Sometimes it isn’t a day at a time when life is difficult, It is just a few minutes at a time. And if tomorrow isn’t better or the day after that…. a better day is not far off.

_Helen McIntosh – stroke survivor_
Disclosure

• Joint Commission Stroke Certification Surveyor
Objectives

- Brief Introduction to the problem – review of literature

- Post-Stroke Depression Study
  - Phase 1 of the study
    - Determine prevalence and incidence
    - Determine treatment rate
    - Evaluate correlation with caregiver
    - Evaluate relationship of PSD, stroke severity & disability
  - Phase 2 of the study- Quality improvement
    - Evaluate timing of assessment
    - Evaluate correlation with caregiver
    - Evaluate relationship of PSD, stroke severity & disability

- Data analysis

- Implications for Practice
Introduction – Prevalence, Risk, Complications

• Approximately 33% report depression symptoms
  ✓ Considerable variation in reported rate

• Risk of PSD
  ✓ Severity of stroke and physical disability
  ✓ History of depression
  ✓ Cognitive impairment

• PSD Complications after Stroke
  ✓ Negative impact on recovery
  ✓ Increased mortality (OR 1.22, (95% CI 1.02-1.47)
  ✓ Increased risk of stroke
  ✓ Higher hospital costs ($77,864 vs $47,790, p< 0.001)
  ✓ Increased risk of readmission
  ✓ Decreased quality of life

Hackett, et al., 2014
Paolucci, 2008
Hadidi, et al., 2011
Husaini et al., 2013
Robinson & Jorge, 2016
Prior history of Depression

Psychological
- Coping skills
- Personality traits
- Adverse life events
- Dependence
- History of depression

Stroke Severity & Physical Disability

Cognitive Impairment: Executive Dysfunction

Social
- Living alone
- Poor Social support

Biological
- Lesion location
- Biogenic amines
- Cytokines
- Genes

Modified by Pedrosa (2015)
Introduction - Challenges

• PSD is under-detected and under-treated
  ✓ Shorter length of stays
  ✓ Passive attitude toward diagnosis
  ✓ Concern about treatment side effects

• Clinicians face challenges to screening
  ✓ Optimal screening tool remains unclear
  ✓ Clinicians unclear when to screen
  ✓ Patient neurological impairments

El Husseini et al., 2012; Gaete & Bogousslavsky, 2008
Recovery from PSD

Major Depression

Minor Depression

Introduction – Treatment, Recommendations

• Antidepressants beneficial in treating PSD
  ✓ Improves motor recovery (p = 0.003)

• AHA/ASA Scientific Statement Paper
  ✓ Provides guidance for clinical practice and further research

Local Problem
Phase 1: Post Stroke Depression Screening Study
Pre-Study Practice

- **UNC HealthCare**
  - 900 bed Academic Medical Center
  - Comprehensive Stroke Center
  - NSICU – ISCU – 6NSH

- **PSD Screening**
  - PHQ-2

- **Problems**
  - Low screening rate: 23-58%
  - MDs unable to determine treatment plan
  - Perceived high report of depression symptoms during follow-up phone calls
“Show Me The Data”

- Literature review
  - Determine prevalence
  - Determine risk
  - Determine assessment tool

- IRB approved protocol
  - PHQ-9 – reliability/validity in stroke
    - Admission Day 60
    - Day 7 Day 90
    - Day 30 6 months
  - Compare patient to proxy
  - Evaluate PSD association, stroke severity and disability
Any Depression Symptoms During Admission

n=271

Ischemic (n=163)  ICH (n=47)  SAH (n=40)  TIA (n=21)

