

# Evaluation of a State Early Hearing Detection & Intervention (EHDI) System

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# Outline

- Background
- Framework
- Method
- Results and Findings
- Discussion

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# National EHDI Goals



## ■ The 1-3-6 Plan

- All newborns will be screened for hearing loss before **1 month of age**, preferably before hospital discharge
- All infants who screen positive will have a diagnostic audiologic evaluation before **3 months of age**.
- All infants identified with hearing loss will receive appropriate early intervention services before **6 months of age** (medical, audiologic, and early intervention).

# National EHDI Goals – cont.

- Every state will have a complete EHDI Tracking and Surveillance System that will minimize loss to follow-up.
- Every state will have a comprehensive system that monitors and evaluates the progress towards the EHDI Goals and Objectives.

# Evaluation Project Objectives

- To establish a systematic process for evaluating state EMD tracking systems based on the specific needs of the state EMD program
- To develop easy-to-use evaluation tools for assessment of a state EMD tracking system with regard to its functionality, efficiency, and usability



## Texas Early Hearing Detection and Intervention Program

# Pick a "Pilot" State



# Texas House Bill 714

HB 714 (1999) requires that certain birth facilities offer newborn hearing screening (NBHS) to all families of newborns during the birth admission.

Facilities that must offer NBHS are:

- Hospitals that offer obstetrical services and are located in counties with populations  $> 50,000$ .
- Midwifery Centers that are located in counties with populations greater than 50,000 and that have 100 or more births per year.





# Rural Hospital Exemptions

- Hospitals in rural counties with populations of 50,000 or less were exempted from the mandate requiring the offering of infant hearing screenings.
- However, in 2002, many rural hospitals waived this exemption by accepting grant funded hearing screening equipment.



# Is TEHDI Universal?

## Is a hearing screening required by mandate for every infant born in Texas?

- Texas mandates that parents must be *offered* a hearing screening, not that the infant be screened.
- Parents must give written permission before the hearing screening is performed.



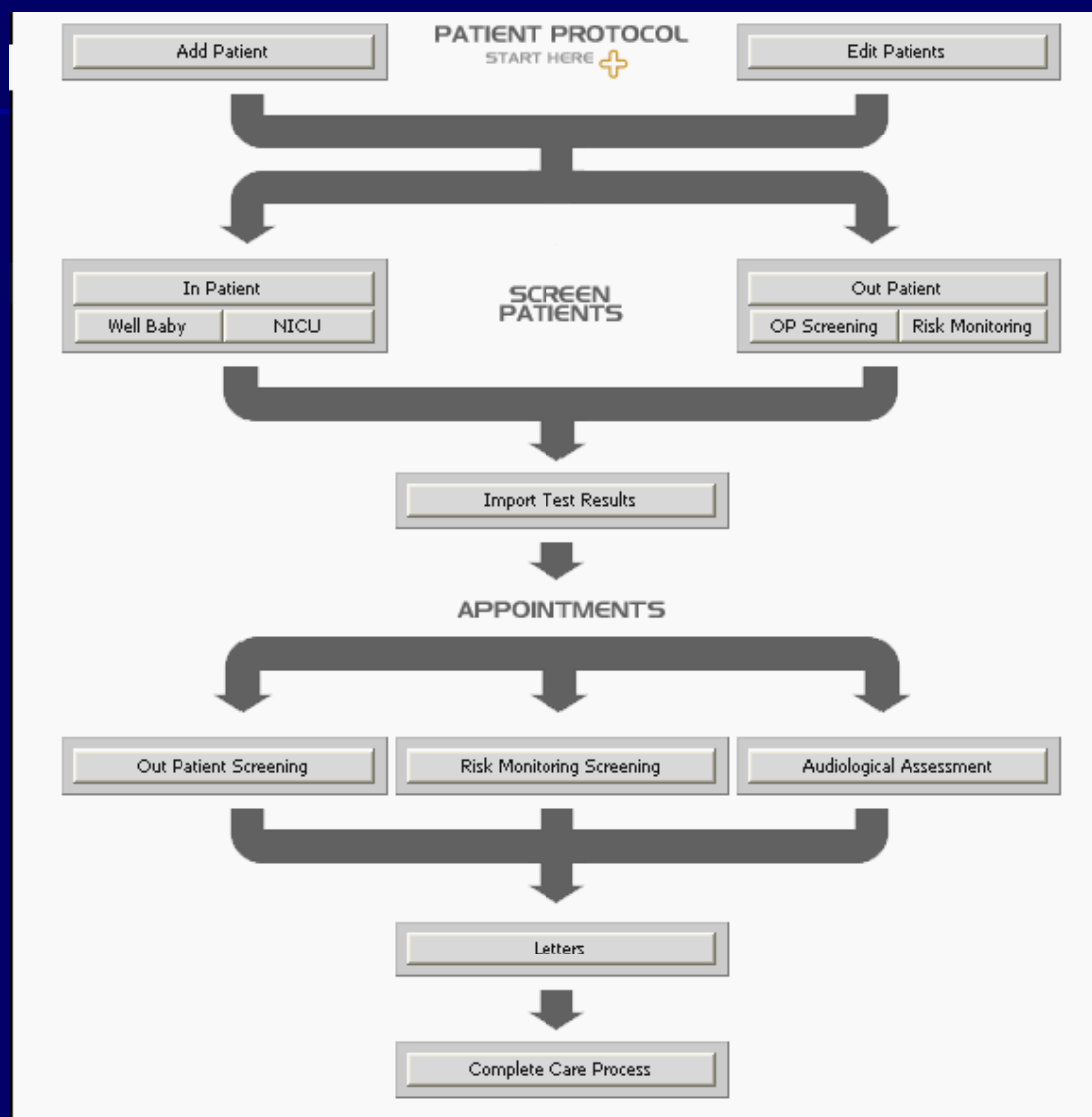
# Texas Department of State Health Services (DSHS)

## Services Provided:

- TEHDI Program – TEHDI database tracking and reporting system
- Follow-up/case management
- Educational outreach
- Birth facility training and technical assistance
- Birth facility certification



