

Computerized Auditory Training to Rehabilitate Traumatic Brain Injury:  
An Emerging Trend?

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South Texas Veterans Healthcare System

LACE is a home-based, adaptive, computerized auditory training program

Presents pt w/ 20 sessions (each about 30 minutes long) of drills in:

- Speech-in-noise

- Auditory working memory

- Rapid speech

Also provides many helpful communication tips.

Audiologist goes to manufacturer's secure (SSL-encrypted) website and dispenses LACE CD to pt and briefly explains to pt how to use it or has pt work through a 10 minute demo in office.

Pt then takes LACE CD home, installs on their computer and registers their CD on manufacturer's secure website. After each session pt completes their performance data is securely transmitted to the manufacturer's server.

Their supervising audiologist can then log into server and securely view pt's progress through the program.

Audiologist only needs to enter pt's **name** and the software **CD's serial number** to complete the Dispensing project. Can **optionally** enter pt's age, PTAC thresholds at 500 and 3000 Hz, and Word recognition scores (But this is NOT required).

Pt only needs to enter their **name** and **CD serial number** to complete registration process.

No other personal data is entered or transmitted, other than LACE performance scores (which would not be understood by anyone other than audiologists who have familiarized themselves w/ LACE scoring format).

This computerized version of LACE has been banned in VA since Sept/Oct 2006.

## Uses of LACE

-Given to hearing aid patients (both new and experienced users) to help them adapt to their new HAs, and develop better auditory/listening skills. Has been shown to substantially reduce HA return Rates.

-Used to treat listening difficulties of pts w/ normal to near-normal who do Not need or wear HAs.

-Could it be used to treat auditory complaints of mTBI vets?  
What about their non-auditory cognitive complaints?

DVD version of LACE

- Can use on DVD player and pt's TV, using DVD remote control to navigate and respond to drills.

- Can also be viewed on DVD player of pt's computer.

- Shorter (only 10 sessions)

- No data is stored or transmitted.

### **DVD version was approved for use in VA in 2008**

- Neurotone's CEO tells me his data show pt's improve w/ DVD version, but NOT as much as they improve w/ the 20-session computer version.

**From:** Iwakabe, Monica R.

**Sent:** Monday, August 11, 2008 2:18 PM

**To:** VHAWAS Nat'l Audiologist; VHAWAS National Audiology Techs

**Subject:** Listening and Communication Enhancement (LACE) DVD Available

Listening and Communication Enhancement (LACE) software from Neurotone is an interactive computerized auditory training program for patients with hearing loss and may also be useful for brain injury rehabilitation. Hearing care providers can issue LACE to selected patients as part of their program of care. Some hearing aid manufacturers provide LACE to their private sector customers in conjunction with hearing aid orders. Neurotone has recently released a DVD version of LACE. And, after consultation between DALC contracting specialists and the ASPS Program Office, it has been determined that hearing aid manufacturers with VA contracts will be allowed to provide the LACE DVD in association with new VA hearing aid orders.

It is important to note that manufacturers are not required to include the LACE DVD with VA hearing aid orders, but are free to do so at their prerogative. Also, this applies only to the DVD version of LACE for the time being. ASPS and DALC officials are pursuing approval to use the standard software version of LACE, which includes Internet connectivity for monitoring patient progress in completing LACE learning modules.

For more information on the benefits of LACE, please visit [www.neurotone.com/lace/](http://www.neurotone.com/lace/).

Contact your preferred hearing aid manufacturer(s) for information on their standard practices for distributing LACE, and their plans for distribution with VA orders.

Monica Iwakabe

Program Specialist

VA Denver Acquisition and Logistics Center

Sweetow, R. W., & Henderson-Sabes, J. (2006). The need for and development of an adaptive listening and communication enhancement (LACE™) program. *Journal of the American Academy of Audiology*, 17, 538-558.

Gave a thorough description of the LACE™ training program and reported on a five-site pilot study of the full 20-session, take-home, computerized LACE™ regimen in patients being fitted w/ hearing aids. The five sites included university clinics and private practices. Subjects completing the LACE™ training showed significant improvement on all except one outcome measure compared to a control group.

See also:  
“Using LACE software with CAPD Patients”  
by CAPT Malisha Martukovich, USAF,  
presented at 2009 JDVAC (available at AVAA website).

“TBI often affects the ability to use a function in the real world as much as or more than it affects the primary function itself.” (p. 954).

Lux, W. E., (2007). A neuropsychiatric perspective on traumatic brain injury. *Journal of Rehabilitative Research & Development*, 44(7), 951-961.

“Invitation to Participate” e-mail sent to:

Approx. 947 Audiologists

Approx. 799 VA

68 DOD – Active Duty

80 DOD – Civilian

Approx. 387 Speech-Language Pathologists

Approx. 363 VA

5 DOD – Active Duty

19 DOD – Civilian

Total invitations sent: Approx. 1334

45 of the 1334 Invitations were UNDELIVERABLE (all DOD)

36 DOD Audiologists

9 DOD Speech-Language Pathologists

<b>Position</b>	<b>N (Sent To)</b>	<b>N (Repsonded)</b>	<b>Response Rate</b>
VA Audiol	799	96	12%
DOD Audiol (AD)	68	7	10%
DOD Audiol (Civ)	80	15	19%
<b>Total Audiol</b>	<b>947</b>	<b>118</b>	<b>12%</b>
VA SLP	363	50	14%
DOD SLP (AD)	5	1	20%
DOD SLP (Civ)	19	4	21%
<b>Total SLPs</b>	<b>387</b>	<b>55</b>	<b>14%</b>
<b>Overall Total</b>	<b>1334</b>	<b>173</b>	<b>13%</b>

## **RESPONSE RATES:**

VA Audiologists: 96/799 = 12%

DOD Audiologists(AD): 7/68 = 10%

DOD Audiologists (Civ): 15/80 = 19%

**Overall Audiologist Response Rate: 118/947 = 12%**

VA SLPs: 50/363 = 14%

DOD SLPs(AD): 1/5 = 20%

DOD SLPs (Civ): 4/19 = 21%

**Overall SLP Response Rate: 55/387 = 14%**

**TOTAL Overall Response Rate (All): 173/1334 = 13%**

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your completed form if you would like a copy for your records.

## 2. Default Section

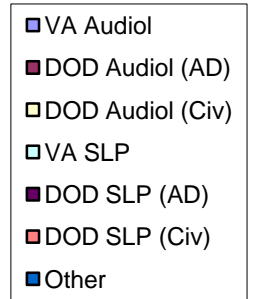
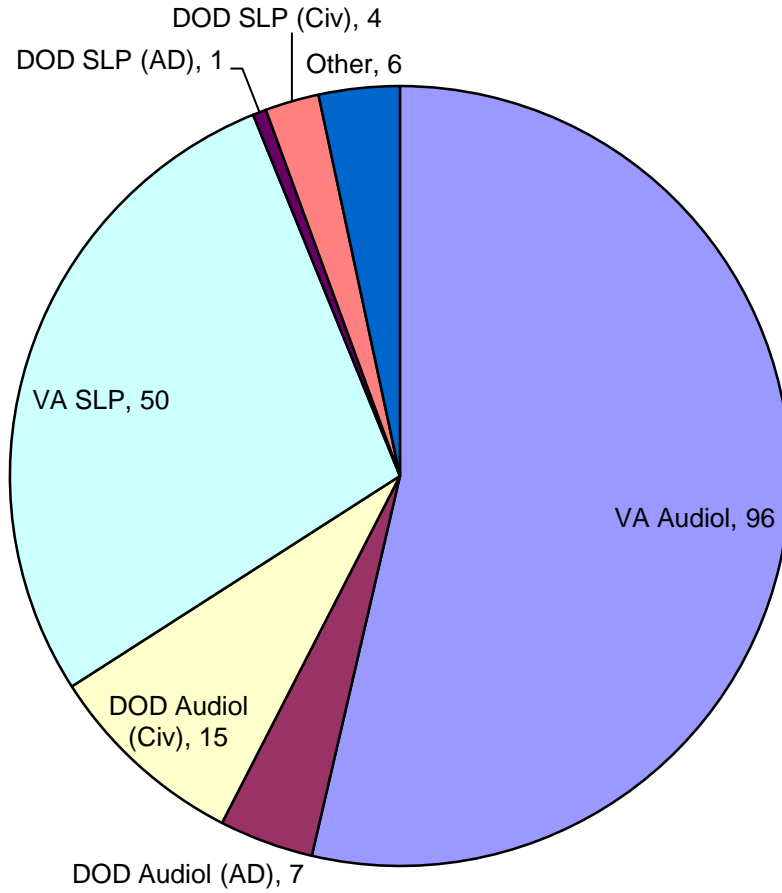
### 1. What best describes your position within the VA or DOD?

