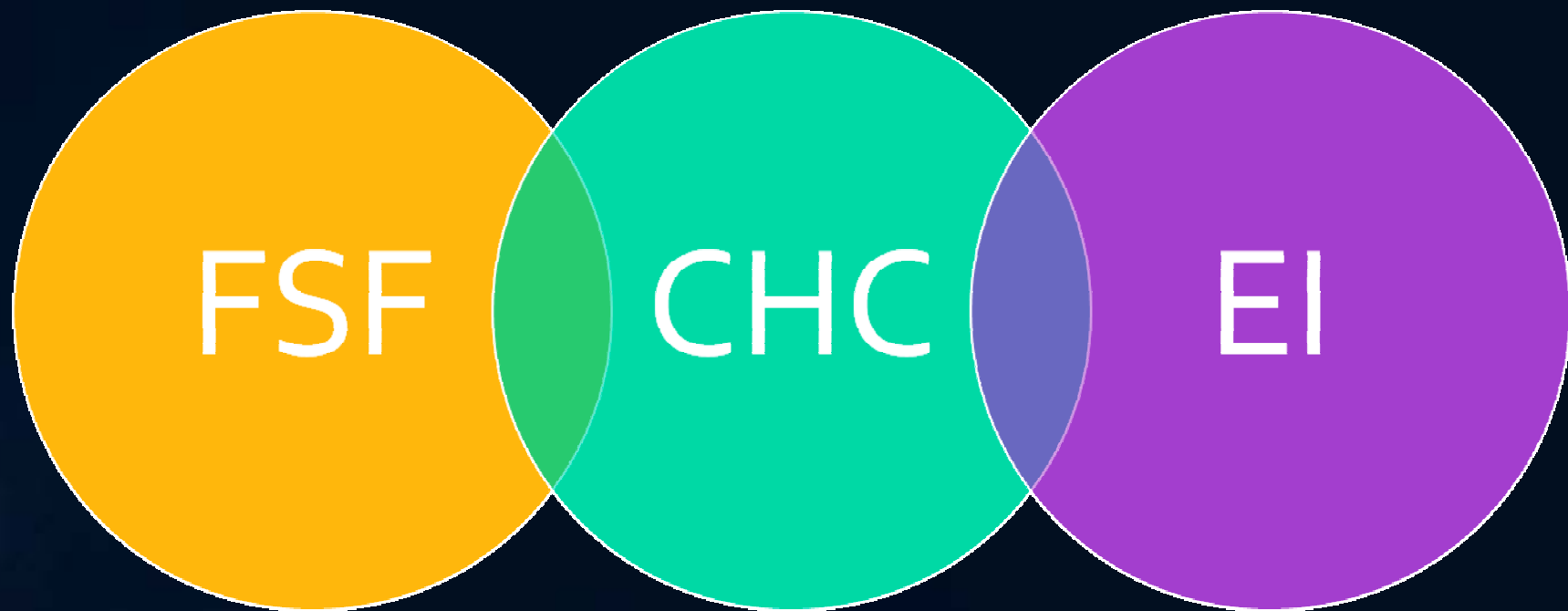
WNL

Active Audiology - WNL this year



Audiology

- Fast and efficient data entry
- Main objective: compliance with data entry
- Standardize practice across Queensland
- Easy reporting on case loads for departments
- Audit



Appointments

Clinician
caseloads

Assessments/tests
completed

Outcomes of
assessments

Information
provided to
families

Therapy
progress

Age of
support

Medical information

Therapy plan

Type: Screening


Birth Recruitment	Key Performance Indicators	%	Rate Per Thousand	Total
Births/Transfers In		100%		63451
Ineligible - Too Young		0%		1
Ineligible - Too Ill		0%		1
Ineligible - Moved Out of State		0.11%		68
Ineligible - Deceased		0.39%		247
Medical Exclusion		0.05%		30
Proportion Eligible		99.45%		63103
Screening Outcomes - Proportion of Infants Eligible				
Infants Eligible		100%		63103
Refused	<1%	0.21%		131
In Progress Screening		0.05%		32
Lost Contact	<1%	0.27%		171
Proportion Screened	>97%	99.47%		62770
Screening Outcomes - Proportion of Infants Screened				
Infants Screened		100%		62770
Passed Screen		99.08%		62195
Screened within 30 days CA	>97%	96.97%		60870
First Refer Rate	<10%	6.27%	62.66	3933
2nd Refer Rate	<4%	0.92%	9.18	576
Unilateral Refer		0.67%	6.71	421
Bilateral Refer		0.25%	2.47	155
Targeted Surveillance	<4%	2.12%	21.22	1332
Early Targeted Surveillance		0.12%	1.18	74

or

	Key Performance Indicators	%	Rate Per Thousand	Total
Following Diagnosis - HH Program Outcome - Based on Infants Screened				
Within Normal Limits (WNL)		0.45%	4.52	284
Target Condition: Confirmed PCHL - bilateral, moderate or greater	1/1000	0.08%	0.76	48
All PCHL - bilateral, moderate or greater - Confirmed and Suspected		0.08%	0.76	48
All PCHL - Unilateral, moderate or greater - Confirmed and Suspected		0.04%	0.35	22
All PCHL - Unilateral and Bilateral, moderate or greater - Confirmed and Suspected		0.11%	1.12	70
Detail - HH Program Outcome - Based on Infants Screened				
Confirmed PCHL - bilateral, moderate or greater	1/1000	0.08%	0.76	48
Confirmed PCHL - bilateral, mild to moderate		0.02%	0.22	14
Confirmed PCHL - unilateral, moderate or greater		0.03%	0.33	21
Confirmed PCHL - unilateral, mild to moderate		0%	0.03	2
Suspected PCHL - bilateral, moderate or greater		0%	0.00	0
Suspected PCHL - bilateral, mild to moderate		0%	0.00	0
Suspected PCHL - unilateral, moderate or greater		0%	0.02	1
Suspected PCHL - unilateral, mild to moderate		0%	0.00	0
Transient Conductive HL		0.11%	1.10	69
Lost Contact		0.03%	0.33	21
Moved out of QLD		0%	0.00	0
Deceased		0%	0.02	1
Refused Audiology		0%	0.00	0
Medical Exclusion to Audiology		0%	0.00	0

Future development

- Go live to external users
- Further develop the reporting aspects within the system
- Investigating other areas in child health that may benefit from the system
- Look at trends within the data



Implementation of an Early Hearing Detection Management and Information System to improve quality and standardisation in Queensland

RACHAEL BESWICK
HEALTHY HEARING PROGRAM

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