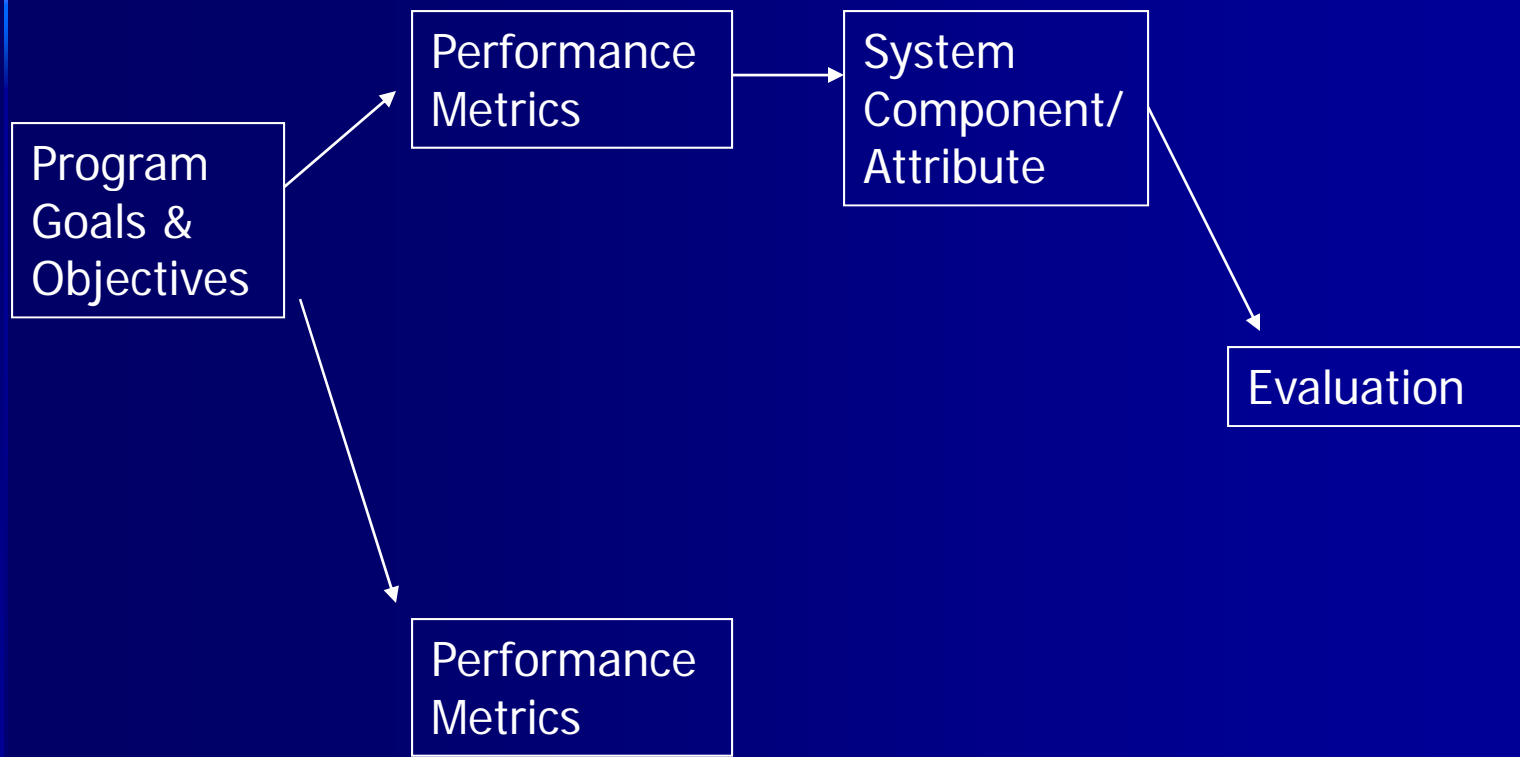
# The TEHDI Tracking System– data flow



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# A Systematic Evaluation Process



Stakeholders

# Stakeholder Analysis

Stakeholder	Role	Interest	Influence	Level of involvement in evaluation
CDC EHDI	Sponsor	High	Medium	Plan, design, execution, dissemination
Newborn Screening (NBS) Branch Manager	Branch Manager	High	Medium	Management oversight of data systems within the Branch
EHDI Coordinator in Texas	Subject Matter Expert/Team Lead	High	Medium	Subject matter expertise
TEHDI tracking system: Project Coordinator	Project Coordinator	High	High	Day to day operations of project
IT Contractor for current data management system	Software developer	High	Low	Informant of system details
Early Childhood Intervention (ECI) Manager	System user	High	Low	Planner for system enhancements
Audiology Provider: Karen Ditty	Oversight of hospital screeners in a variety of hospitals	High	High	User of system
...	...	...	...	...

# TEHDI Program Goals/Objectives

1. Enhance the tracking and surveillance system of the TEHDI program to accurately identify, match, and collect unduplicated individual identifiable data on a web reporting system throughout the TEHDI process – **Function/Process**
2. Enhance the ability of TEHDI to accurately report the status of every occurrent birth in Texas, including those exempt from the Texas hearing screening program -- **Birth**
  - Increase the number of birth reported in TEHDI to come closer in alignment with the Bureau of Vital System (BVS)
3. Enhance the ability to TEHDI to integrate/share data systems related to infant/child health care -- **Referral**
  - Increase the match between infants and served by the PACT system and referred for Early Childhood Intervention (ECI) by 5%
  - Increase the number of children referred to outpatient services and reported in the TEHDI system by 10%



# Measure What?

- Health and health service **outcomes**
- System **use**
- **Workflow** impact
- **Data** quality

# Performance Indicators

	Function/Process	Birth	Referral
Outcomes		Reportability	Reportability

Use	User friendliness Usefulness
-----	---------------------------------

Workflow	user activity support, frequency of use, training
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Data	Accuracy, timeliness, completeness, ...
------	--

# System Components under review

- Add or edit patient information and notes
- Search patient
- Import test result (screening, diagnosis, etc.)
- Add or edit professional contact information
- Search professional contact information
- Appointment scheduling
- Letters
- Configure report
- Search report
- Training
- Integration with other health information (EHR, public health surveillance, Newborn Screening, etc.) systems

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# Evaluation Method

- Feasibility
- Direct vs. Indirect
- Subjective vs. Objective
- Qualitative vs. Quantitative

# Performance Indicators

	Function/Process	Birth	Referral
Outcomes		Reportability	Reportability

Use	User friendliness Usefulness
-----	---------------------------------

Workflow	User activity support, frequency of use, training
----------	---

Data	Accuracy, timeliness, completeness, ...
------	--

# Performance Indicators

	Function/Process	Birth	Referral
Outcomes		Reportability	Reportability

Use	User friendliness Usefulness
-----	---------------------------------

Workflow	user activity support, frequency of use, training
----------	---

Data	Accuracy, timeliness, completeness, ...
------	--

# Performance Indicators

	Function/Process	Birth	Referral
Outcomes		Reportability	
Use	User friendliness Usefulness user activity support, frequency of use, training		# of birth reported by TEHDI/# of birth reported by vital records  Direct, Objective, Quantitative
Workflow			
Data		Survey TEHDI system users  Indirect, Subjective, Qualitative	



# Reportability

- Sept. 08-Aug. 09
- Births report by BVS
  - Total 409,453
  - Home births 1622
  - Exempt facilities 8710
- Births reported by TEHDI
  - 389,248
  - 95.07% of all BVS births
  - ~95.44% of all BVS births excluding home birth
  - ~97.53% of all BVS births excluding home birth and exempt facilities

# An on-line survey on TEHDI system users

- Questionnaire Design
- Test and Implementation
- Result and findings
- Limitations

# Questionnaire Design

- General Information about the site being surveyed – 4 questions
- General information about the respondent – 3 questions
- System use, work-flow, and functionality – 11 questions
- User satisfaction toward overall system – 5 questions
- User satisfaction toward individual function or system component – 4 questions
- Training – 4 questions
- Additional comments – 3 questions

# Survey – Site Location and Provider Type

1 2 3 4 5 7

**Part II General Information about your site**

**1. Location of your site**

City/Town:

ZIP/Postal Code:

**2. Type of practice (check all that apply)**

<input type="checkbox"/> Birth Hospital (well baby)	<input type="checkbox"/> Ophthalmology
<input type="checkbox"/> Birth Hospital (NICU)	<input type="checkbox"/> Otological Evaluation
<input type="checkbox"/> Audiological clinic or private practice	<input type="checkbox"/> Parent Group
<input type="checkbox"/> Other birth facility	<input type="checkbox"/> PCP/Medical Home
<input type="checkbox"/> Early Childhood Intervention (ECI)	<input type="checkbox"/> Family Practice
<input type="checkbox"/> Case Management	<input type="checkbox"/> Resource Specialist
<input type="checkbox"/> Geneticists	<input type="checkbox"/> Social Services
<input type="checkbox"/> Habilitation	<input type="checkbox"/> Speech Language Pathology
<input type="checkbox"/> Medicaid	
<input type="checkbox"/> Other (please specify)	

**3. Is the site exempt from conducting hearing screening for newborns?**

# Test

- Tested by
  - CDC EHDI
  - Texas EHDI
- Time to take the survey
- Question validity and clarity