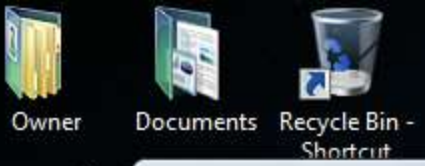
- A. VA Audiologist
- B. VA Speech-Language Pathologist
- C. DOD Audiologist (Active Duty)
- D. DOD Audiologist (Civilian)
- E. DOD Speech-Language Pathologist (Active Duty)
- F. DOD Speech-Language Pathologist (Civilian)
- G. OTHER (please specify in box below)

<b>Position</b>	<b>N</b>	<b>%</b>
VA Audiol	96	53.63%
DOD Audiol (AD)	7	3.91%
DOD Audiol (Civ)	15	8.38%
VA SLP	50	27.93%
DOD SLP (AD)	1	0.56%
DOD SLP (Civ)	4	2.23%
Other	6	3.35%
Total	179	99.99%

Total Audiologists	118	65.92%
Total SLPs	55	30.73%
Total Other	6	3.35%
Total	179	100.00%

# Profession and Component





Copy of Survey.pdf - Adobe Reader

File Edit View Document Tools Window Help

Print, Save, Open, Previous, Next, 2 / 7, 150%, Find

Please fill out the following form. You cannot save data typed into this form. Please print your completed form if you would like a copy for your records.

## 2. Which of the following best describes your position in (please click All that apply)?

- A. Clinician (Audiologist or Speech-Language Pathologist)
- B. Researcher
- C. Administrator
- D. Technician