- Ischemic (n=163)
- ICH (n=47)
- SAH (n=40)
- TIA (n=21)

p=0.5

Minor: PHQ9 = 5-9
Moderate-Severe: PHQ9 = ≥ 10
New Cases

Total Number New Cases

Day 7: 35
Day 30: 29

P<0.0001
Phase 1: Treatment Rates

n=271

<table>
<thead>
<tr>
<th></th>
<th>Admission</th>
<th>Discharge</th>
<th>Day 7</th>
<th>Day 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment rates</td>
<td>28.7</td>
<td>21.4</td>
<td>30.2</td>
<td>29.7</td>
</tr>
</tbody>
</table>

p=0.0023

Treatment with antidepressants
Disability by Depression at Discharge

p = 0.016
### Pearson’s Correlation Between Patient PHQ-9 and Proxy PHQ-9

<table>
<thead>
<tr>
<th></th>
<th>Admit Patient</th>
<th>Day 7 Patient</th>
<th>Day 30 Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admit Proxy</td>
<td>0.49683 (moderate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>195</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 7 Proxy</td>
<td>0.47082 (weak moderate)</td>
<td>0.47082 (weak moderate)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>183</td>
<td>183</td>
<td></td>
</tr>
<tr>
<td>Day 30 Proxy</td>
<td></td>
<td>0.51820 (moderate)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>191</td>
<td></td>
</tr>
</tbody>
</table>
Practice Problem

Because of the

- high prevalence of PSD
- Low treatment rate
- Poor functional recovery
- Increased mortality

A practice change was necessary
Next Step - Phase 2: Depression Improvement Program in Stroke

Model for Evidence-Based Practice Change

- Assess the need for practice change
- Analyze the evidence
  - Literature
  - UNC data
- Design the practice change
  - DIPS
    - PHQ-9 by nursing
    - Patient/caregiver education
    - Treatment algorithm
    - Post D/C follow-up
- Implement and pilot change
- If successful integrate and maintain change

Project Objectives/Questions

- Increase screening and identification of PSD
- Increase treatment rate
- Evaluate timing of PSD screening
- Evaluate relationship between PSD, stroke severity, and disability
- Evaluate correlation between patient and proxy reported PHQ-9
- Evaluate staff satisfaction
Phase 2: Practice Change Study

- **Design:** Prospective observational

- **Setting:** UNC HealthCare
  - 6NSH – 32 bed acute care floor
  - Neurology service

- **Population:** n=85
  - Convenience sample
  - Strokes admitted to neurology service

- **Interventions:** Admission, Day 7 and Day 30
  - PHQ-9: patient and caregiver
  - NIHSS – stroke severity
  - Modified Rankin – functional outcome
  - Medication history
  - Medical history
EPIC Nursing Stroke Screening Tab
Houses Important Stroke Documentation

- Neurological Assessment (NIHSS)
- Dysphagia Screen
- DVT prophylaxis
- Depression Screen

<table>
<thead>
<tr>
<th>Evaluation: Nursing Bedside Dysphagia Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Findings</td>
</tr>
<tr>
<td>Screening Results</td>
</tr>
<tr>
<td>Depression Scale</td>
</tr>
<tr>
<td>Reported by</td>
</tr>
<tr>
<td>-PN</td>
</tr>
<tr>
<td>Little interest or pleasure in doing things</td>
</tr>
<tr>
<td>-PN</td>
</tr>
<tr>
<td>Feeling down, depressed, or hopeless</td>
</tr>
<tr>
<td>-PN</td>
</tr>
<tr>
<td>Depression Scale Score</td>
</tr>
<tr>
<td>-PN</td>
</tr>
<tr>
<td>Anti-Embolism Devices</td>
</tr>
<tr>
<td>Anti-Embolism Device Type</td>
</tr>
</tbody>
</table>
Strategies for Collaborative Success

- Involve stroke community advisory board
- Provide PSD education
  - Bulletin board
  - Articles in virtual library
- Increase physician engagement
  - Journal club
  - Grand round presentation
  - Involvement of stroke fellow
- Commitment from stroke team and department chair

Inter-professional collaboration
- Nurse leadership
- Engage unit nurse champions
- Nursing roundtables and staff meetings
  - Discuss concerns performing PHQ9 assessment
  - Develop EPIC workaround
  - NP real time education and assistance
- NP and research team assist with assessments
Overview of PHQ-9 Implementation/Build in EPIC

6NSH Roll Out with PHQ-9 Dot Phrase

March 2017

Change from dot phrase to flowsheet rows utilizing Stroke Research Tab

May 2017

Medical Center roll-out to ICU’s and Step-Downs using Stroke Research Tab

August 2017

Switch PHQ-2 for PHQ-9 in Stroke Screening Tab (system-wide approval)