# Implementation

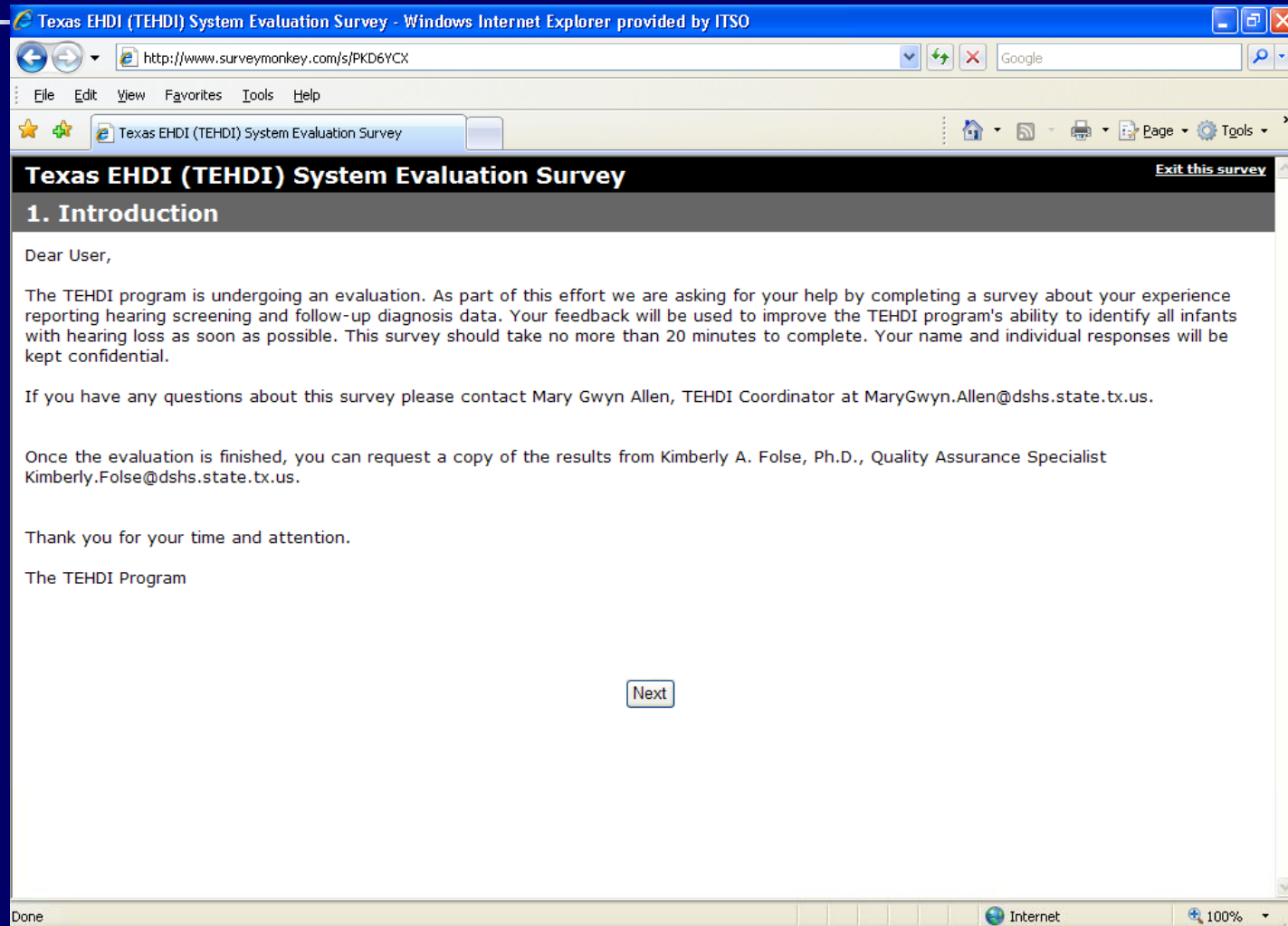
- <http://www.surveymonkey.com>

The screenshot shows the SurveyMonkey 'Edit Survey' interface. At the top, the survey title is 'Texas EHD (TEHDI) System Evaluation Survey' with an 'Edit Title' link. Navigation buttons for 'design survey', 'collect responses', and 'analyze results' are visible. A left sidebar contains buttons for 'Edit Survey', 'Survey Options', 'Print Survey', and 'Restore Questions'. The main area is titled 'Edit Survey' and includes a 'Preview Survey' button. Below this, there are options to 'Print Theme' and 'New Theme', and an 'Add Page Before' button. A navigation bar shows 'Page #6' with buttons for 'Edit Page', 'Move', 'Copy', 'Delete', and 'Add Logic'. A dropdown menu is set to '#6. User satisfaction toward ...'. The main content area displays a question: '6. User satisfaction toward individual function or system component'. Below the question is a text prompt: 'Please rate your satisfaction toward the listed individual function or system component of the TEHDI system' and an 'Add Question Here' button. The question itself is: '\* 1. Frequency of use for this function or system component'. It features a table with four columns: 'Multiple times a day', 'Once a day', 'Less than once a day', and 'Never (not applicable)'. The rows list functions: 'Add or edit patient information and notes', 'Search patient', and 'Import test result (screening, diagnosis, ...'. Each cell in the table contains a radio button.

	Multiple times a day	Once a day	Less than once a day	Never (not applicable)
Add or edit patient information and notes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search patient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Import test result (screening, diagnosis, ...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# Activate the Survey

<http://www.surveymonkey.com/s/PKD6YCX>



The screenshot shows a Windows Internet Explorer browser window. The title bar reads "Texas EHDI (TEHDI) System Evaluation Survey - Windows Internet Explorer provided by ITSO". The address bar shows the URL "http://www.surveymonkey.com/s/PKD6YCX". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The page content is titled "Texas EHDI (TEHDI) System Evaluation Survey" with a sub-header "1. Introduction". The main text reads: "Dear User, The TEHDI program is undergoing an evaluation. As part of this effort we are asking for your help by completing a survey about your experience reporting hearing screening and follow-up diagnosis data. Your feedback will be used to improve the TEHDI program's ability to identify all infants with hearing loss as soon as possible. This survey should take no more than 20 minutes to complete. Your name and individual responses will be kept confidential. If you have any questions about this survey please contact Mary Gwyn Allen, TEHDI Coordinator at MaryGwyn.Allen@dshs.state.tx.us. Once the evaluation is finished, you can request a copy of the results from Kimberly A. Folse, Ph.D., Quality Assurance Specialist Kimberly.Folse@dshs.state.tx.us. Thank you for your time and attention. The TEHDI Program". At the bottom center of the page is a "Next" button. The browser's status bar at the bottom shows "Done" and "Internet" with a 100% zoom level.

Texas EHDI (TEHDI) System Evaluation Survey [Exit this survey](#)

## 1. Introduction

Dear User,

The TEHDI program is undergoing an evaluation. As part of this effort we are asking for your help by completing a survey about your experience reporting hearing screening and follow-up diagnosis data. Your feedback will be used to improve the TEHDI program's ability to identify all infants with hearing loss as soon as possible. This survey should take no more than 20 minutes to complete. Your name and individual responses will be kept confidential.

If you have any questions about this survey please contact Mary Gwyn Allen, TEHDI Coordinator at [MaryGwyn.Allen@dshs.state.tx.us](mailto:MaryGwyn.Allen@dshs.state.tx.us).

Once the evaluation is finished, you can request a copy of the results from Kimberly A. Folse, Ph.D., Quality Assurance Specialist [Kimberly.Folse@dshs.state.tx.us](mailto:Kimberly.Folse@dshs.state.tx.us).

Thank you for your time and attention.

