Vision and Hearing Screening Tools Dissemination Event

Agenda

8:30 – 8:45 a.m.   Opening Program

8:45 – 9:00 a.m.   Study background

9:00 – 9:15 a.m.   Study procedures and methods

9:15 – 10:00 a.m.   Demonstration

10:00 – 10:45 a.m.   Presentation of findings

10:45 – 11:15 p.m.   Presentation on the DepEd MFAT

11:15 – 11:35 p.m.   Questions and Answers

11:35 – 12:00 p.m.   Handover Ceremony & Closing

12:00 – 1:00 p.m.   Lunch

Today's Objectives

- Share approaches and lessons from the screening pilot

- Sensitize participants to important considerations in the selection of screening tools and approaches based on purpose, context, and resources

Using Mobile Technology for Sensory Disability Screening - Field Experiences from the Philippines

Kellie Betts
Carmen Strigel

What Is Screening?

- Process conducted by a non-medical staff or personnel to determine whether a student might have a potential disability

- Does not result in, or replace, a medical diagnosis by a trained professional

- Screening is typically only for some aspects of a potential disability

- Used to determine the need for referral and further evaluation

- Screening approaches, by definition, are rapid and simplified measures

Study Background and Procedures

Vision and Hearing Screening Pilot Activity in the Philippines

USAID
FROM THE AMERICAN PEOPLE

Study Origin

- Demonstrated commitment to inclusion by Department of Education

- Commitment by USAID/Philippines to support the country's education development and inclusion agenda

- Emerging international evidence of a potentially higher than 15% disability prevalence rate

- Advancements in disability measurement and screening approaches

- Emerging international evidence of practical approaches to addressing drivers of low school enrollment and limited implementation of inclusive education (RTI International, 2018)

Drivers of Low School Enrollment of Children with Disabilities

Limitations in the operationalization of national policies

Poor representation of disabled people organizations to include actual issues

Lack of relevant data to inform policy and practice

Lack of appropriate financing of inclusive education policy in light of scarce resources

Absence of systematic early screening

Lack of materials & resources

Lack of individual assistive devices

Lack of specialized materials to diversify instruction

Lack of practical screening and assessment tools

Poverty

Families with disability more likely to experience multi-dimensional poverty

Lower educational attainment is key contributor to poverty for persons with disability

Poverty can be cause or product of disability

Lack of accessible, affordable, & quality health care

Factors established in literature

Low school enrollment (and high dropout) of children with disabilities in low and middle-income countries

Community and families do not have knowledge about disabilities, e.g., cause of disability

Community and family hold negative attitudes to children with disabilities

Community and family do not know of value of education for disabled child

Principals, teachers, students hold negative attitude to children with disabilities…

Insufficient & inappropriate pre-service training…

Insufficient and inappropriate in-service training…

Large class sizes…

Insufficient instructional support and practical guidance…

…lead to low teacher self-efficacy in teaching children with disabilities in inclusive classrooms …

Socio-cultural barriers

Gaps in teacher development & support

Gaps in the Current Evidence Base

- Widely adopted, validated screening and measurement tools for disabilities that can easily be adapted to local context

- Research including learning outcomes of students with different disabilities and severity levels

- Causal models that can underpin the plausibility of interventions addressing barriers to inclusive education

- Cost-effectiveness research into different models of inclusion (resource room, resource teacher, grade-based phasing, etc.)

Philippines Study Research Questions

1) Are the selected screening tools able to appropriately and reliably detect children with vision and hearing difficulties within the Filipino context?

– What are the necessary conditions to effectively administer the selected tools?

2) Can the screening tools be effectively used by teachers in the Philippines to screen and detect students with vision and hearing difficulties?

– How much training is needed to ensure reliable screening results?

Data Collection Instruments

Rapid user adoption test: Pre- and post-test that was administered individually to screeners to gauge experience and skill levels prior to training (use of electronics, use of the specific software) and then compared to screeners' abilities at the end of training

hearScreen: Smartphone-based hearing screening test developed by HearX, South Africa

Peek Acuity: Smartphone-based vision screening test developed by Peekvision, UK

Student background interview: Brief interview conducted with children; included the Washington Group Short Set of Disability Questions

Diagnostic audiometry re-tests: Hearing tests conducted in medical facility as re-tests for select students who tested positive at schools when using hearScreen

Principal interview: A brief interview to answer background questions about the school, disability among students in the school, and the school's inclusive education program.

Screener performance instrument: Collected data on the accuracy of screeners in administering the vision and hearing screening

Screener exit interviews: Interview with screeners at the end of the data collection gathering feedback on the tools, training, and data collection process

School and Student Sample

- 8 schools selected, conveniently located in Region IV and National Capital Region

  – All medium- to large-size schools; located around cities/major roads; constructed in/around the school

- 1,218 children (50% boys and 50% girls)