February 2018
**EPIC Nursing Work Around: .strokephq9**

### Date of Assessment:
Adm 4.17.17

---

**Over the last 2 weeks, how often have you been bothered by any of the following problems? (use X to indicate your answer)**

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Little interest or pleasure in doing things</td>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Feeling down, depressed, or hopeless</td>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. Trouble falling/staying asleep, sleeping too much</td>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Feeling tired or having little energy</td>
<td>X</td>
<td>X</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. Poor appetite or overeating</td>
<td>X</td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down</td>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. Trouble concentrating on things, such as reading the newspaper or watching television</td>
<td>X</td>
<td>X</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual</td>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. Thoughts that you would be better off dead, or of hurting yourself in some way.</td>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Add Columns:**

---

**TOTAL:** 2

---

**PHQ-9 = 2 (4.17.17)**

76 y/o male with transient aphasia and right side weakness. Likely symptomatic carotid stenosis.

PMH: chronic back pain, HTN, chronic diastolic dysfunction, COPD, CAD (stents) and PTSD

Exam: Nonfocal

Txt plan:
- [x] CTA neck
- [ ] extravasation of contrast in b/l arms, monitor for compartment syndrome
- [x] PT/OT 5x (low intensity)
- [ ] Ceftriaxone (4/16 - ) for fever and tachycardia. UCx NG. F/up BCx.
- [ ] NPO for angio
- [ ] CEA on Wednesday with neurosurg

NF: NPO for angio
Monitor for pulses on the LEFT and RIGHT arms, monitor for pain with passive flexion/extension of the wrist.

If patient endorses paresthesias on the LEFT or RIGHT or if he loses his pulse or his arm becomes cold or he develops pain with passive flexion/extension of the wrist→ page vascular surgery or plastics for compartment syndrome.

O/N:

Last edited by Susan Elizabeth Wilson, NP on 04/17/17 at 1758
Overview of PHQ-9 Implementation/Build in EPIC

6NSH Roll Out with PHQ-9 Dot Phrase

Change from dot phrase to flowsheet rows utilizing Stroke Research Tab

Medical Center roll-out to ICU’s and Step-Downs using Stroke Research Tab

Switch PHQ-2 for PHQ-9 in Stroke Screening Tab (system-wide approval)

March 2017

May 2017

August 2017

February 2018
To access PHQ-9:
Go to Flowsheets -> Stroke Research Tab
*Use the ‘wrench’ tool so that the flowsheet is always visible
*Choose ‘No’ for ‘hide if no data’ (so you don’t have to wrench it in each time)
# Patient Health Questionnaire-9 (PHQ-9)

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all</th>
<th>Several Days</th>
<th>More than Half the Days</th>
<th>Nearly Every Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little interest or pleasure in doing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling down, depressed, or hopeless</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble falling or staying asleep, or sleeping too much</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling tired or having little energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Poor appetite or overeating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling bad about yourself or that you are a failure or have let yourself or your family down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble concentrating on things, such as reading the newspaper or watching television</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Moving or speaking so slowly that other people could have noticed. Or the opposite, being so fidgety or restless that you have been moving around a lot more than usual</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Thoughts that you would be better off dead, or of hurting yourself</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Total for each column
Add columns for total score

## PHQ-9 Scores and Proposed Treatment Actions*

<table>
<thead>
<tr>
<th>PHQ-9 Score</th>
<th>Depression Severity</th>
<th>Proposed Treatment Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>None-minimal</td>
<td>None</td>
</tr>
<tr>
<td>5-9</td>
<td>Mild</td>
<td>Watchful waiting; repeat PHQ-9 at follow-up</td>
</tr>
<tr>
<td>10-14</td>
<td>Moderate</td>
<td>Treatment plan, considering counseling, follow-up and/or pharmacotherapy</td>
</tr>
<tr>
<td>15-19</td>
<td>Moderately Severe</td>
<td>Active treatment with pharmacotherapy and/or psychotherapy</td>
</tr>
<tr>
<td>20-27</td>
<td>Severe</td>
<td>Immediate initiation of pharmacotherapy and, if severe impairment or poor response to therapy, expedited referral to a mental health specialist for psychotherapy and/or collaborative management</td>
</tr>
</tbody>
</table>

UNC Department of Neurology
Depression Screening/Treatment Algorithm in Stroke (DIPS)