The TEHDI Program

[Next](#)

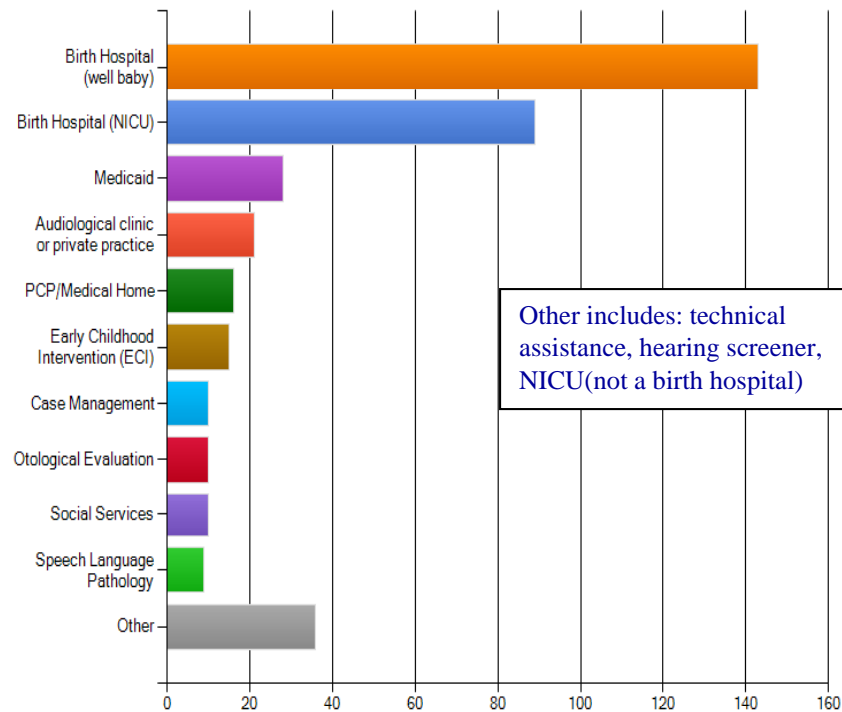
# Response rate

- Survey period  
July 22, 2009 – Sept. 09, 2009
- Total Completed Survey: 134

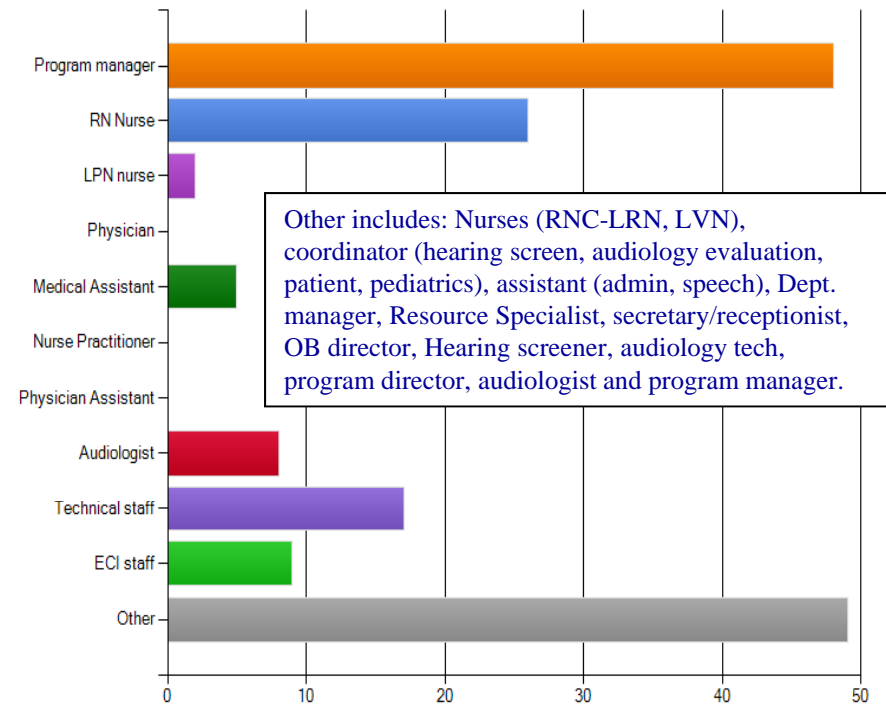


# Sites and respondents

Type of practice (check all that apply)



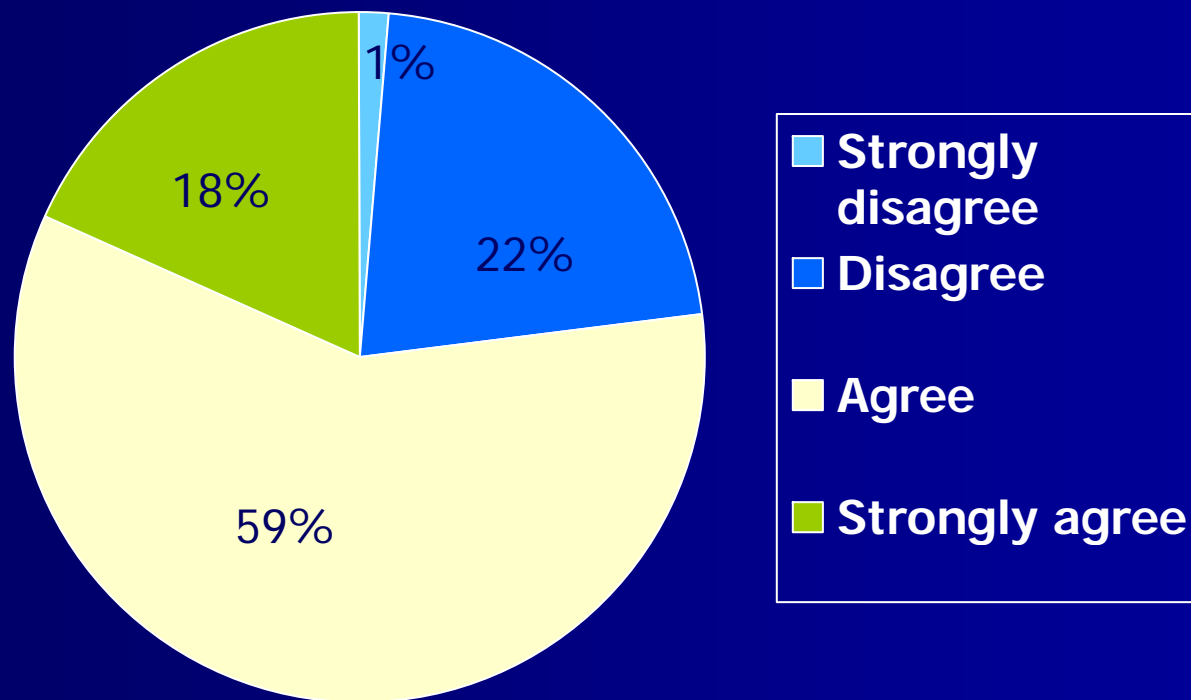
Title/Role (Please select one that best describes your title or role at this site)



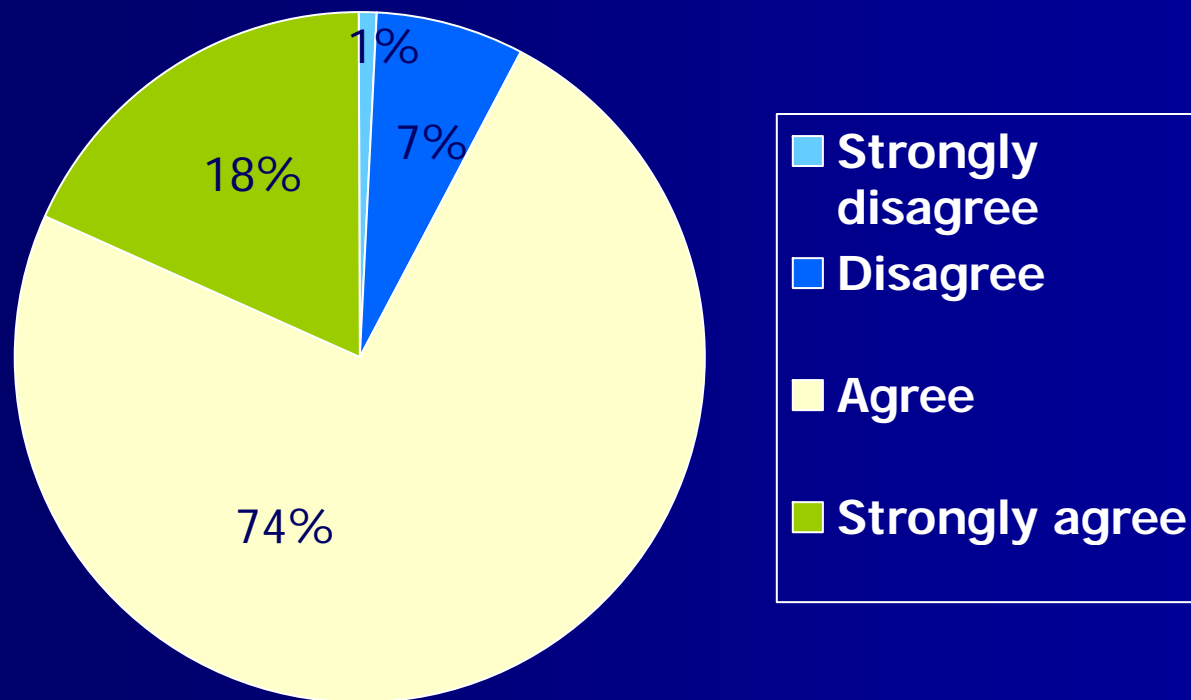
# Major findings

- Strength of the system
  - User-friendliness
  - Usefulness
  - Workflow
- Areas that may benefit from modification
  - Workflow
  - The letter function
  - Training