  – Grade 1: 190 students

  – Grade 2: 814 students

  – Grade 3: 214 students

Screening Spaces Used in Schools
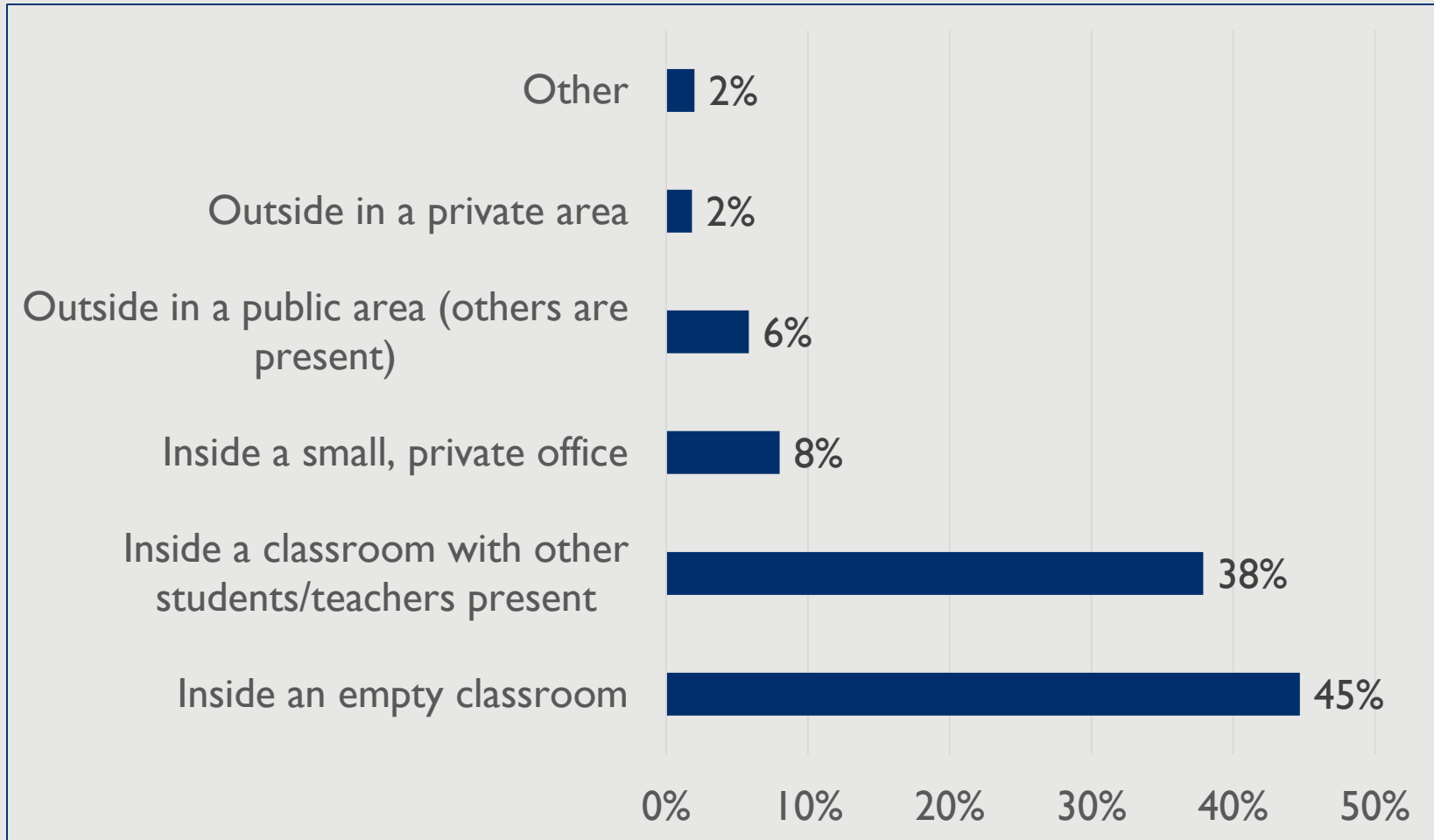
Pilot Screeners

- 18 screeners trained

    - 8 teachers

    - 4 medical officers (under the School Health Division)

    - 6 data collectors (principals and school supervisors)

Screener type	Average age	Average years of experience (range)
Teacher	39	11 years (2–20 years)
Medical Officer	40	10 years (1–11 years)
Data Collector	50	21 years (9–28 years)

Peek Acuity

- Vision acuity screening

- Screener-administered

- Already piloted in Ethiopia and several other countries in Africa and Asia

- Clinically validated (De Venecia et al., 2018)

- Proprietary tool

hearScreen

- Pure tone audiometric screening

- Screener-administered

- Default protocol: sounds at 3 frequencies both right and left ear

- Clinically validated (Faheema et al., 2016)

- Proprietary tool

- Headset calibration to specific hardware

DEMONSTRATION

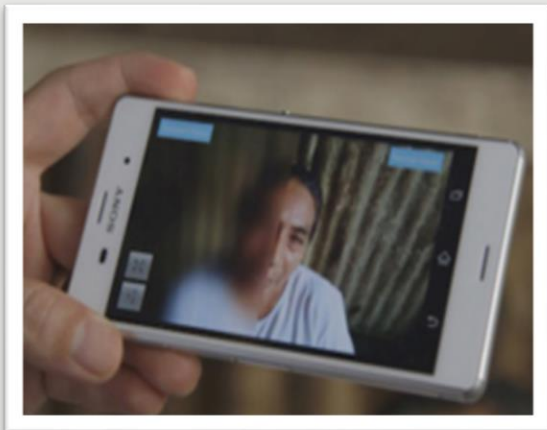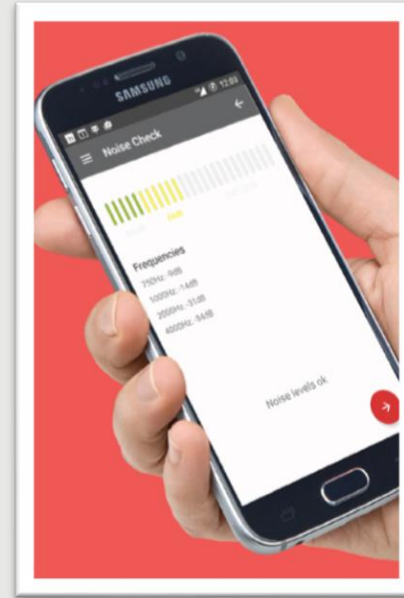# Vision Screening Pilot Findings

USAID
FROM THE AMERICAN PEOPLE

Peek Acuity

- Vision acuity screening

- Screener-administered

- Already piloted in Ethiopia and several other countries in Africa and Asia

- Clinically validated (De Venecia et al., 2018)

- Proprietary tool

Percent of Screened Children with Potential Vision Impairment by Severity Level (n=1,218)