PHQ-9 Assessment

0-4 Not Clinically Depressed
- No Treatment Necessary

5-9 Mild depression
- Consider Antidepressant Especially if Functional Deficits Present and Referral to Psychotherapy

10-14 Moderate ≥ 15 Severe Depression
- Start Antidepressant and Referral to Psychotherapy
<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Trade Name</th>
<th>Class</th>
<th>Dose Range</th>
<th>Starting Dose</th>
<th>Titration</th>
<th>Management Strategies</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citalopram</td>
<td>Celexa</td>
<td>SSRI</td>
<td>10 to 40mg</td>
<td>10mg daily</td>
<td>Increase by 10mg every 2 weeks</td>
<td>Safe in the elderly, good initial therapy, few interactions, $4 list, generic available</td>
<td>Use with caution if history of hyponatremia or GI bleed (all SSRIs). Nausea, dry mouth, somnolence, diarrhea, tremor</td>
</tr>
<tr>
<td>Escitalopram</td>
<td>Lexapro</td>
<td>SSRI</td>
<td>5 to 20mg</td>
<td>5mg daily</td>
<td>Increase by 5mg increments</td>
<td>Good in depression and anxiety</td>
<td>Dizziness, insomnia, GI disturbance, weight changes, decrease sex drive</td>
</tr>
<tr>
<td>Fluoxetine</td>
<td>Prozac</td>
<td>SSRI</td>
<td>10 to 80mg</td>
<td>10mg daily for 6 weeks</td>
<td>Increase by 10mg every 4 weeks if no response after 6 weeks</td>
<td>Good in forgetful patients, long half-life, $4 list, generic available</td>
<td>Nausea, Anorexia, Tremor, Insomnia, Anxiety</td>
</tr>
<tr>
<td>Paroxetine</td>
<td>Paxil</td>
<td>SSRI</td>
<td>10 to 40mg</td>
<td>10mg daily with food or QHS if sedating</td>
<td>Increase by 10mg every 2 weeks if no response after 3 weeks</td>
<td>Good in anxious patients (sedating)</td>
<td>Discontinue syndrome - must be tapered. Increased drug interactions. Vision changes, dizziness, anxiety, insomnia, loss of appetite, constipation, dry mouth, decreased sex drive</td>
</tr>
<tr>
<td>Sertraline</td>
<td>Zoloft</td>
<td>SSRI</td>
<td>25 to 200mg</td>
<td>25mg daily</td>
<td>Increase by 50mg every 2 weeks if no response after 3 weeks</td>
<td>Safe after MI, few interactions, generic available</td>
<td>GI disturbance, weight changes, insomnia, decreased sex drive, dizziness, dry mouth</td>
</tr>
<tr>
<td>Duloxetine</td>
<td>Cymbalta</td>
<td>SNRI</td>
<td>20 to 60mg</td>
<td>20mg daily</td>
<td>Increase to 20mg BID after 1 week. If no response after 3 weeks increase to 30mg BID</td>
<td>Good in neuropathic pain; expensive</td>
<td>Stress urinary incontinence, difficulty sleeping, diarrhea, dizziness, dry mouth, decrease appetite</td>
</tr>
<tr>
<td>Venlafaxine</td>
<td>Effexor</td>
<td>SNRI</td>
<td>37.5 to 225mg</td>
<td>37.5mg daily with food</td>
<td>Increase to 37.5mg BID if no response after 3 weeks (can be raised by 75mg every 4 days)</td>
<td>Good in anxious patients; can worsen HTN</td>
<td>Discontinuation syndrome, nausea, sexual dysfunction, (insomnia, anxiety, HTN - occur at high doses)</td>
</tr>
<tr>
<td>Mirtazapine</td>
<td>Remeron</td>
<td>Serotonin &amp; Norepinephrine Antagonist</td>
<td>15 to 45mg</td>
<td>7.5mg QHS</td>
<td>Increase by 7.5mg every 2 weeks if no response after 3 weeks</td>
<td>Increases appetite, weight gain - use in malnourished patients; good in geriatrics, less sexual dysfunction</td>
<td>Dizziness, strange dreams, vision changes, dry mouth, constipation, weight gain, dry mouth,</td>
</tr>
<tr>
<td>Bupropion</td>
<td>Wellbutrin</td>
<td>NDRI</td>
<td>100 to 300mg</td>
<td>100mg daily</td>
<td>Increase to 100mg BID if no response after 3 weeks</td>
<td>Stimulating, less sexual dysfunction, least weight gain</td>
<td>Dry mouth, Nausea, Insomnia, Constipation, Agitation, May lower seizure threshold</td>
</tr>
<tr>
<td>SR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Overview of PHQ-9 Implementation/Build in EPIC