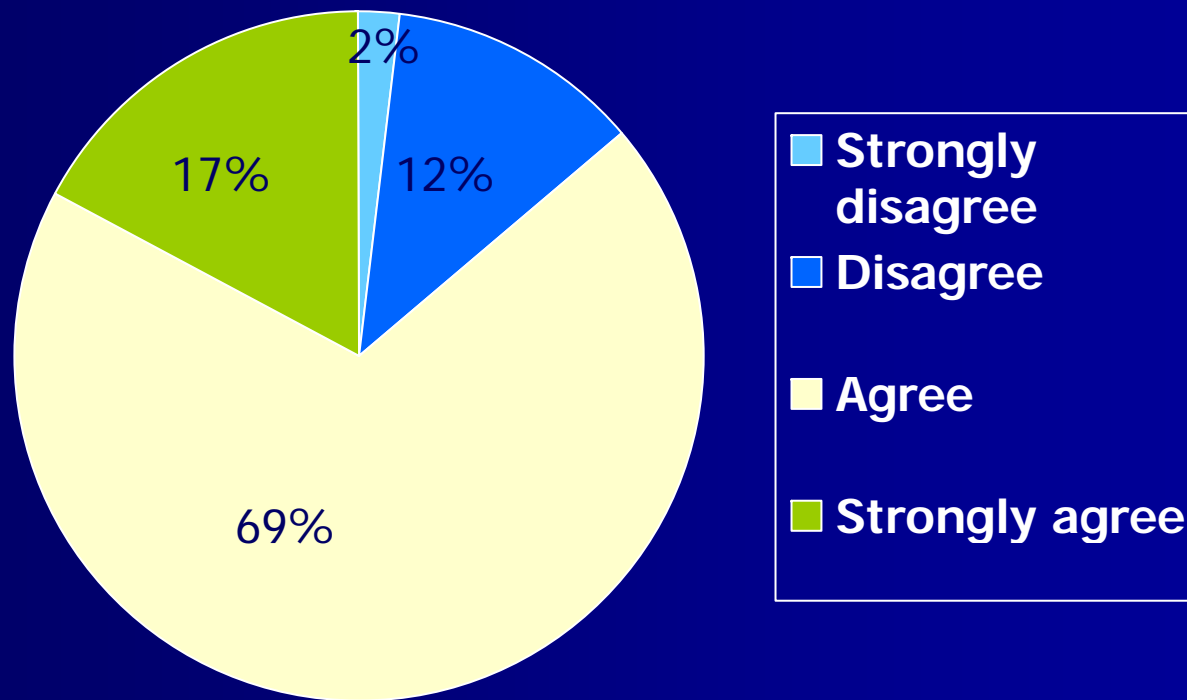
# Q: The system is easy to use



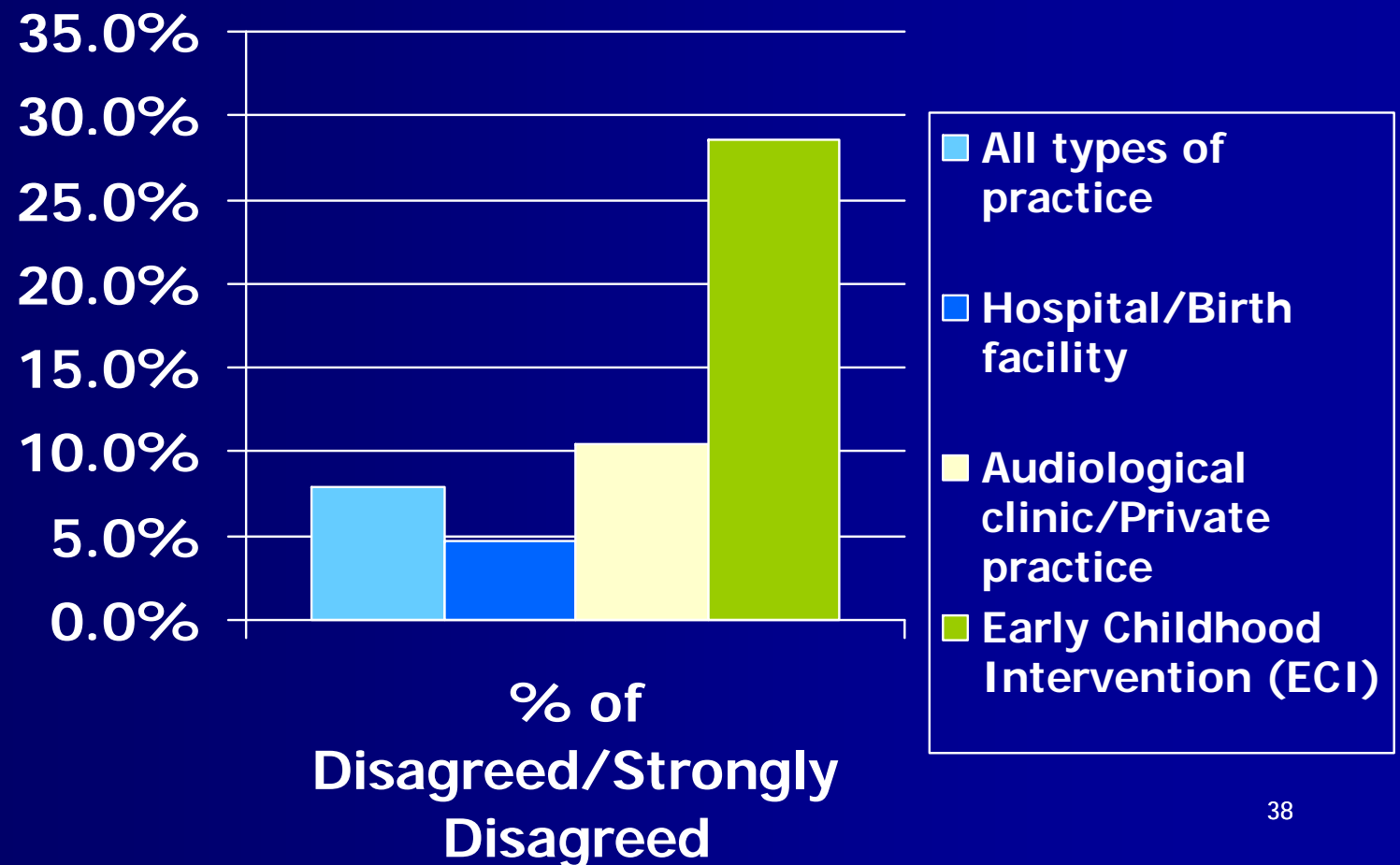
**Q: The functions provided by the system are appropriate for the purpose they were intended**