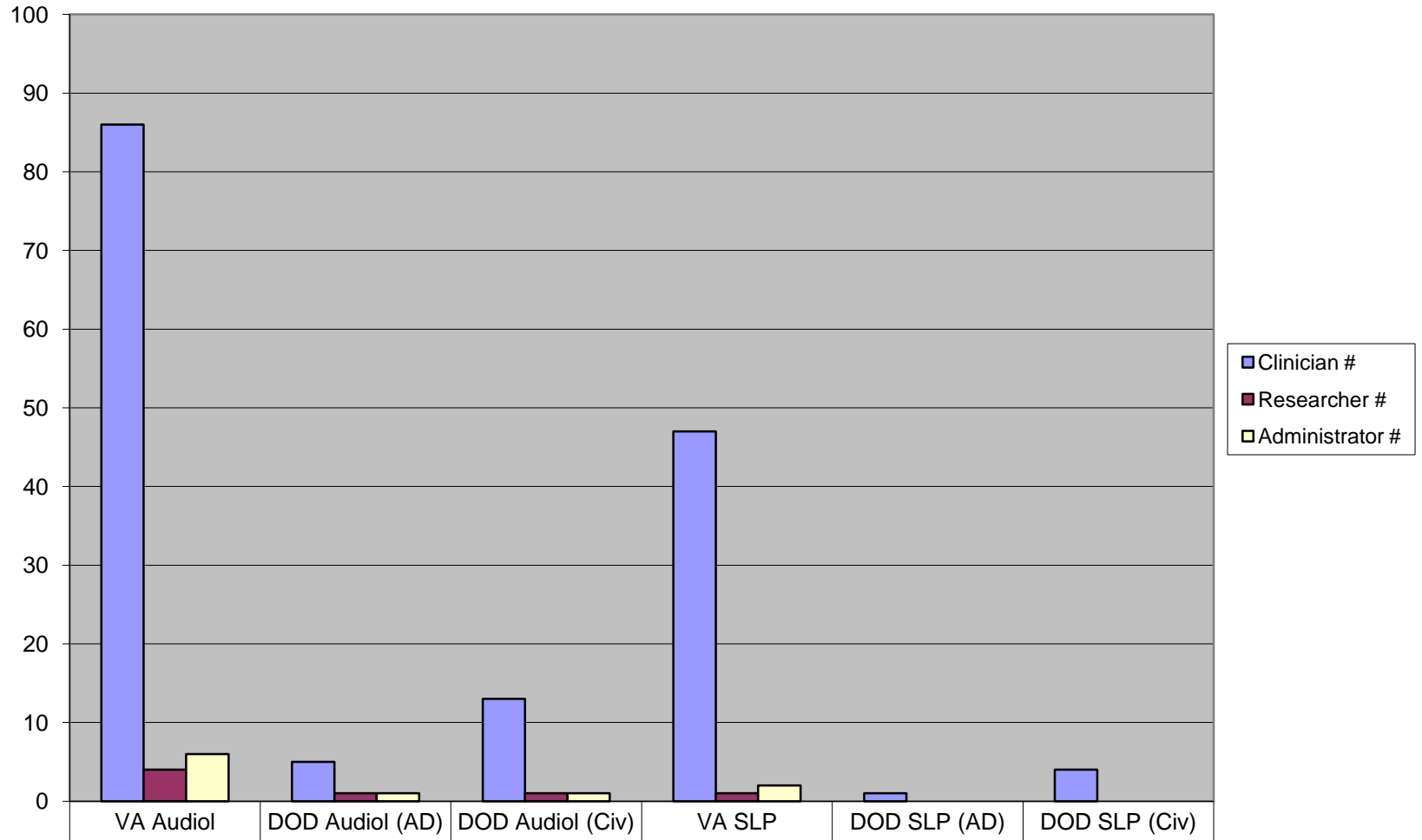
8.50 x 11.00 in

1 item selected

40.5 KB

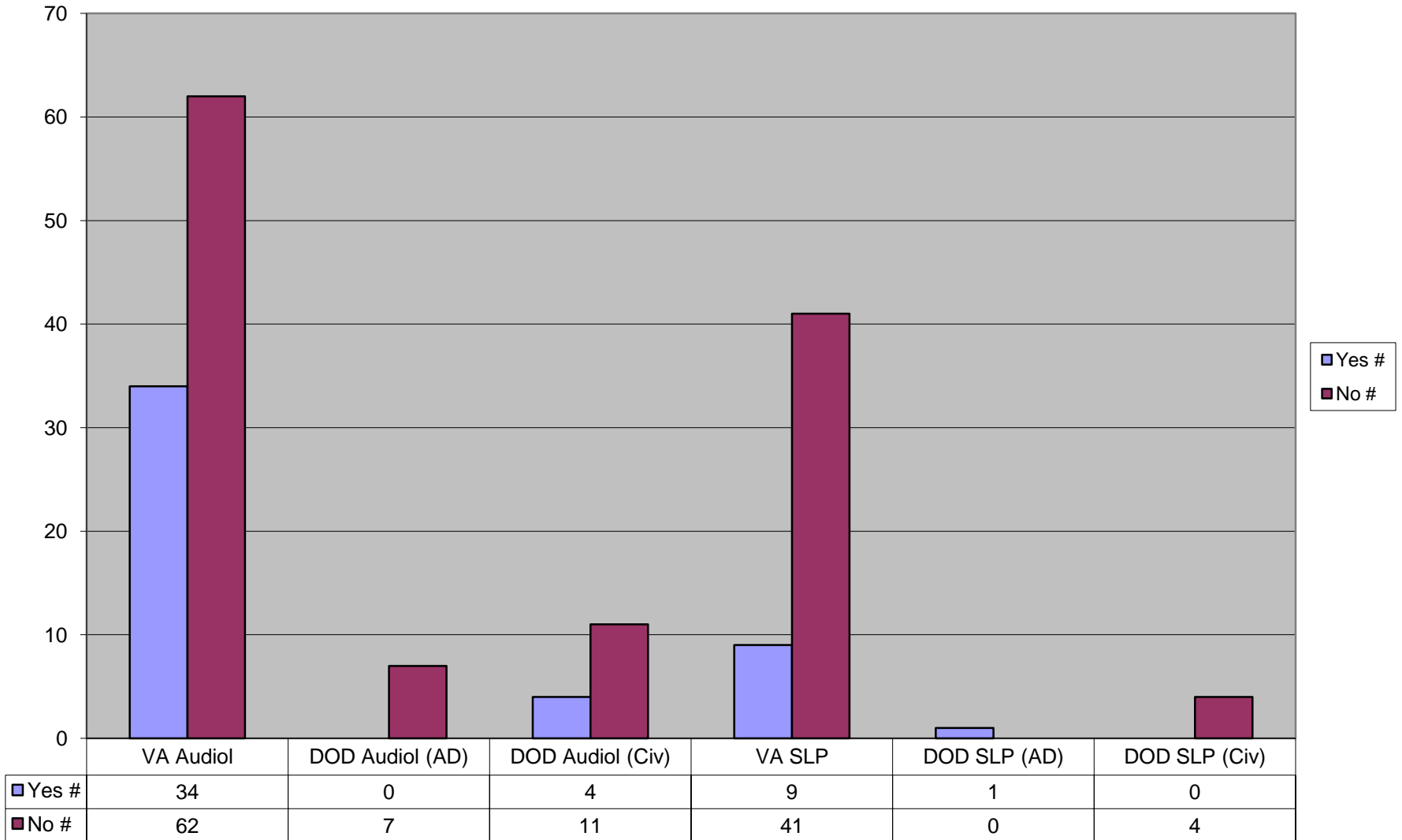
Computer

### Position (primary only)

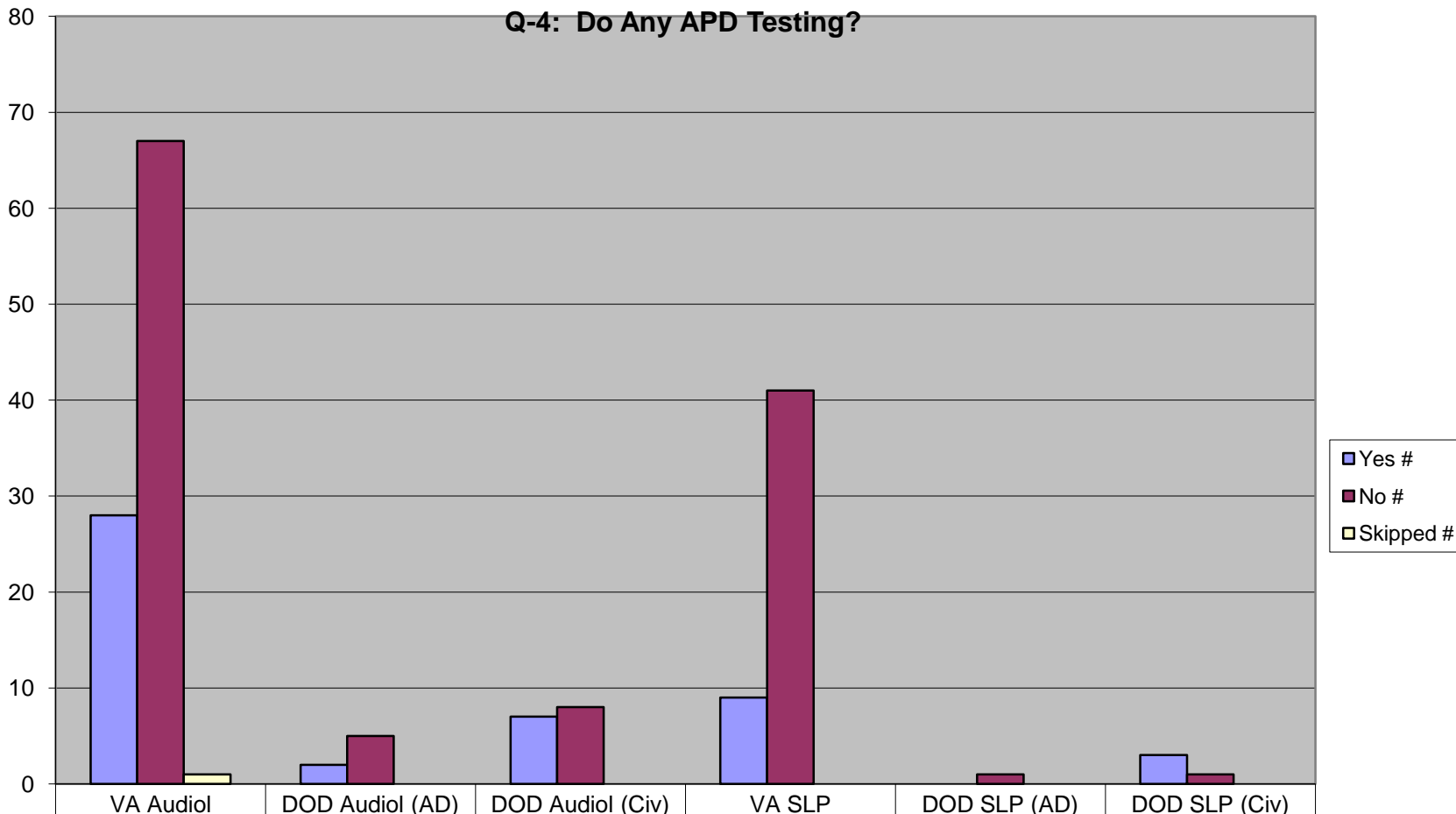


■ Clinician #	86	5	13	47	1	4
■ Researcher #	4	1	1	1	0	0
■ Administrator #	6	1	1	2	0	0