- **6NSH Roll Out with PHQ-9 Dot Phrase**: March 2017
- **Change from dot phrase to flowsheet rows utilizing Stroke Research Tab**: May 2017
- **Medical Center roll-out to ICU’s and Step-Downs using Stroke Research Tab**: August 2017
- **Switch PHQ-2 for PHQ-9 in Stroke Screening Tab (system-wide approval)**: February 2018
**Stroke Sub-types**

**Phase 1 subjects**
- N=271
- Ischemic: 163
- ICH: 47
- SAH: 40
- TIA: 1

**Phase 2 subjects**
- N=85
- Ischemic: 68
- Hemorrhage: 15
- Subarachnoid: 1
- TIA: 1

*p*=0.26

*p*=0.46
Mean Age

Phase 1 Subjects

- Ischemic: 62.8
- ICH: 63.4
- SAH: 53.9
- TIA: 68

Phase 2 Subjects

- Ischemic: 65.7
- ICH: 65.4
- SAH: 53
- TIA: 76

p = 0.56

p = 0.89
Cases by Sex

Phase 1 Subjects

- Female (n=125): 53.64%
- Male (n=146): 46.1%
- p=0.71

Phase 2 Subjects

- Female (n=44): 51.8%
- Male (n=41): 48.2%
- p=0.57
Percent Cases by Race

Phase 1 Subjects

- Black (n=95)
- Hispanic (n=9)
- White (n=162)
- Other (n=5)

p = 0.67

Phase 2 Subjects

- Black (n=29)
- Hispanic (n=4)
- White (n=50)
- Other (n=2)

p = 0.27
Phase 2 Subjects

**Education**
- Some High School: 10.6%
- High School/GED: 16.5%
- Some College: 28.4%
- College: 34.1%
- Graduate: 10.6%

**Work History**
- Disabled: 10.6%
- Full-Time: 49.4%
- Homemaker: 5.9%
- Part-Time: 4.7%
- Retired: 23.5%
- Unemployed: 4.7%
- Student: 1.2%

p-value: 0.08
Percent Depression Symptoms Reported During Admission, Discharge Days 7 and 30

Minor Depression: PHQ9 = 5-9
Moderate to severe depression: PHQ9 = ≥ 10

- Admission: 22.4%
- Day 7 (p=0.053): 21.4%
- Day 30 (p=0.0046): 20.7%

New Cases:
- Admission: 24.7%
- Day 7 (p=0.053): 25%
- Day 30 (p=0.0046): 24.4%
### Documentation Rates for PHQ-9 by Nursing and Treatment Plan by Physicians in Discharge Summary

<table>
<thead>
<tr>
<th>Staff</th>
<th>Pre-Project</th>
<th>April (N=39)</th>
<th>May (n=26)</th>
<th>June (n=30)</th>
<th>July (n=36)</th>
<th>August (n=31)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing</td>
<td>23-58% (PHQ-2)</td>
<td>41%</td>
<td>69%</td>
<td>97%</td>
<td>81%</td>
<td>87%</td>
<td>81%</td>
</tr>
<tr>
<td>Physicians</td>
<td>0%</td>
<td>71%</td>
<td>69%</td>
<td>100%</td>
<td>94%</td>
<td>100%</td>
<td>94%</td>
</tr>
</tbody>
</table>
Pre and Post DIPS Intervention Treatment Rates