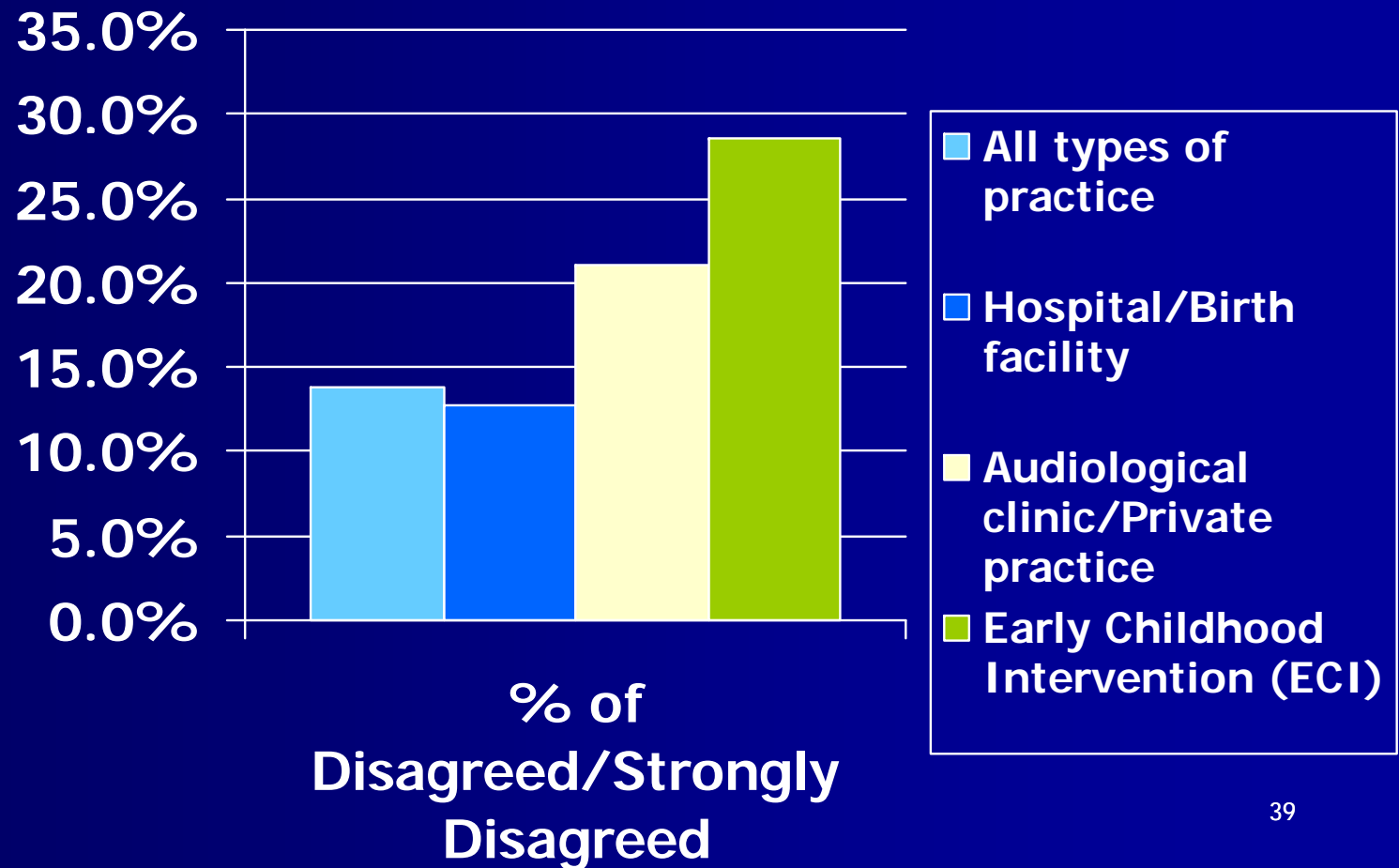
**Q: The functions provided by the system are sufficient for my work**



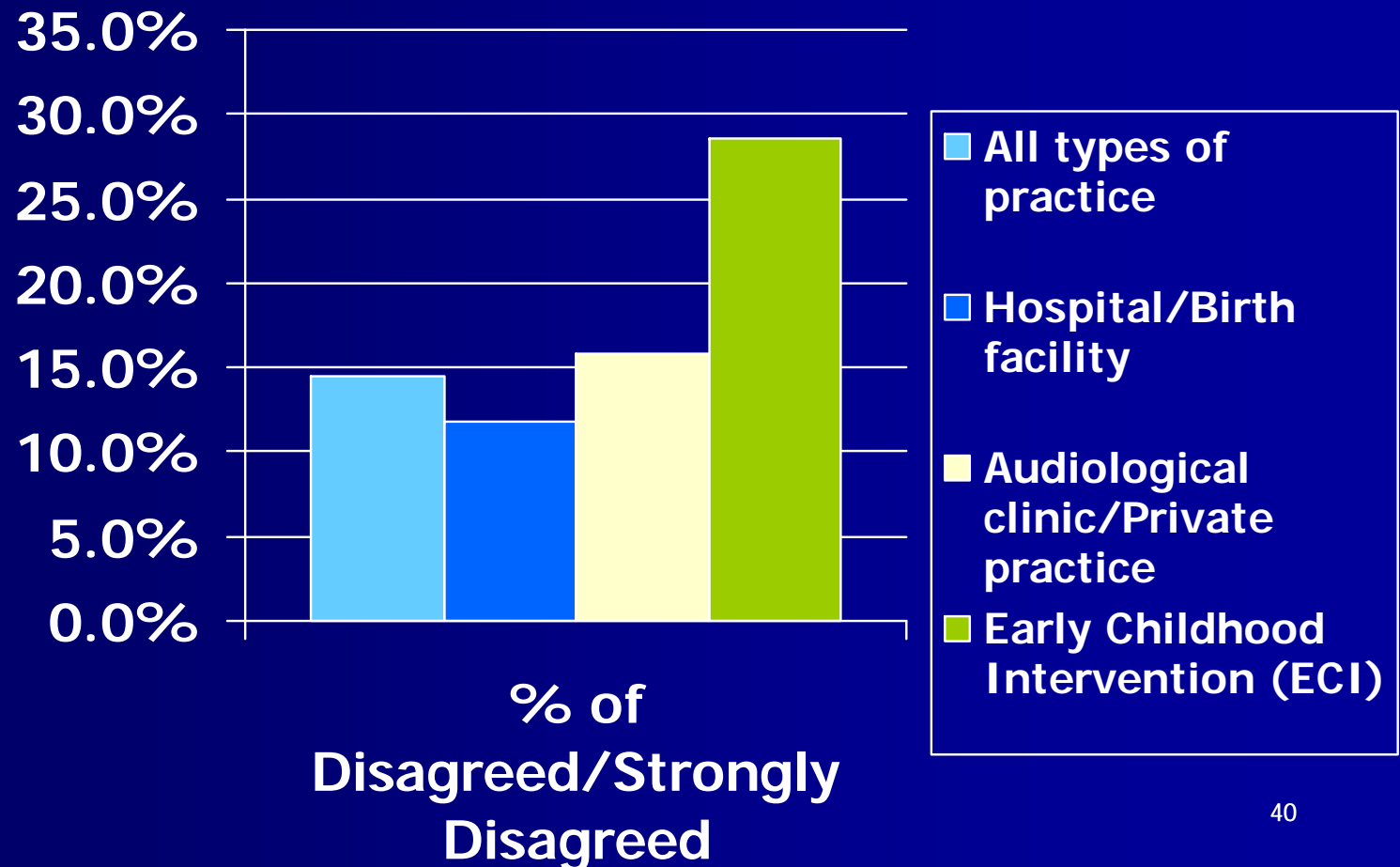
**Q: The functions provided by the system are appropriate for the purpose they were intended**