### Q-3: Do Aural Rehab (beyond HA fitting/HAO)?

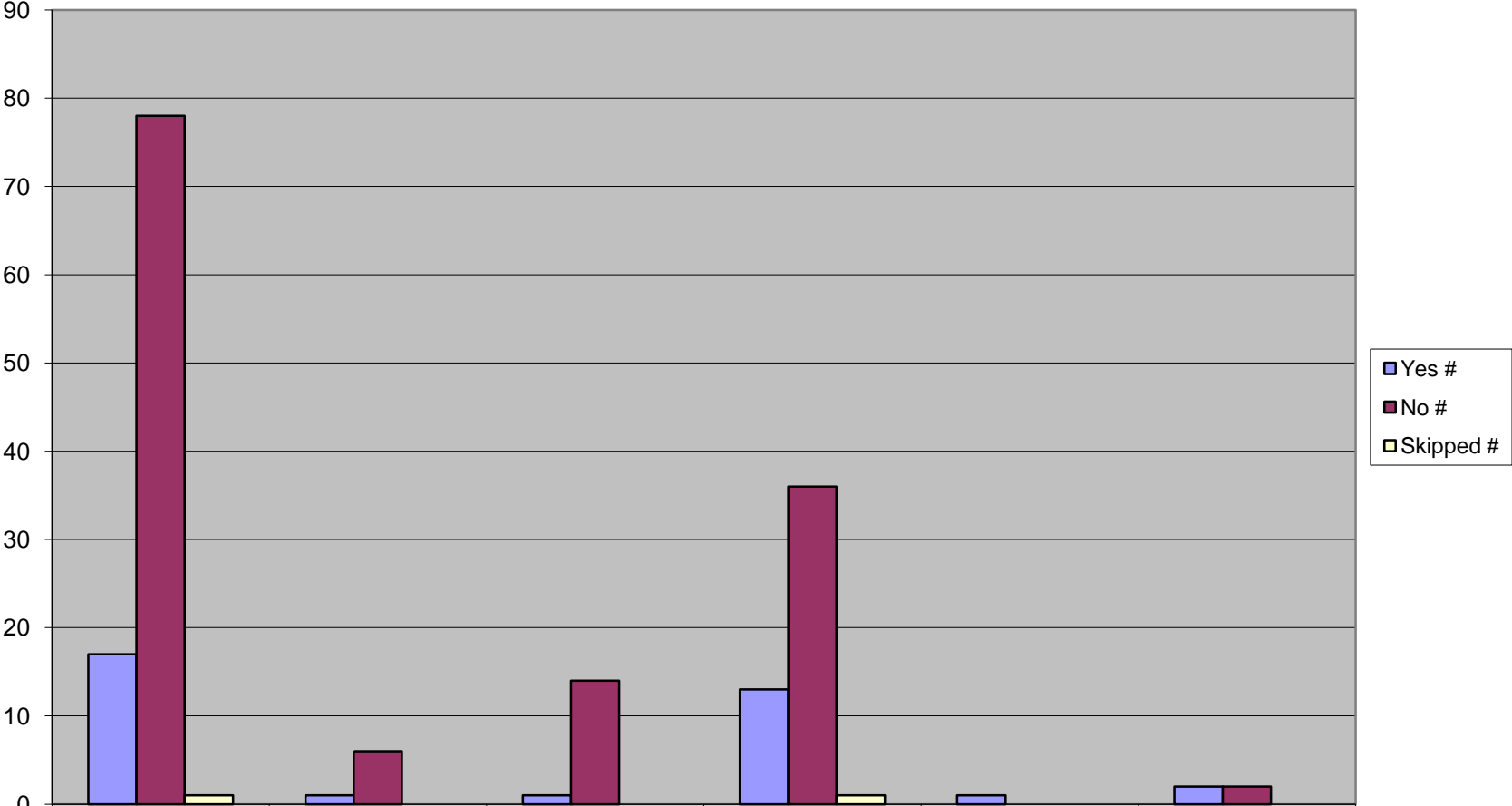


**Q-4: Do Any APD Testing?**



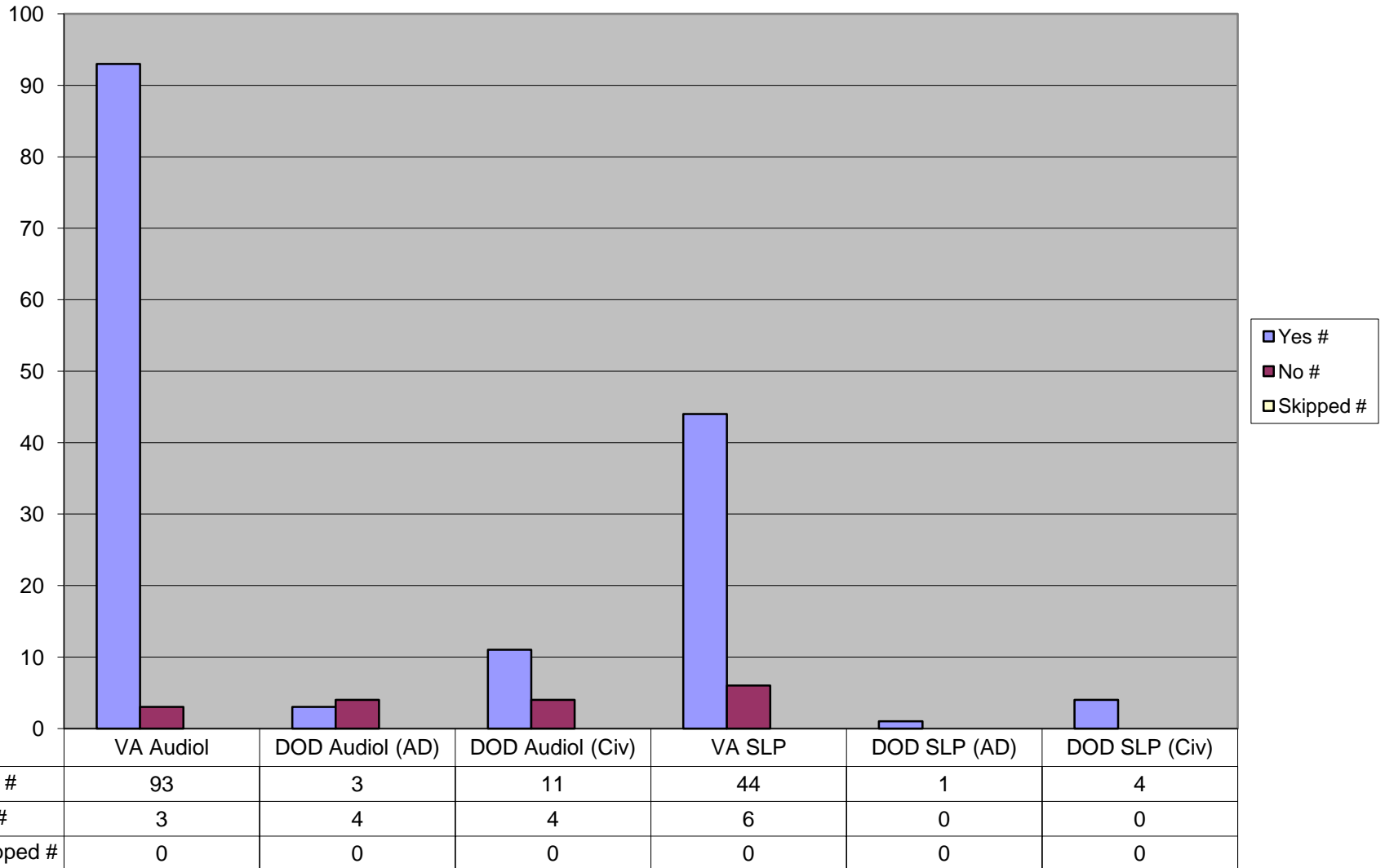
■ Yes #	28	2	7	9	0	3
■ No #	67	5	8	41	1	1
■ Skipped #	1	0	0	0	0	0