Pie chart:
- Normal: 93.68%
- Mild Impairment: 2.38%
- Moderate Impairment: 3.61%
- Severe Impairment: 0.25%
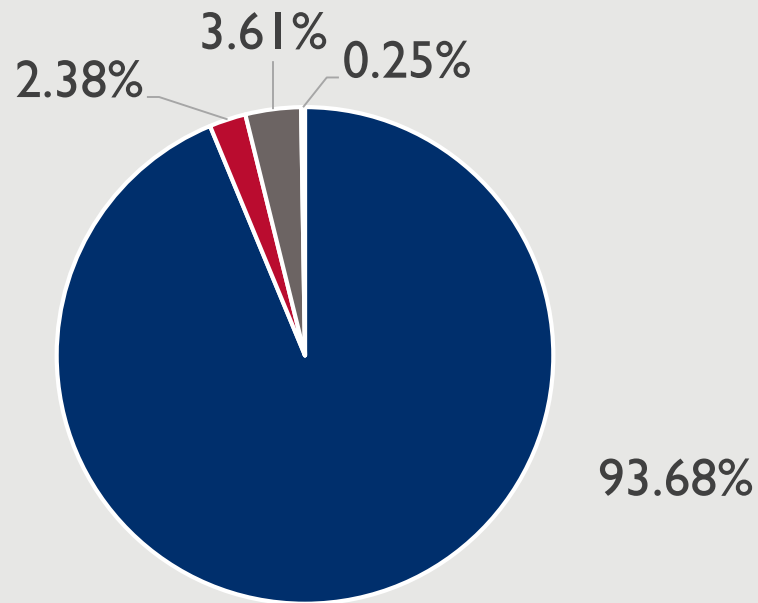
Legend:
- ■ Normal
- ■ Mild Impairment
- ■ Moderate Impairment
- ■ Severe Impairment

Vision Screening Referrals by Region and Gender

- Number of referrals significantly higher in NCR than Region IV-A

  – Aligns with DepEd *Consolidated SPED Data 2016–2017* that shows NCR has the highest level of diagnosed and undiagnosed vision impairments among elementary-aged students

- Slightly higher number of referrals for girls

	NCR (n=551)	REGION IV-A (n=667)	Male (n=611)	Female (N= 606)
Normal	481	660	580	561
Mild Impairment	27	2	8	21
Moderate Impairment	39	5	23	21
Severe Impairment	3	0	0	3

Hearing Screening Pilot Findings

Vision and Hearing Screening Pilot Activity in the Philippines

hearScreen

- Pure tone audiometric screening

- Screener-administered

- Default protocol: sounds at 3 frequencies both right and left ear

- Clinically validated (Faheema et al., 2016)

- Proprietary tool
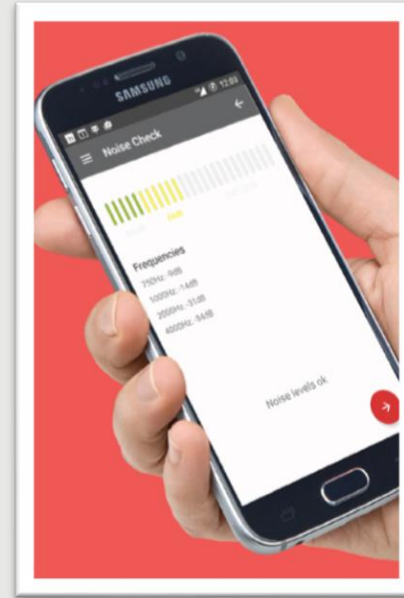
- Headset calibration to specific hardware

hearScreen Tool Adjustments during Pilot

- Days 1–3: Referral rates using Standard Protocol extremely high (88% and 95% of screened students)

  - Left and right ear tests at 25 dB at 1kHz, 2kHz, and 4kHz

  - Referrals at 1 or more failed frequencies

- On Day 4 and on Day 5: Small decrease in referral rate using Severity Protocol

  - Left and right ears tested starting at 25 dB at all 3 frequencies; if no response at 25 dB, beep is presented at increasingly higher frequencies until patient responses

  - Referrals at 1 or more failed frequencies

- Days 6–8: Significant increase in pass rate using a modified Severity Protocol

  - Left and right ears tested starting at 30 dB at all 3 frequencies

  - Refers at 2 or more failed frequencies

> dB: degree of loudness
> Hz: a unit of alternating current

Hearing Screening Results by Day

|	NCR				Region IV			
	Day 1 (n=66)	Day 2 (n=164)	Day 3 (n=144)	Day 4 (n=205)	Day 5 (n=112)	Day 6 (n=178)	Day 7 (n=201)	Day 8 (n=190)
Referred	89%	96%	90%	76%	78%	7%	7%	2%
Passed	11%	4%	10%	24%	22%	93%	93%	98%
Protocol Used	Standard Protocol	Standard Protocol	Standard Protocol	Standard Severity Protocol 25 dB	Standard Severity Protocol 25 dB	Modified Severity Protocol 30 dB & 2 failed frequencies	Modified Severity Protocol 30 dB & 2 failed frequencies	Modified Severity Protocol 30 dB & 2 failed frequencies