# Q: The functions provided by the system are sufficient for my work

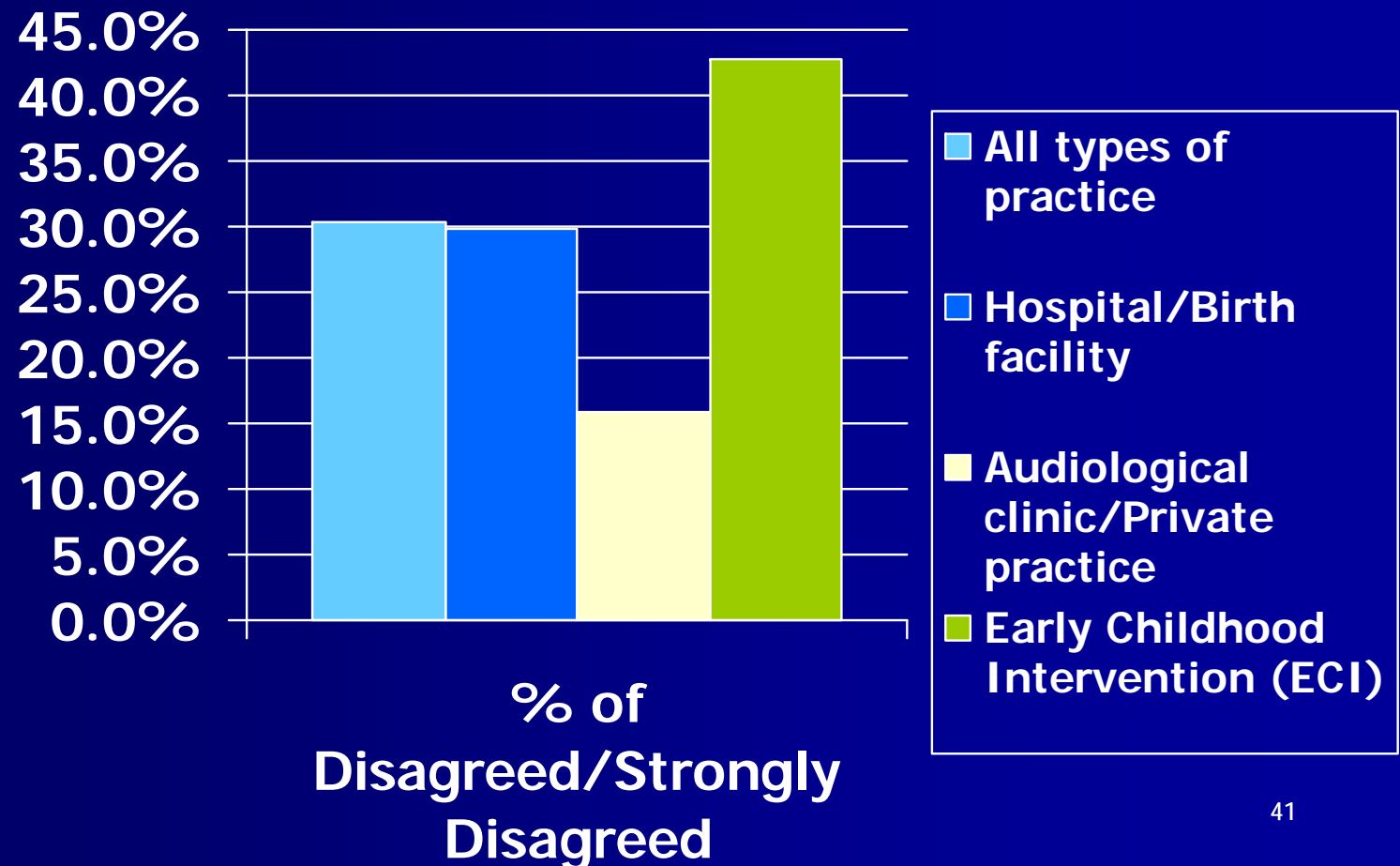


# Q: Use of the TEHDI system is easily integrated into my routine workflow

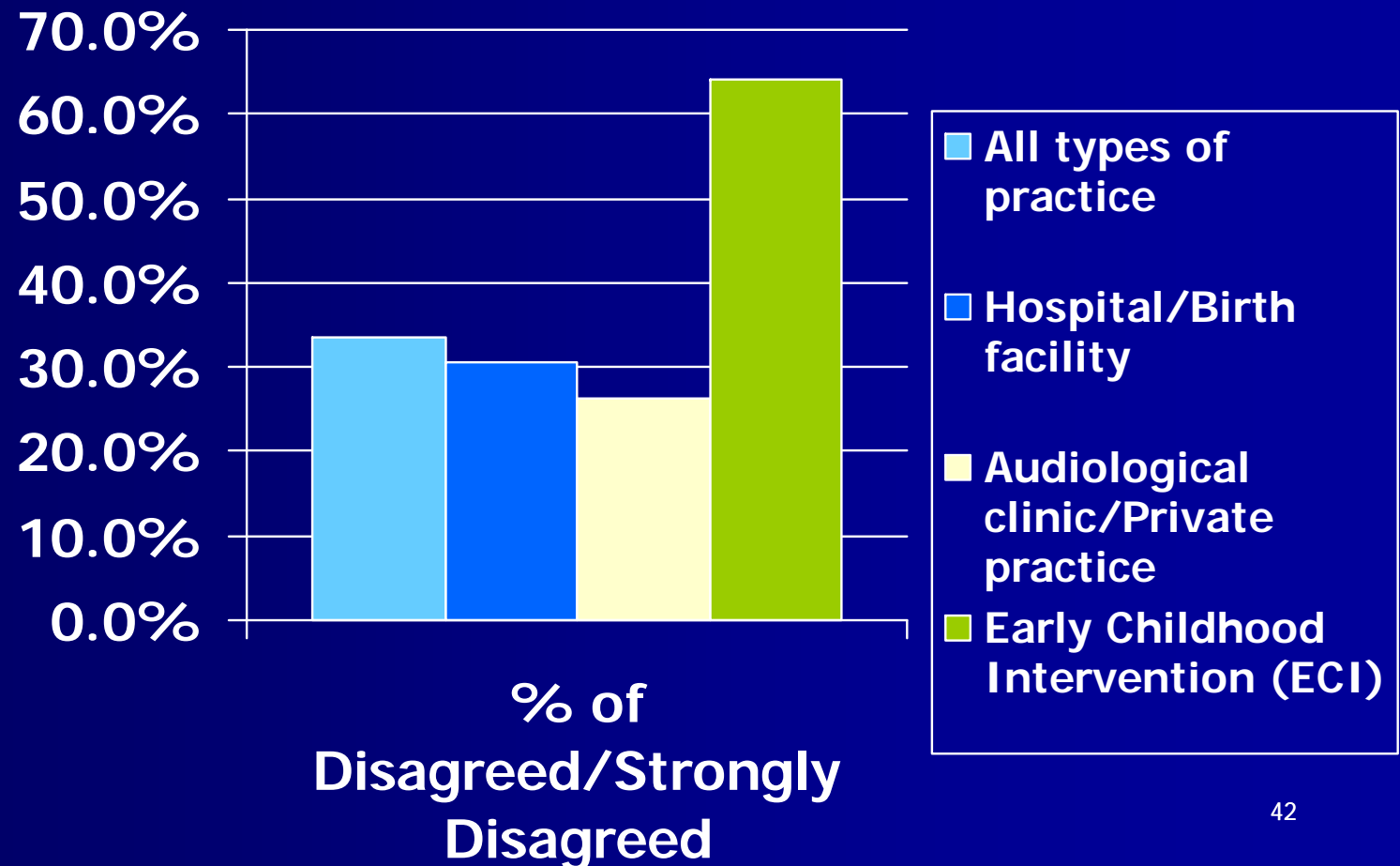




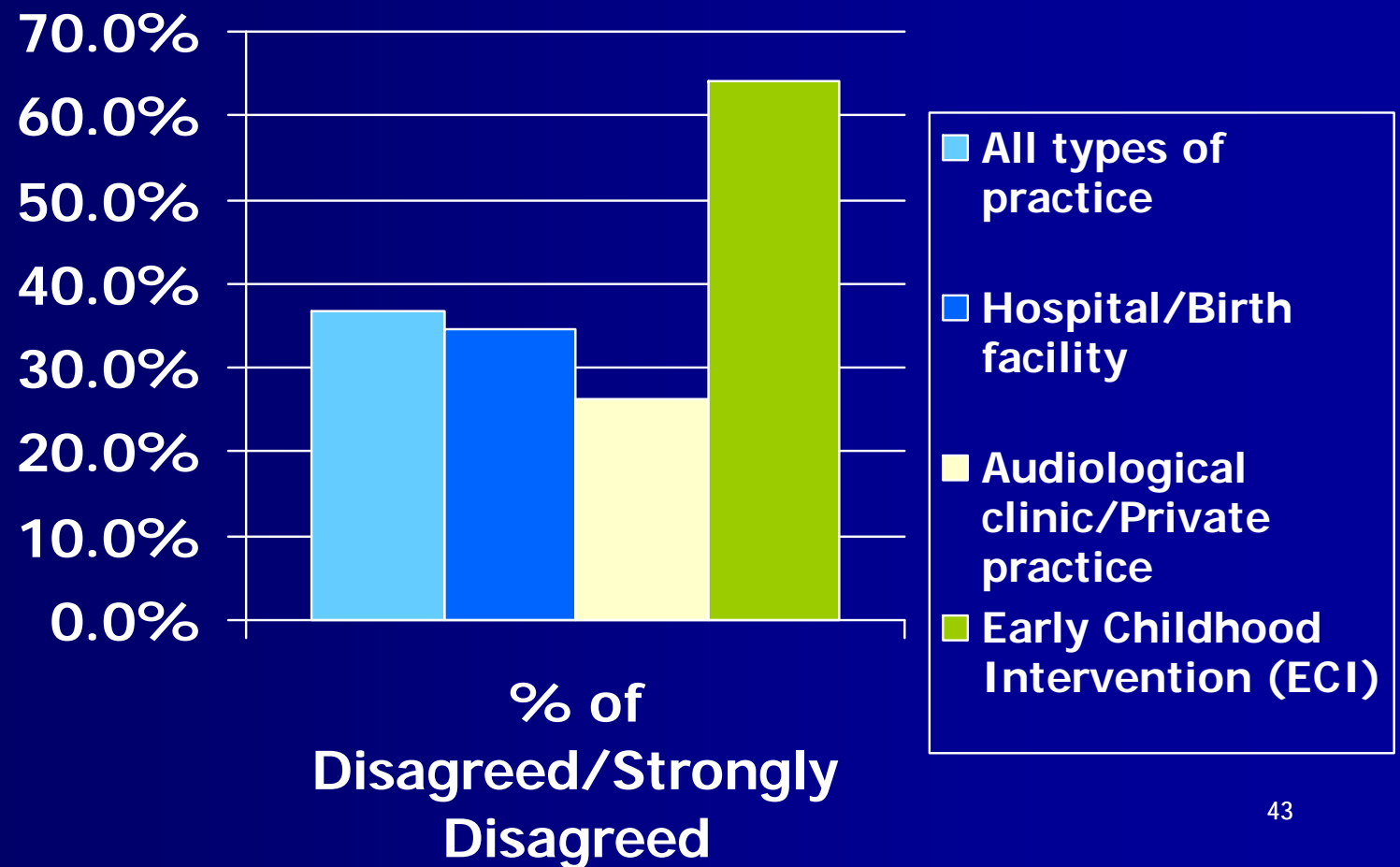
**Q: The TEHDI system output (e.g. report generated, data exported) can be used for fulfilling my routine work responsibilities without any extra work**



# Q: Using the TEHDI system helps me be more productive



**Q: Using the TEHDI system gives me more control over the activities in my work**



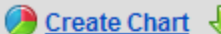
# Q: The design of this function or system component is appropriate and sufficient for the purpose it was intended

3. The design of this function or system component is appropriate and sufficient for the purpose it was intended.

[Create Chart](#)

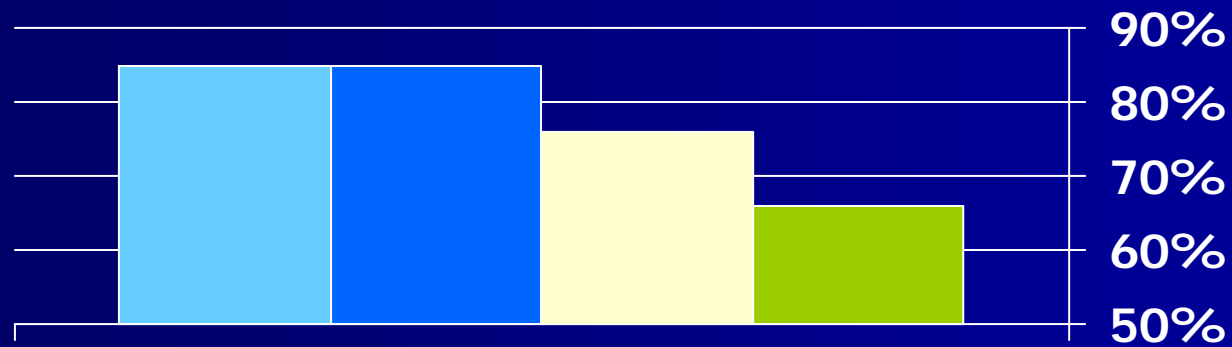
	Strongly Disagree	Disagree	Agree	Strongly Agree	Not applicable
Add or edit patient information and notes	2.9% (4)	1.4% (2)	65.9% (91)	23.9% (33)	5.8% (8)
Search patient	2.9% (4)	5.1% (7)	67.2% (92)	24.1% (33)	0.7% (1)
Import test result (screening, diagnosis, etc.)	5.1% (7)	5.8% (8)	58.7% (81)	21.0% (29)	9.4% (13)
Add or edit professional contact information	2.9% (4)	8.1% (11)	63.2% (86)	19.1% (26)	6.6% (9)
Search professional contact information	2.9% (4)	2.9% (4)	63.0% (87)	21.0% (29)	10.1% (14)
Appointment scheduling	3.0% (4)	6.7% (9)	40.7% (55)	16.3% (22)	33.3% (45)
Letters	6.7% (9)	6.7% (9)	56.3% (76)	17.8% (24)	12.6% (17)
Configure report	3.0% (4)	4.5% (6)	48.1% (64)	16.5% (22)	27.8% (37)
Search report	2.3% (3)	4.5% (6)	48.9% (65)	16.5% (22)	27.8% (37)

# Q: It is easy to use this function or system component

4. It is easy to use this function or system component 