**Q-5: Do Any APD Treatment?**

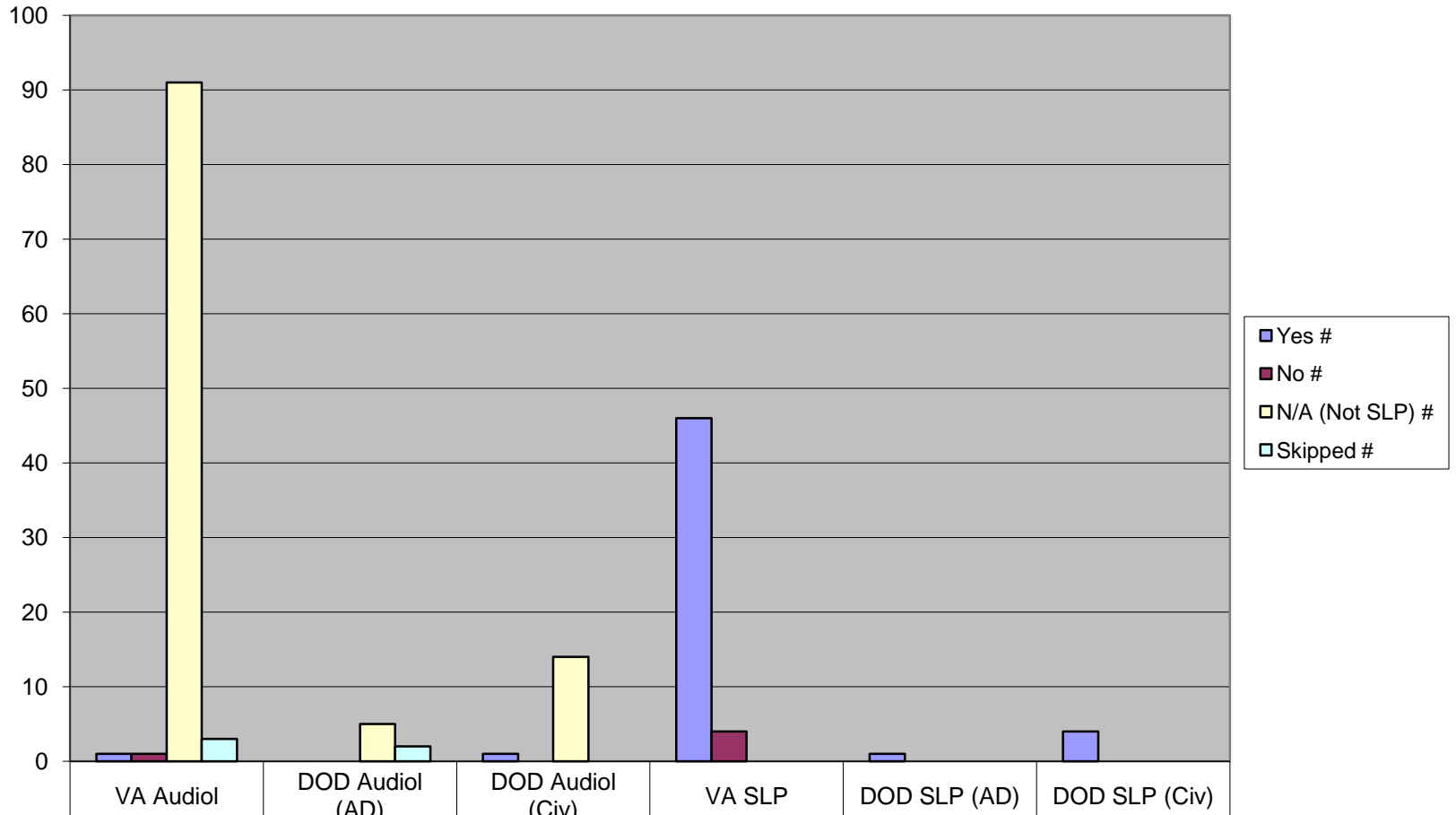


■ Yes #	17	1	1	13	1	2
■ No #	78	6	14	36	0	2
■ Skipped #	1	0	0	1	0	0

### Seeing Any OIF/OEF Vets w/ TBI (any level)?

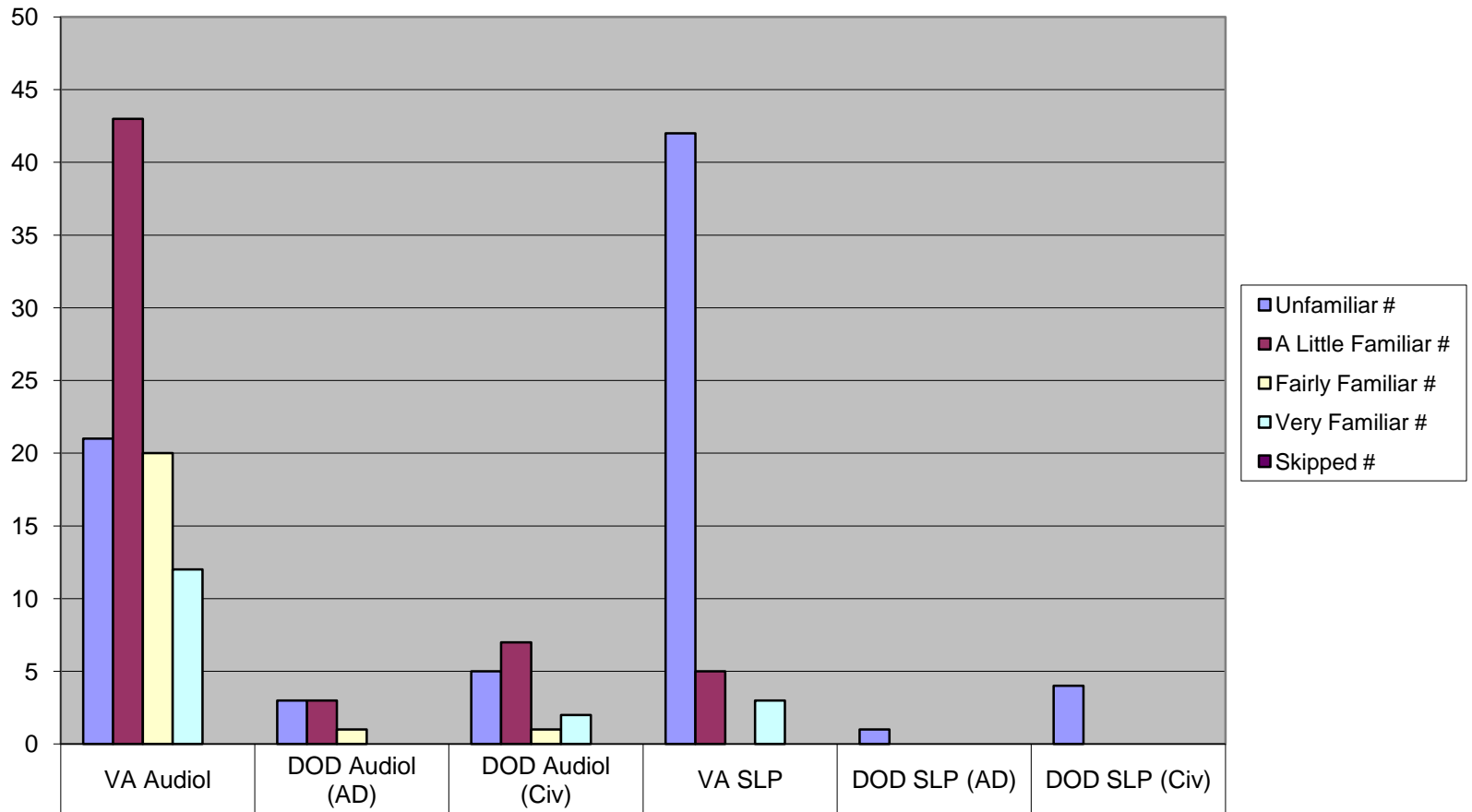


### Q-7: If SLP, Doing Cognitive Rehab w/ mTBI Vets



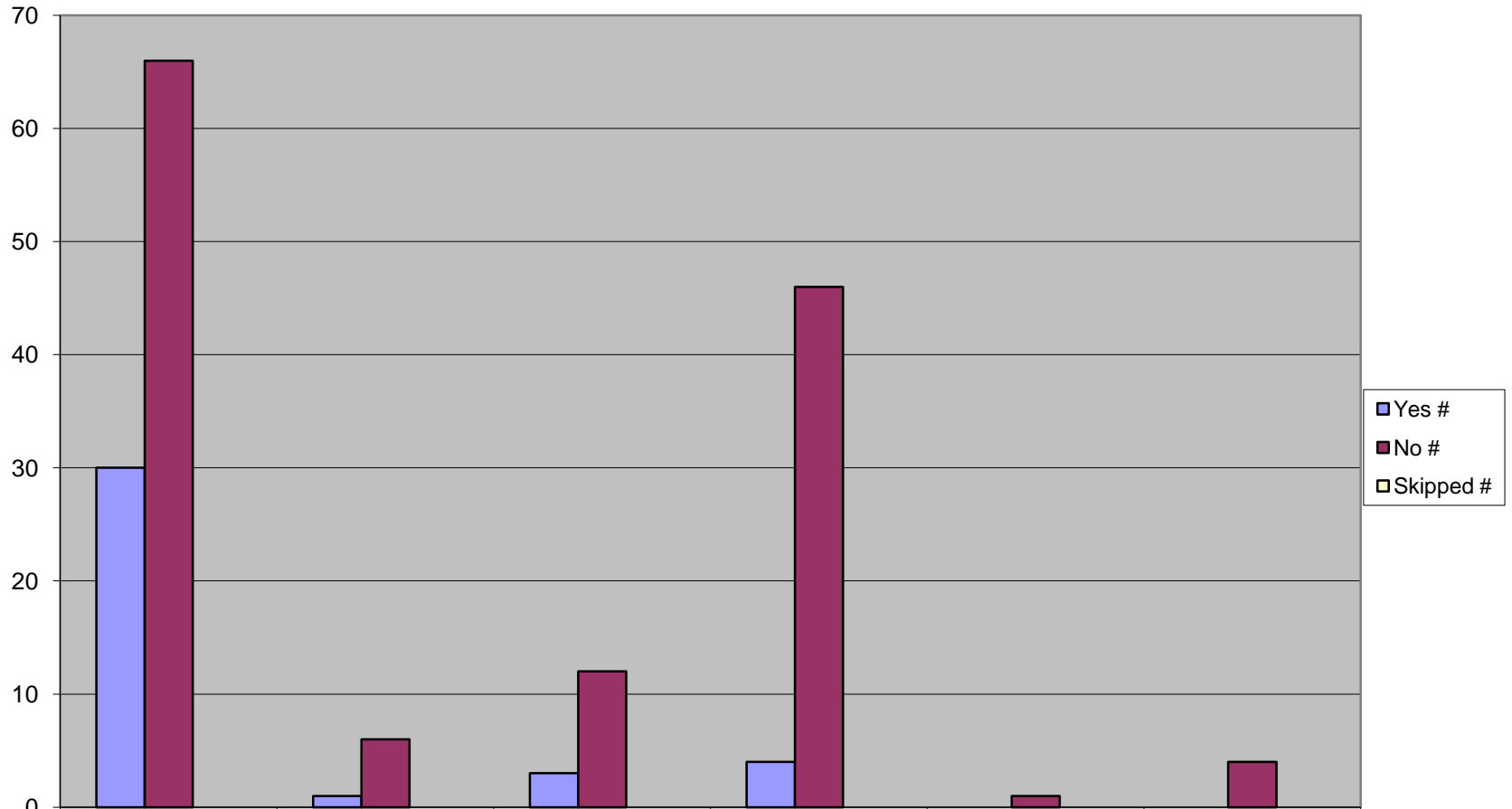