Hearing Referrals by Severity Level
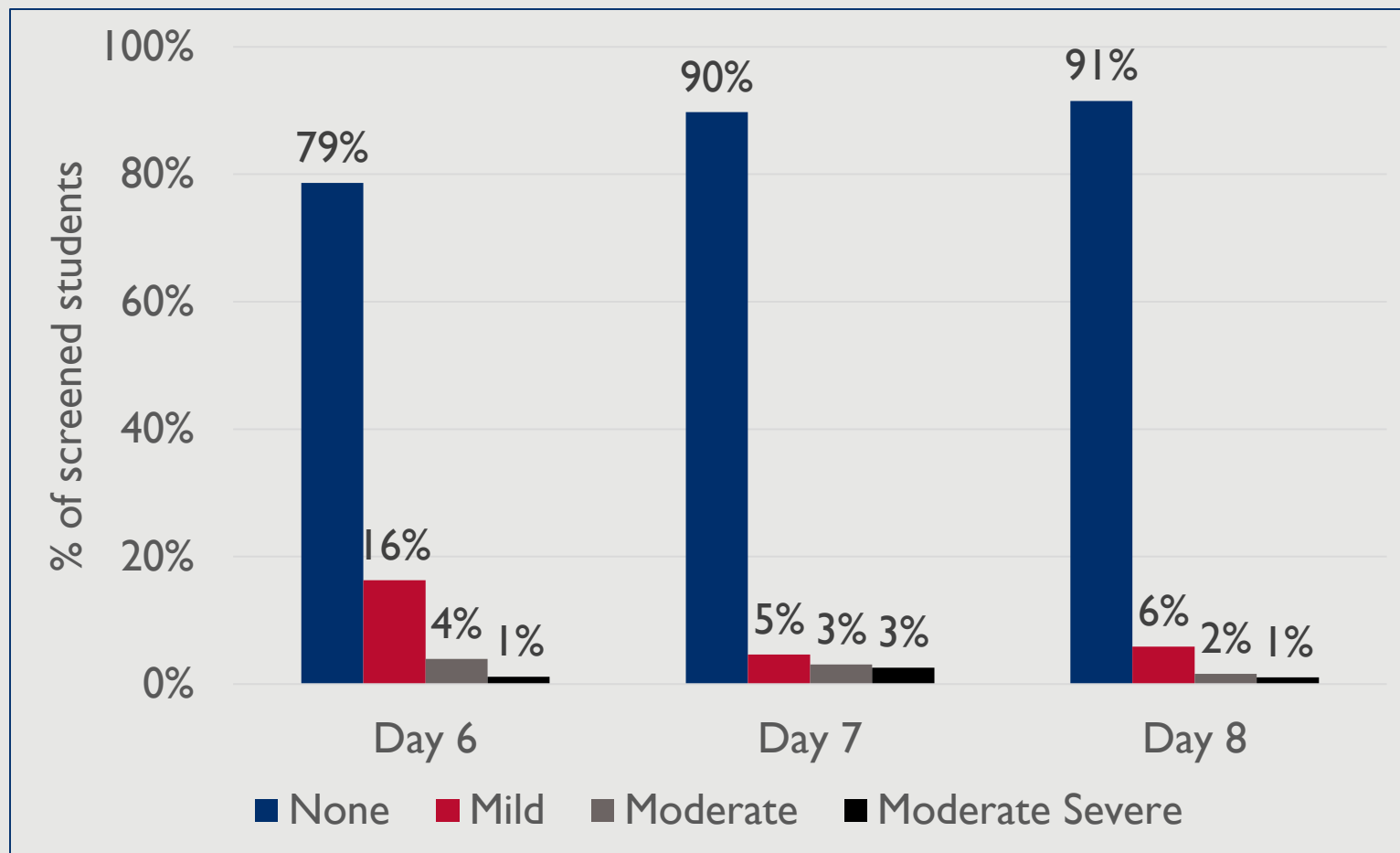
Considerations and Recommendations: Using Schools Settings for Screenings

Considerations: Using Schools for Screenings

- Schools can have higher than desired ambient noise levels from teachers, students, parents, class breaks/shift change, etc.

- hearScreen tool constantly monitors background noise during screening process

    - Automatically rescreens failed frequencies if ambient noise levels were above permissible levels

- Permissible ambient noise levels are 49, 57, and 61 dB for 1, 2, and 4 kHz, respectively
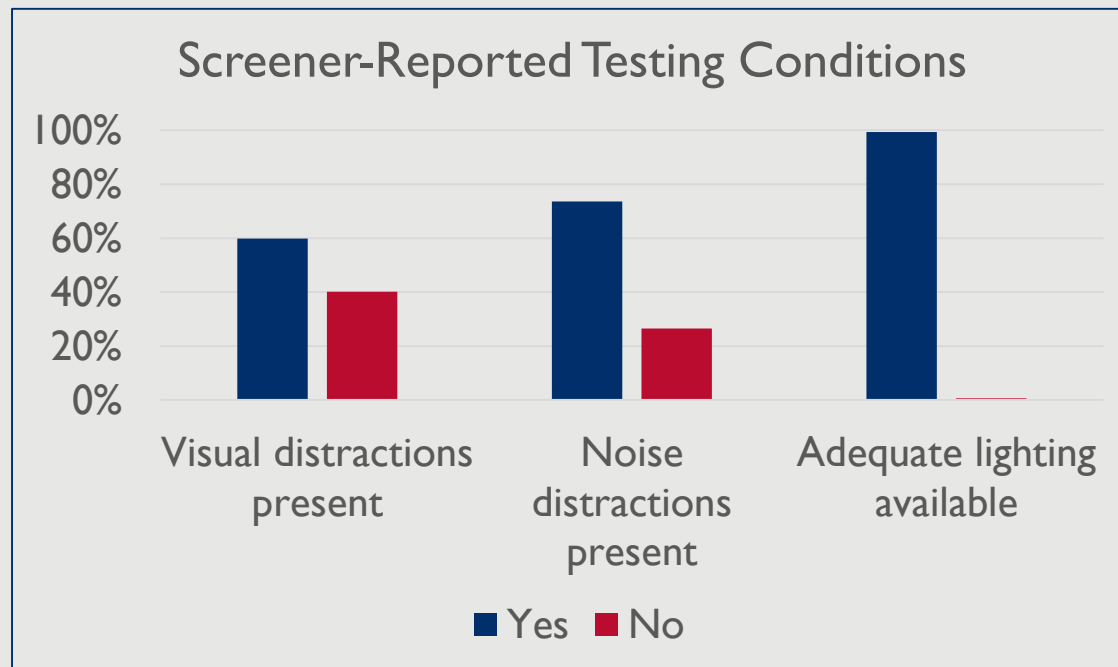
Screener-Reported Testing Conditions

Vision and Hearing Screening Pilot Activity in the Philippines

b. _Noise_. The school site shall be so selected that the intensity of noise field in which the building is to be constructed will be as low as possible. Noise levels at the school site shall not exceed 70 decibels. The acceptable noise levels in the school shall be as follows:

Table 1. ACCEPTABLE NOISE LEVELS IN SCHOOL AREAS

TYPE OF ROOM	ACCEPTABLE NOISE LEVELS (DECIBELS)
Classrooms	35 to 40
Hearing Test Rooms	Less than 40
Music Rooms	Less than 40
Health Rooms	Less than 45
Cafeterias/Canteen	50 to 55
School Sites (outdoor noise level	Less than 70

Ambient Noise Levels in Pilot Schools

49 dB- 1000 Hz
57 dB- 2000 Hz
61 dB- 4000 Hz
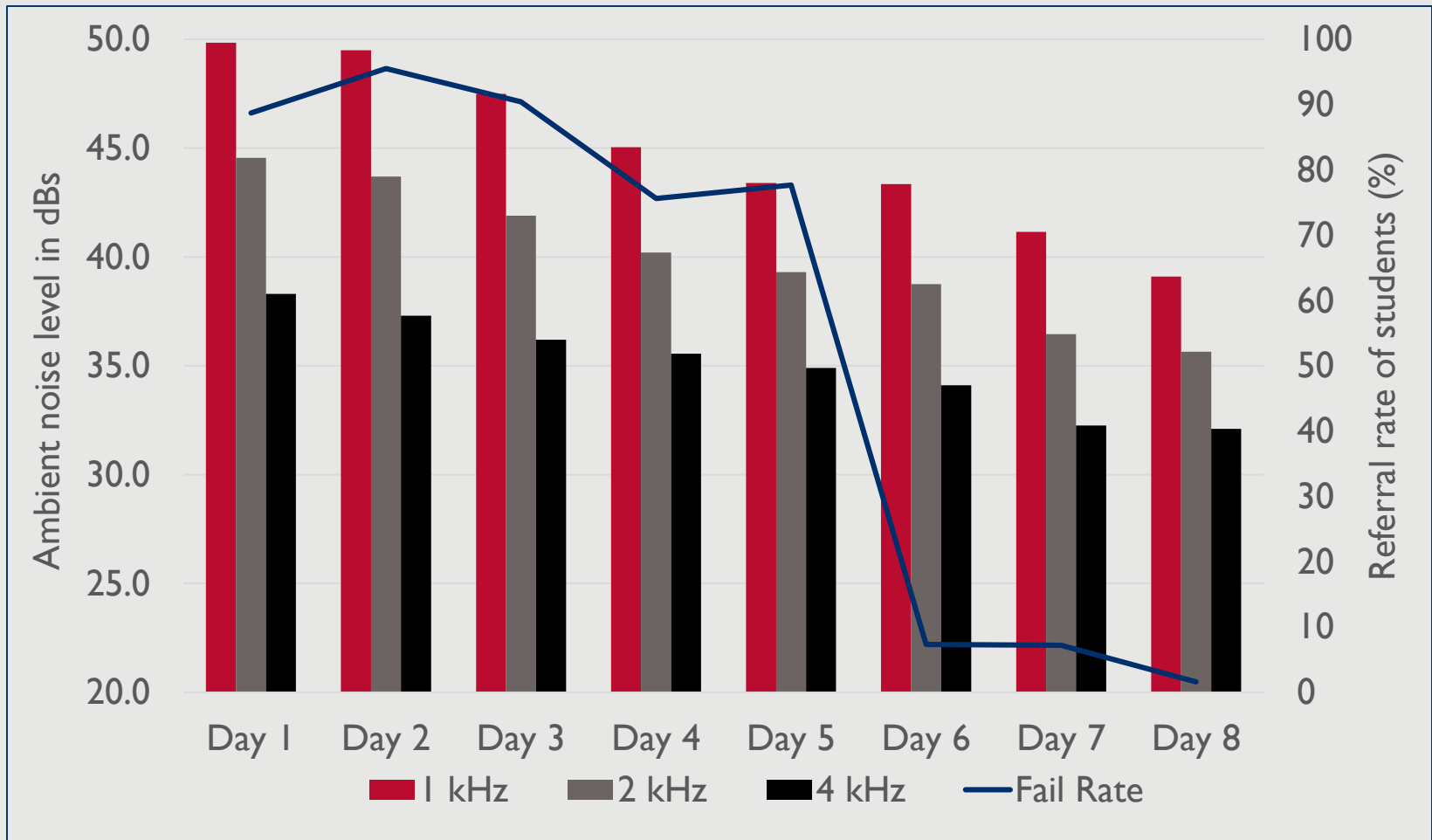
Recommendations: Using Schools for Screenings

- Be aware that school settings do present challenges, especially for electronic hearing screening

    - Consider larger implications related noise levels in schools

- Screening space set-up is critical to performance of tools

    - 1 or 2 screeners in a room

    - Be aware of school break times/shift changes

    - Small offices or empty classrooms

- Test/adjust tool settings

- Closely monitor referral rates

- Consider screening outside of the normal school day (e.g., at the end of the day, Saturday, or before the school year starts)

Considerations and Recommendations: Screener Type

Considerations: Screener Type

- Using teachers as screeners helps them better understand which students have a potential vision or hearing impairment

    - Can adjust their teaching or classroom practices to provide necessary assistance to students most in need

- Medical officers tend to have more experience with screening and referral processes; might be better at communicating results to parents