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not applicable
Add or edit patient information and notes	2.2% (3)	5.8% (8)	60.6% (83)	25.5% (35)	5.8% (8)
Search patient	2.9% (4)	7.2% (10)	63.0% (87)	26.1% (36)	0.7% (1)
Import test result (screening, diagnosis, etc.)	3.6% (5)	8.0% (11)	58.0% (80)	21.7% (30)	8.7% (12)
Add or edit professional contact information	3.7% (5)	11.0% (15)	55.9% (76)	21.3% (29)	8.1% (11)
Search professional contact information	2.9% (4)	5.9% (8)	59.6% (81)	22.8% (31)	8.8% (12)
Appointment scheduling	2.9% (4)	6.6% (9)	39.4% (54)	17.5% (24)	33.6% (46)
Letters	4.3% (6)	11.6% (16)	52.9% (73)	16.7% (23)	14.5% (20)
Configure report	2.9% (4)	7.4% (10)	45.6% (62)	15.4% (21)	28.7% (39)
Search report	2.3% (3)	9.2% (12)	46.2% (60)	14.6% (19)	27.7% (36)

# Training



- Experienced/Expert computer user
- Experienced/Expert TEHDI user
- Learned to use TEHDI system quickly (agreed/strongly agreed)
- Need more training (disagreed/strongly disagreed)

# Suggestion for system improvement

- Provide more training to the ECI staff to enhance user experience with the system
- Integrate TEHDI with other information systems that ECI uses, or explore ways to use TEHDI to meet other needs of the routine ECI responsibilities
- Work with the vendor to modify some system functions as needed, for example: add a “select all” function to generate all types of letters with a single mouse click
- Work with the vendor to provide more systematic training on a regular basis.

# Limitations

- On-line survey
  - Sample bias
  - Format
- Data quality not investigated



# Acknowledgement

## CDC NCBDDD

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Questions ?

**Thank you !**