■ Yes #	1	0	1	46	1	4
■ No #	1	0	0	4	0	0
■ N/A (Not SLP) #	91	5	14	0	0	0
■ Skipped #	3	2	0	0	0	0

### Q-8: Familiarity w/ LACE



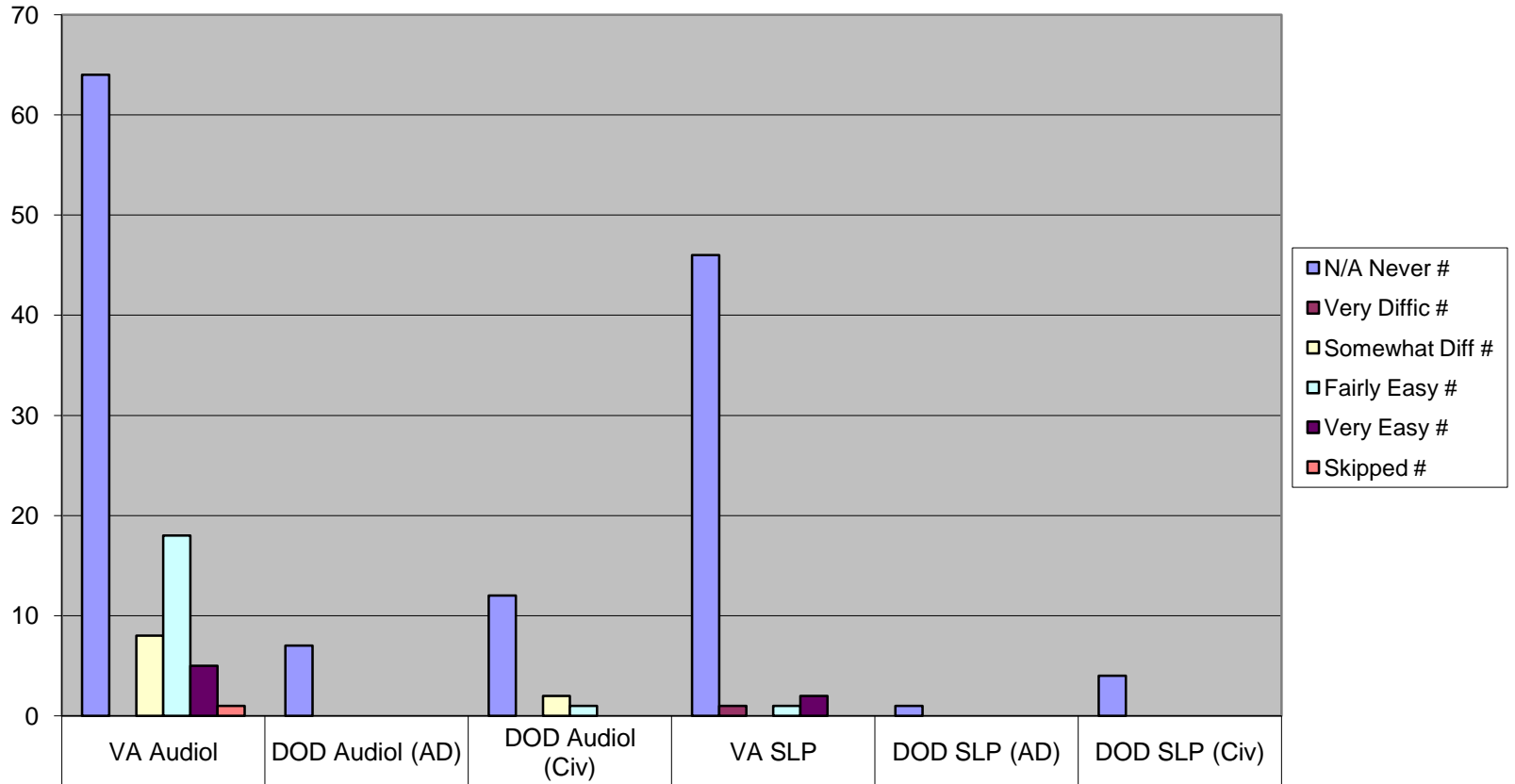
Unfamiliar #	21	3	5	42	1	4
A Little Familiar #	43	3	7	5	0	0
Fairly Familiar #	20	1	1	0	0	0
Very Familiar #	12	0	2	3	0	0
Skipped #	0	0	0	0	0	0