- Data collectors are especially useful in the parent-notification process

Screener Performance by Type

Percent of screeners' performance observations without errors by screener type
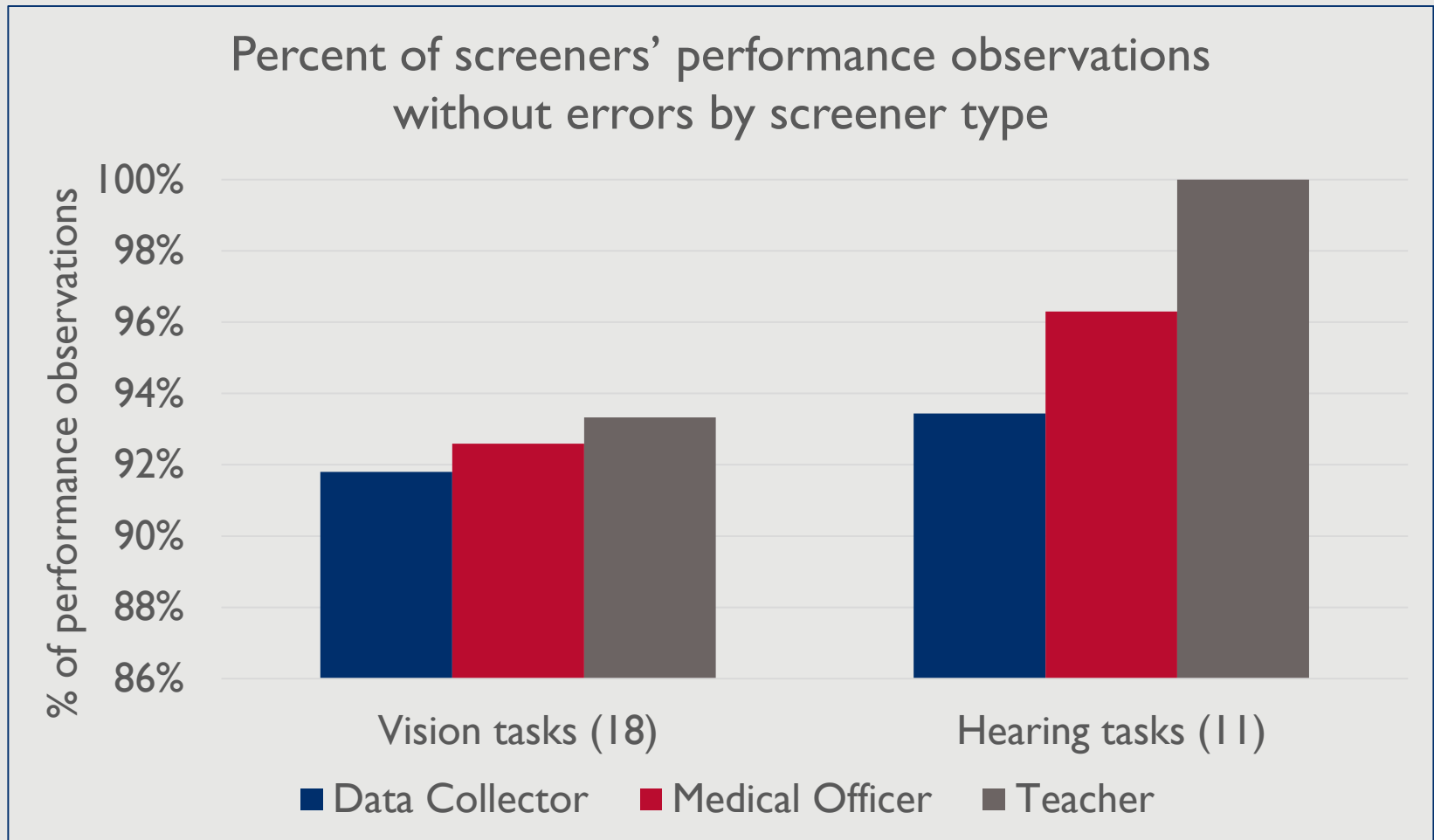
Source: Screener Performance Observation

Understanding How to Use Screening Results

QUESTION: How do you plan on using the results of today's screenings?

- **Teachers:** Tend to focus on individual child/family support (e.g., notifying parents of referral and allow family to follow up); few aware of action items for classroom/teaching methodologies that could provide additional support to children with a potential hearing or vision impairment

- **Medical Officers:** Want to use the data to dig deeper to explore issues behind the impairment; interested in being involved in screenings to work with teachers and parents to understand results

- **Data Collectors:** Want to focus on communicating to and advising parents to have a second opinion to justify the results; look for sponsors/funding to help parents fund additional assistance/screenings

Support Needed to Use Screening Results

QUESTION: What other types of support would you need in order to use today's results or to continue to support the identified children in the future?

- **Teachers:** Most teachers were unsure of what other types of support they would need to effectively use the results or continue to support identified children

- **Medical Officers:** Want to learn how to use the data to get support (financial and other) from other agencies; how to educate and talk to parents of the identified students

- **Data Collectors:** Budget for parents to get second opinions

Recommendations: Screener Type

- Teachers are able to pick up and use tools with relative ease

    - Teachers' gains (33%) are similar to those of Medical Officers (35%) and Data Collectors (36%) in *Rapid User Adoption Test*

- Teachers tend to have better rapport with students during screening process

- Teachers need additional support (training/intervention) to understand how to use screening results at classroom level

- Continue to involve medical officers in screening process

    - Medical officers might have better understanding of referral process and knowledge of local medical facilities for follow-up testing

Considerations and Recommendations: Training Duration and Design

Considerations: Training Duration And Design

Tools were user-friendly and easy to administer; all screeners were able to pick up tools with relatively small amount of training time