<table>
<thead>
<tr>
<th></th>
<th>Phase 1 Sample Treated (pre)</th>
<th>Phase 2 DIPS Sample Treated (Post)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission (p=0.0005)</td>
<td>28.7</td>
<td>37.5</td>
</tr>
<tr>
<td>Discharge (p=0.0002)</td>
<td>21.4</td>
<td>42.1</td>
</tr>
<tr>
<td>Day 7 (p=0.0007)</td>
<td>30.2</td>
<td>43.6</td>
</tr>
<tr>
<td>Day 30 (p&lt;0.0001)</td>
<td>29.7</td>
<td>40.5</td>
</tr>
</tbody>
</table>
## Treatment Rates at Discharge for ALL Stroke Patients

<table>
<thead>
<tr>
<th>Treatment Rates</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate to Severe Depression Symptoms (PHQ-9 ≥ 10)</td>
<td>100% (n=2)</td>
<td>60% (3 pts treated, 1 refused) (n=5)</td>
<td>80% (4 pts treated, 1 refused) (n=5)</td>
<td>80% (4 patients treated, 1 refused) (n=5)</td>
<td>67% (4 patients treated, 1 refused) (n=6)</td>
</tr>
<tr>
<td>Mild Depression Symptoms (PHQ-9 = 5-9)</td>
<td>12.5% (1 patient treated) (n=8)</td>
<td>0 (n=4)</td>
<td>57% (4 pts treated, 2 refused) (n=7)</td>
<td>60% (3 pts treated, 1 refused) (n=5)</td>
<td>100% (3 pts treated) (n=3)</td>
</tr>
<tr>
<td>Total</td>
<td>30% (n=10)</td>
<td>33% (n=9)</td>
<td>66.7% (n=12)</td>
<td>70% (n=10)</td>
<td>77.78% (n=9)</td>
</tr>
</tbody>
</table>
# Stroke Severity and Disability

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Stroke Severity</th>
<th>NIHSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 (10.6%)</td>
<td>No deficits</td>
<td>0</td>
</tr>
<tr>
<td>46 (54.1%)</td>
<td>Minor stroke</td>
<td>1-4</td>
</tr>
<tr>
<td>25 (29.4%)</td>
<td>Moderate stroke</td>
<td>5-15</td>
</tr>
<tr>
<td>4 (4.7%)</td>
<td>Moderate to severe stroke</td>
<td>16-20</td>
</tr>
<tr>
<td>1 (1.2%)</td>
<td>Severe to very severe stroke</td>
<td>≥ 21</td>
</tr>
</tbody>
</table>

- **Disability at Discharge – mRS ≥ 3**
  - At discharge: 35 subjects (41.2%)
  - At day 7: 31 (36.5%)
  - At day 30: 27 (31.8%)
Association of PSD and Functional Disability

- **Phase 1 sample (n=271)**
  ✓ (M=7.1, SD=5.5)(M=5.5, SD=5.3),
  (F(1,269)=5.66,p=0.018)

- **Phase 2 sample (n=85)**
  ✓ (M=6.9, SD=6.01)(M=5.4, SD=5.4),
  (F(1,83)=1.72,p=0.19)

- **Combined samples (n=356)**
  ✓ (M=7.1, SD=5.63)(M=5.4, SD=5.3),
  (F(1,354)=7.40,p=0.0068)
## PSD and Discharge Location: Combined Sample (n=356)

<table>
<thead>
<tr>
<th>Discharge Location</th>
<th>Total</th>
<th>Depressed</th>
<th>Not Depressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>252 (70.8%)</td>
<td>109 (43.3%)</td>
<td>143 (56.8%)</td>
</tr>
<tr>
<td>AIR</td>
<td>78 (21.9%)</td>
<td>42 (53.9%)</td>
<td>36 (46.2%)</td>
</tr>
<tr>
<td>SNF</td>
<td>26 (7.3%)</td>
<td>18 (69.2%)</td>
<td>8 (30.8%)</td>
</tr>
</tbody>
</table>

p=0.018
Timing of Screening

- **73 subjects**
  - Visit 1 PHQ-9 = 1.08 days (26 hours)
  - Visit 2 PHQ-9 = 2.23 days (55 hours)

- **Significant difference in timing of PHQ-9 scores**
  - Visit 1: (M=4.59, SD=5.8)
  - Visit 2: (M=6.16, SD=5.8)
  - t(72) = -2.93, p = 0.0046
## Pearson’s Correlation Between Patient PHQ-9 and Proxy PHQ-9