### Q-9: Ever Used LACE Training on a Patient?



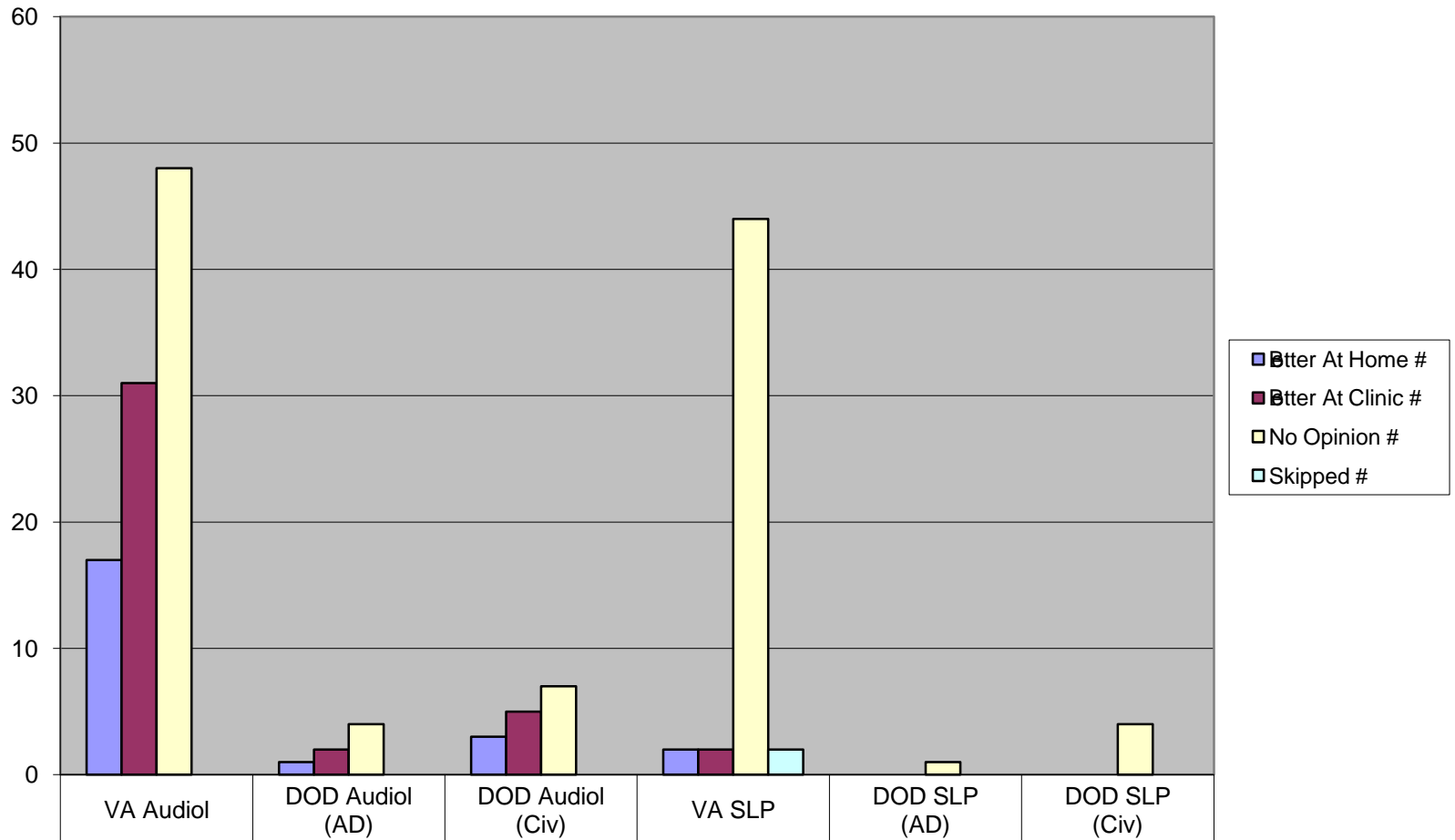
	VA Audiol	DOD Audiol (AD)	DOD Audiol (Civ)	VA SLP	DOD SLP (AD)	DOD SLP (Civ)
Yes #	30	1	3	4	0	0
No #	66	6	12	46	1	4
Skipped #	0	0	0	0	0	0

**Q-10: If Used LACE w/ pt, How difficult for pt to install/navigate/implement?**



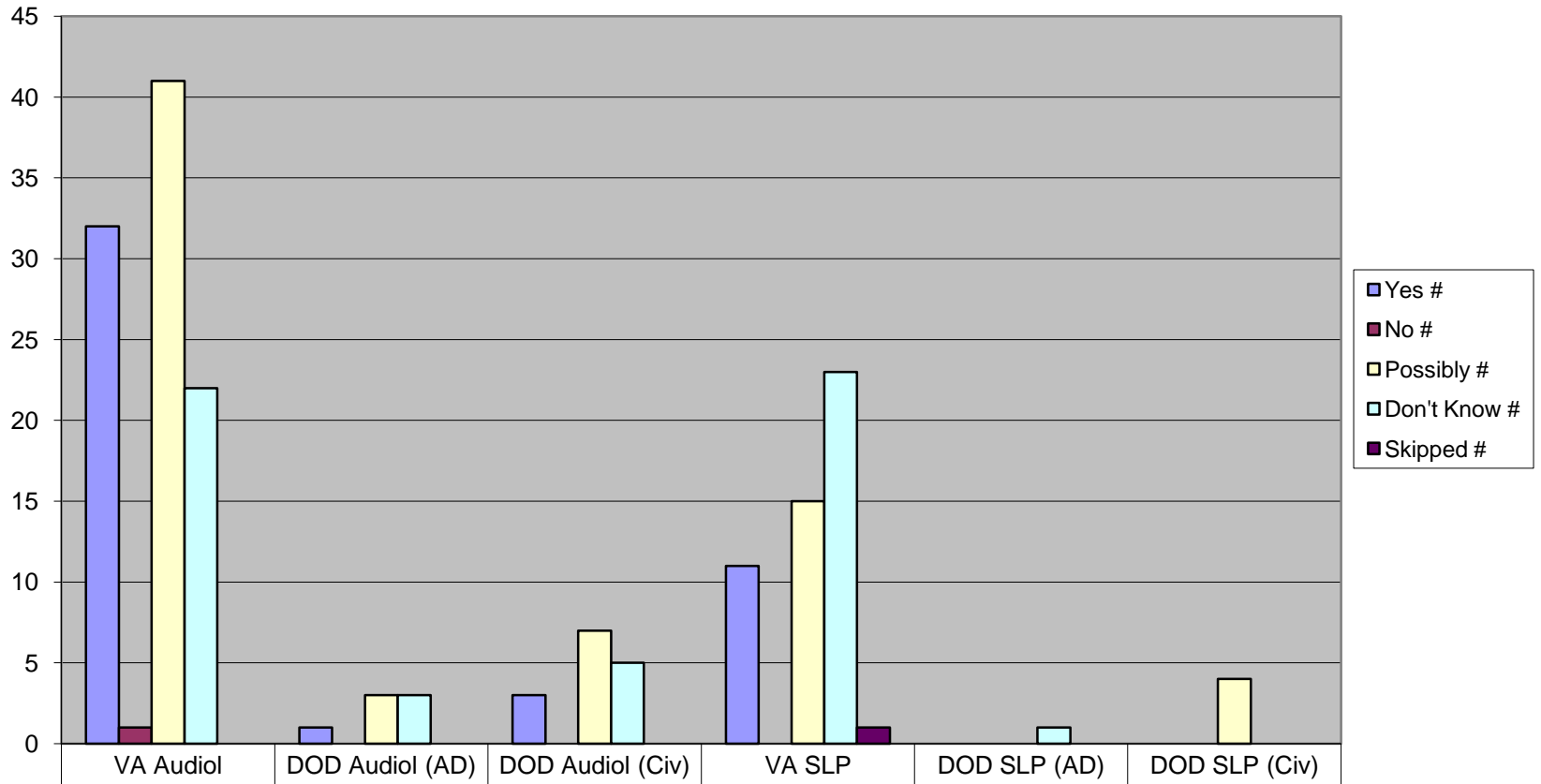
N/A Never #	64	7	12	46	1	4
Very Diffic #	0	0	0	1	0	0
Somewhat Diff #	8	0	2	0	0	0
Fairly Easy #	18	0	1	1	0	0
Very Easy #	5	0	0	2	0	0
Skipped #	1	0	0	0	0	0