Rapid User Adoption Results

	Teachers	Medical Officers	Data Collectors
Average Pre Score	42%	50%	42%
Average Post Score	75%	85%	78%
Average Gain	33%	35%	36%
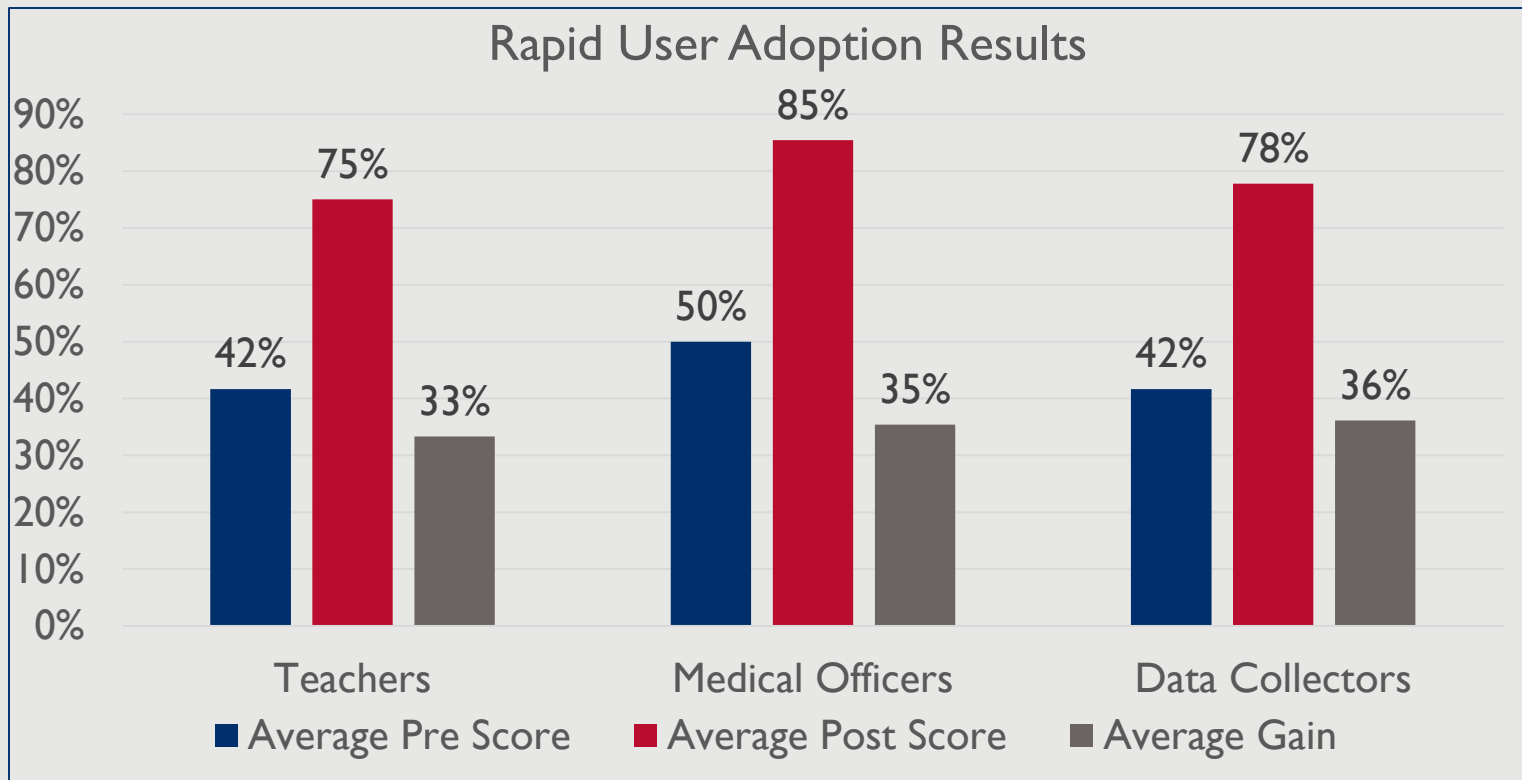
Recommendations: Training Duration and Design

- Extend training by one day to allow for more practice, for a total of 24 hours of training

- Provide extra practice in school setting

  - Allows for better understanding of working with children and challenges with setting up testing space

- Spend more time in training to ensure screeners understand findings/severity levels to better communicate them to parents

Considerations and Recommendations: Screening Age

USAID
FROM THE AMERICAN PEOPLE

Considerations: Screening Age

- Noticeable differences in children's (grade 1 vs. grade 3) ability to understand directions and concentrate during screening process

- Some hearing impairments such as middle ear pathologic disorders are known to be more common in younger children (age 5), and referrals tend to reduce for children ages 6 and 7 (Swanepoel, Eikelboom, and Margolis, 2014)

	1st grade (n=190)	2nd grade (n=814)	3rd grade (n=214)
Referred	82%	37%	63%
Pass	18%	63%	37%

Recommendations: Screening Age

- Early screening and detection remains important

- Recognize that some conditions such as ear infections that may affect hearing can be temporary and are often more common with younger aged children

- Use clear instructions when working with younger students; understand it may take longer to screen younger children

- Use conditioning to help ensure younger students understand screening process

Considerations and Recommendations: Parent Notification and Referral Process

USAID
FROM THE AMERICAN PEOPLE

Considerations: Parent Notification and Referral Process

- Notification and parent engagement is critical to screening process

- Many parents didn't provide consent for students to participate

- Parents don't always understand what referrals/screening results mean

- Parents don't always want to seek further testing/know more about the potential issues

Recommendations: Parent Notification and Referral Process

- Need careful, context-specific consideration of socio-cultural aspects

- Explore other methods to communicate to parents about screening tools and procedures

  - Show videos of screening process

  - Discuss the screenings at PTA meetings or other scheduled meetings with parents

  - Communicate verbally rather than through letters; allow parents to ask questions

- Prepare screeners with better understanding of the results/severity levels to improve ability to communicate findings to parents