<table>
<thead>
<tr>
<th></th>
<th>Admit Patient</th>
<th>Day 7 Patient</th>
<th>Day 30 Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Admit Proxy</strong></td>
<td>0.49374</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(moderate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Day 7 Proxy</strong></td>
<td></td>
<td>0.63412</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(moderate</td>
<td>(strong)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>strong)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Day 30 Proxy</strong></td>
<td></td>
<td></td>
<td>0.73017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(strong)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70</td>
</tr>
</tbody>
</table>
**Staff Feedback**

- **Physicians**
  - ✓ Felt comfortable with DIPS algorithm and treatment recommendations
  - ✓ Majority did not discuss PSD with patients

- **Nurses**
  - ✓ Majority did discuss PSD with patients and families
  - ✓ Majority do not report PHQ-9 score at shift change
  - ✓ Continued to believe physicians not concerned with PSD

- **Needs**
  - ✓ Ongoing education
  - ✓ Improve documentation in EPIC
  - ✓ Barrier to assessing aphasic or cognitively impaired patients
Overview of PHQ-9 Implementation/Build in EPIC

- **6NSH Roll Out with PHQ-9 Dot Phrase**
  - March 2017

- **Change from dot phrase to flowsheet rows utilizing Stroke Research Tab**
  - May 2017

- **Medical Center roll-out to ICU’s and Step-Downs using Stroke Research Tab**
  - August 2017

- **Switch PHQ-2 for PHQ-9 in Stroke Screening Tab (system-wide approval)**
  - February 2018
<table>
<thead>
<tr>
<th>Current Screenshot in EPIC in Stroke Tab</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extinction and Inattention</strong> (11.) (Formerly Neglect)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td><strong>Pre-Evaluation:</strong> Nursing Bedside Dysphagia Screening</td>
</tr>
<tr>
<td>Present Feeding Status</td>
</tr>
<tr>
<td>Consciousness</td>
</tr>
<tr>
<td>History of Aspiration / Dysphagia</td>
</tr>
<tr>
<td>Control of Secretions</td>
</tr>
<tr>
<td>Voice Quality</td>
</tr>
<tr>
<td>Speech</td>
</tr>
<tr>
<td>Spontaneous Cough</td>
</tr>
<tr>
<td>Tracheostomy</td>
</tr>
<tr>
<td>Facial Symmetry</td>
</tr>
<tr>
<td>Pass or Fail?</td>
</tr>
<tr>
<td><strong>Evaluation:</strong> Nursing Bedside Dysphagia Screening</td>
</tr>
<tr>
<td>Assessment Findings</td>
</tr>
<tr>
<td>Screening Results</td>
</tr>
<tr>
<td><strong>PHQ-9:</strong> Over the last 2 weeks, how often have you been bothered by any of the following problems?</td>
</tr>
<tr>
<td>Reported by</td>
</tr>
<tr>
<td>Little interest or pleasure in doing things</td>
</tr>
<tr>
<td>Feeling down, depressed, or hopeless; (age 12-17) Feeling down, depressed, irritable, or</td>
</tr>
<tr>
<td>Trouble falling or staying asleep, or sleeping too much</td>
</tr>
<tr>
<td>Feeling tired or having little energy</td>
</tr>
<tr>
<td>Poor appetite or overeating; (age 12-17) Poor appetite, weight loss or overeating</td>
</tr>
<tr>
<td>Feeling bad about yourself - or that you are a failure or have let yourself or your family</td>
</tr>
<tr>
<td>Trouble concentrating on things, such as reading the newspaper or watching television;</td>
</tr>
<tr>
<td>Moving or speaking so slowly that other people could have noticed. Or the opposite -</td>
</tr>
<tr>
<td>Thoughts that you would be better off dead, or of hurting yourself in some way</td>
</tr>
<tr>
<td>Clinic Collected PHQ-9 Total Score</td>
</tr>
<tr>
<td><strong>PHQ-9 Total Score Depression Severity:</strong></td>
</tr>
<tr>
<td>PHQ-9 Total Score Depression Severity:</td>
</tr>
</tbody>
</table>
Implications for Practice

- Improved detection and treatment
- May use caregiver as proxy
- Screen patients later in admission
- Continued PSD education
- Improve documentation
Questions?