**Q-11: Think LACE would be more effective if pt did at home or at clinic/lab w/coach?**



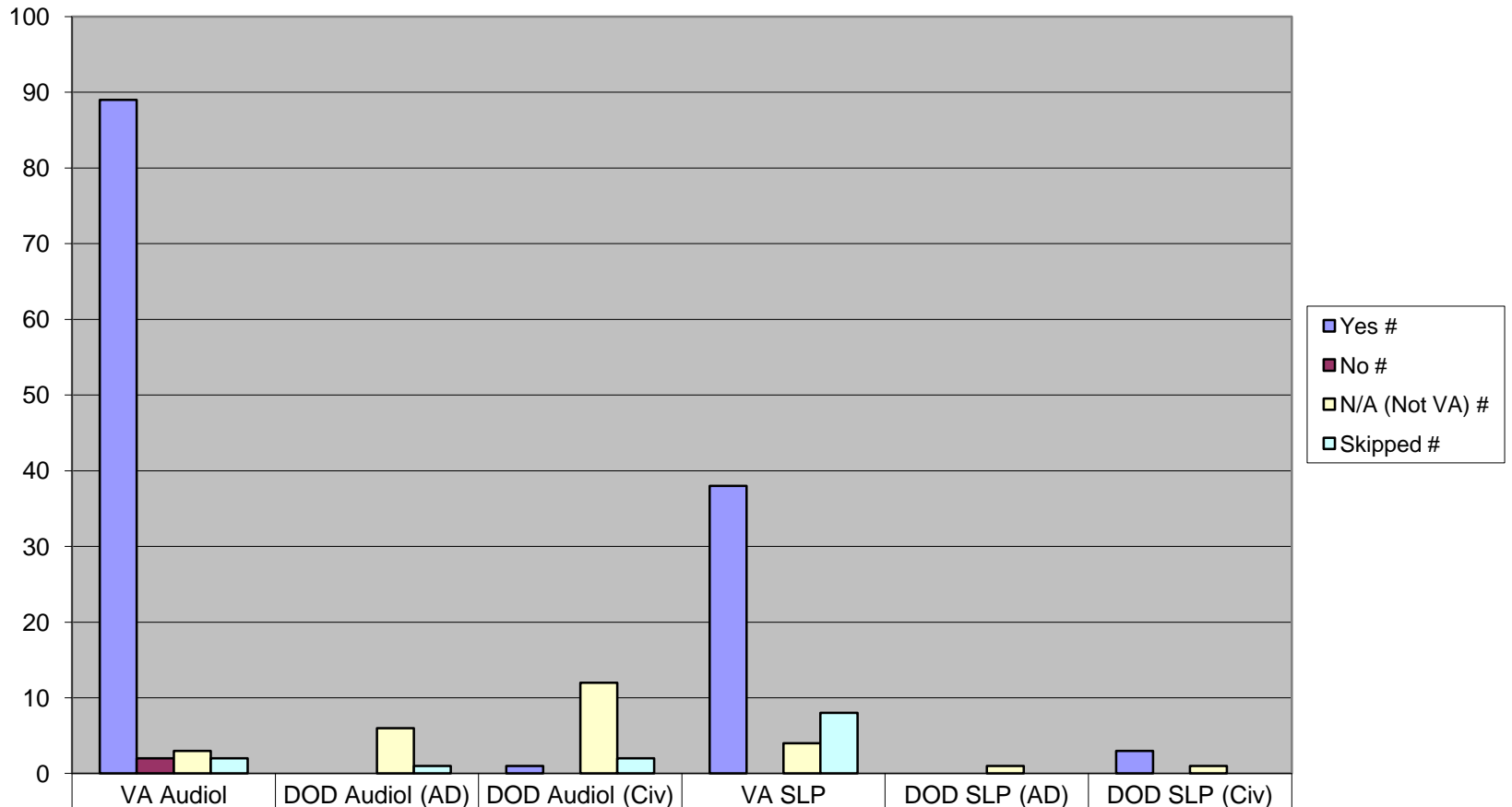
Better At Home #	17	1	3	2	0	0
Better At Clinic #	31	2	5	2	0	0
No Opinion #	48	4	7	44	1	4
Skipped #	0	0	0	2	0	0

**Q-12: Do you think LACE might have applicability in treating other cognitive complaints of mTBI Vets**



■ Yes #	32	1	3	11	0	0
■ No #	1	0	0	0	0	0
■ Possibly #	41	3	7	15	0	4
■ Don't Know #	22	3	5	23	1	0
■ Skipped #	0	0	0	1	0	0

**Q-13: (For VA Clinicians Only) If both versions of LACE were allowed, centrally funded, stocked by DALC so clinicians could order in ROES, Would you use it?**



Yes #	89	0	1	38	0	3
No #	2	0	0	0	0	0
N/A (Not VA) #	3	6	12	4	1	1
Skipped #	2	1	2	8	0	0

Q-13 (Would use LACE if NOT banned and if conveniently available)

Of the 50 responding VA SLPs:

84% were “**Unfamiliar**” re LACE

100% **Never** used LACE on patient

74% answered “**YES, Would Use**”

10% were “**A Little Familiar**”

20% **Had** used LACE on patient

100% (N=1) Skipped Question

80% **Never** Used LACE on patient

100% answered “**YES, Would Use**”

6% were “**Very Familiar**”

100% **Had** used LACE on patient

100% answered “**YES, Would Use**”

**OVERALL: 76% of responding VA SLPs answered “YES, Would Use”**

Q-13 (Would use LACE if NOT banned and if conveniently available):

Of the 96 responding VA **Audiologists**:

21.9% **Unfamiliar** re LACE

100% **Never** Used LACE on Patient

85.7% **“YES, Would Use”**

44.8% **A Little Familiar**

18.6% **Had** Used LACE on Patient

100% **“YES, Would Use”**

81.4% **Never** Used LACE on Patient

94.3% **“YES, Would Use”**

20.8% **Fairly Familiar**

60% **Had** Used LACE on Patient

100% **“YES, Would Use”**

40% **Never** Used LACE on Patient

87.5% **“Yes, Would Use”**

12.5% **Very Familiar**

83.3% **Had** Used LACE on Patient

80% **“YES, Would Use”**

16.7% **Never** Used LACE on Patient

100% **“YES, Would Use”**

**OVERALL: 91.7% of responding VA Audiologists answered “Yes, Would Use”**

## RECOMMENDATIONS:

1. A strong national push to obtain VA Privacy Office approval to allow use of standard PC/internet-based LACE with VA patients
2. Allow DALC to contract for and stock DVD-based LACE (NOW) and Standard PC/internet-based LACE (once Privacy Office approval obtained). This should be set up in such a way that VA audiologists (and SLPs?) can order directly in ROES without having to go through local Prosthetics section.
3. More research re exact training parameters which are most helpful for mTBI population. Neurotone could fairly easily modify LACE to create a version specifically for this population if these parameters are elucidated.

For more information go to:

[www.neurotone.com](http://www.neurotone.com)

## WARNING:

The DVD version of LACE will Not run successfully on some DVD players. It will either not run at all or else will start to run and then go into a continuous loop after user responds to the first phrase in first drill of the first session.

Gerry Kearby, Neurotone CEO, tells me it is DVD players made by manufacturers who do Not adhere to the DVD standard that will sometimes have problems.

I know of two manufacturers on the VA contract who will sell individual LACE DVDs at low price:

- Starkey

  - \$15.00 per DVD

  - P.O.C. is Amy in Government Services

- Phonak

  - \$25.00 per DVD

  - Contact Government Services

- There may be others