  - Sensitize/support parents with screening results

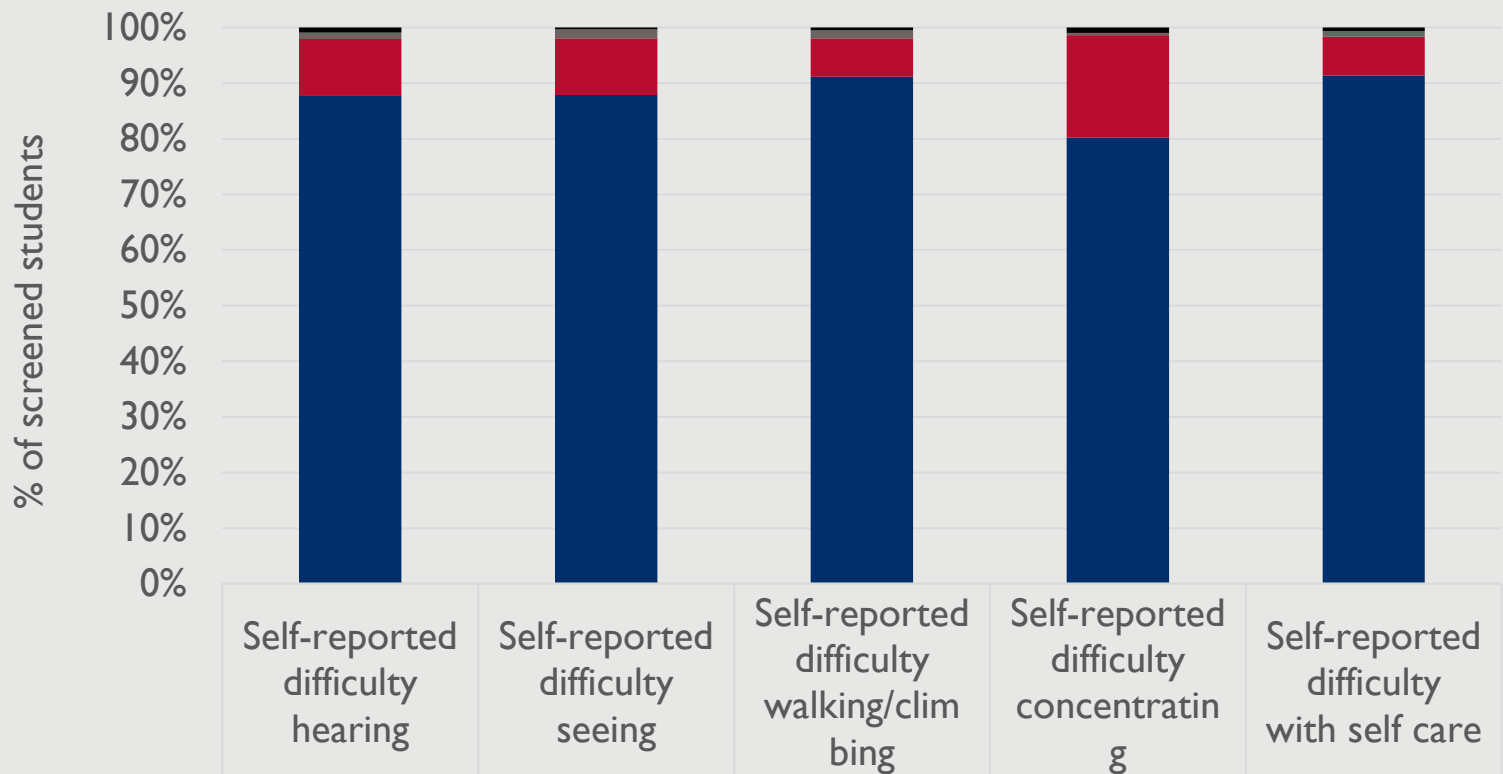 - Be able to suggest clear next steps (in and out of schools)

Considerations and Recommendations: Tool Selection

Considerations: Tool Selection

- Screening tool must be carefully selected, taking into account:

    – Type of disability to screen for

    – Purpose of the screening activity (and related to use of the resulting data)

    – Age of the child

    – Resources available for screening and screening follow-up

    – Screening context

Sample Students Self-Report Using Washington Group Short Set Questions

	Self-reported difficulty hearing	Self-reported difficulty seeing	Self-reported difficulty walking/clim bing	Self-reported difficulty concentratin g	Self-reported difficulty with self care
■ Cannot do at all	1%	0%	0%	1%	1%
■ Yes, a lot of difficulty	1%	2%	1%	0%	1%
■ Yes, some difficulty	10%	10%	7%	18%	7%
■ No, no difficulty	88%	88%	91%	80%	91%

Vision and Hearing Screening Pilot Activity in the Philippines

Small Overlap Between Washington Group Short Set and Electronic Screening Results

- 27% of the students who did not pass the Peek Acuity screening indicated difficulty seeing

- 11% of students indicated difficulty seeing but passed Peek Acuity screening

- 6% of students who indicated difficulty hearing also did not pass the hearScreen test

- 6% of students who indicated difficulty hearing passed the hearScreen test

Hearing Screening Test Retest Results

- 162 students were retested after not passing hearing screening

- Retesting students on the spot reduced referral rates by almost 30%

First Test Result	Last Test Result	# of students (n=162)	Percent
Fail	Fail	107	66%
Fail	Pass	44	27%

Recommendations: Tool Selection

- Carefully consider context and purpose prior to selecting screening tools.

- Screening efforts must invest in careful initial field tests to establish locally appropriate logistics guidance for screeners on where and how to set up adequate screening spaces.

- Comprehensive testing of electronic hearing screening tools is needed to identify the most viable protocols for the context in advance of full rollout.

- Screeners should retest students to ensure screening gives accurate results.

References

De Venecia, B., Bradfield, Y., Møller Trane, R., Bareiro, A., & Scalamogna, M. (2018). Validation of Peek Acuity application in pediatric screening programs in Paraguay. *International Journal of Ophthalmology, 11*(8), 1384–1389. doi:10.18240/ijo.2018.08.21

Swanepoel D., Eikelboom R., & Margolis, R. (2014). Tympanometry Screening Criteria in Children Ages 5–7. *Journal of the American Academy of Audiology, 25*(10), 927-936. doi:10.3766/jaaa.25.10.2.

Contact Information

Kellie Betts, RTI International

kbetts@rti.org

Carmen Strigel, RTI International

cstrigel@rti.org

Monica Ang-Tan, USAID/Philippines

mang-tan@usaid.gov

Bureau of Learning Delivery- Student Inclusion Division

bld.sid@deped.gov.ph