

Notes to Viewers

- The following modifications were made to these slides since the presentation on 11 March 2009:
 - The minutes on Slide #27 were corrected.
 - The left axis on Slide #58 was corrected.
 - The left axis on Slide #72 was added.
 - The ADL Index Slides (#78-84) are now consistent with the planned “Alternative” range of 0-16.
 - The column heading on Slide #94 was corrected.
 - The Special Populations handout that was included in your meeting folder was added as Appendix A.
 - The additional facility and resident sampling information requested by participants during the TEP meeting was added as Appendix B. This information was provided by Dave Malitz.

STRIVE

Staff Time and Resource Intensity Verification

Technical Expert Panel Meeting

March 11, 2009

STRIVE@IFMC.ORG

Welcome & Introductions

- Jean Eby, Project Director,
Iowa Foundation for Medical Care
- Kathy Langenberg, R.N.,
STRIVE Operations Manager,
Iowa Foundation for Medical Care
- Erik Thompson, Program Director,
Iowa Foundation for Medical Care

Welcome & Introductions

- Brant Fries, Ph.D., STRIVE Analytic Task Lead, University of Michigan
- Bob Godbout, Ph.D., STRIVE Survey Design Consultant, Stepwise
- Dave Malitz, Ph.D., STRIVE Survey Design Consultant, Stepwise
- Dave Oatway, R.N., M.P.H., STRIVE Database Manager, CareTrack

Welcome & Introductions

- TEP Participant introductions
- Procedures for the day
- Format
- Amenities
- Phones – place on vibrate
- End at 4:00 p.m.
- Contact – STRIVE@IFMC.ORG

Agenda

- X Welcome & Introductions
- Study Design / Sampling / Data Collection
- Assembling the Analytic Dataset
 - Therapy Imputation
- Preliminary Analytic Results
 - Special Care Units
 - Special populations
- Refining RUGs
- Drug Costs
- Recap / Next Steps
- Observer Comment Period
- Adjourn

STRIVE Background Review

- National nursing home time study
 - Data Collection – Spring '06 Summer '07
 - Staff Time
 - Nursing, therapy, and ancillary staff time
 - Personal digital assistants (PDAs) with paper tool backup
 - Assessment data
 - MDS 2.0 with one-third “grayed out”
 - STRIVE MDS addendum
 - Analysis – ongoing

Sampling Goals

- Probability-based sample that can be generalized to the nation
 - Random selection of facilities and residents
 - Every member of population has a known probability of selection
- Over-sample important special populations to support case mix analyses

Sample Design

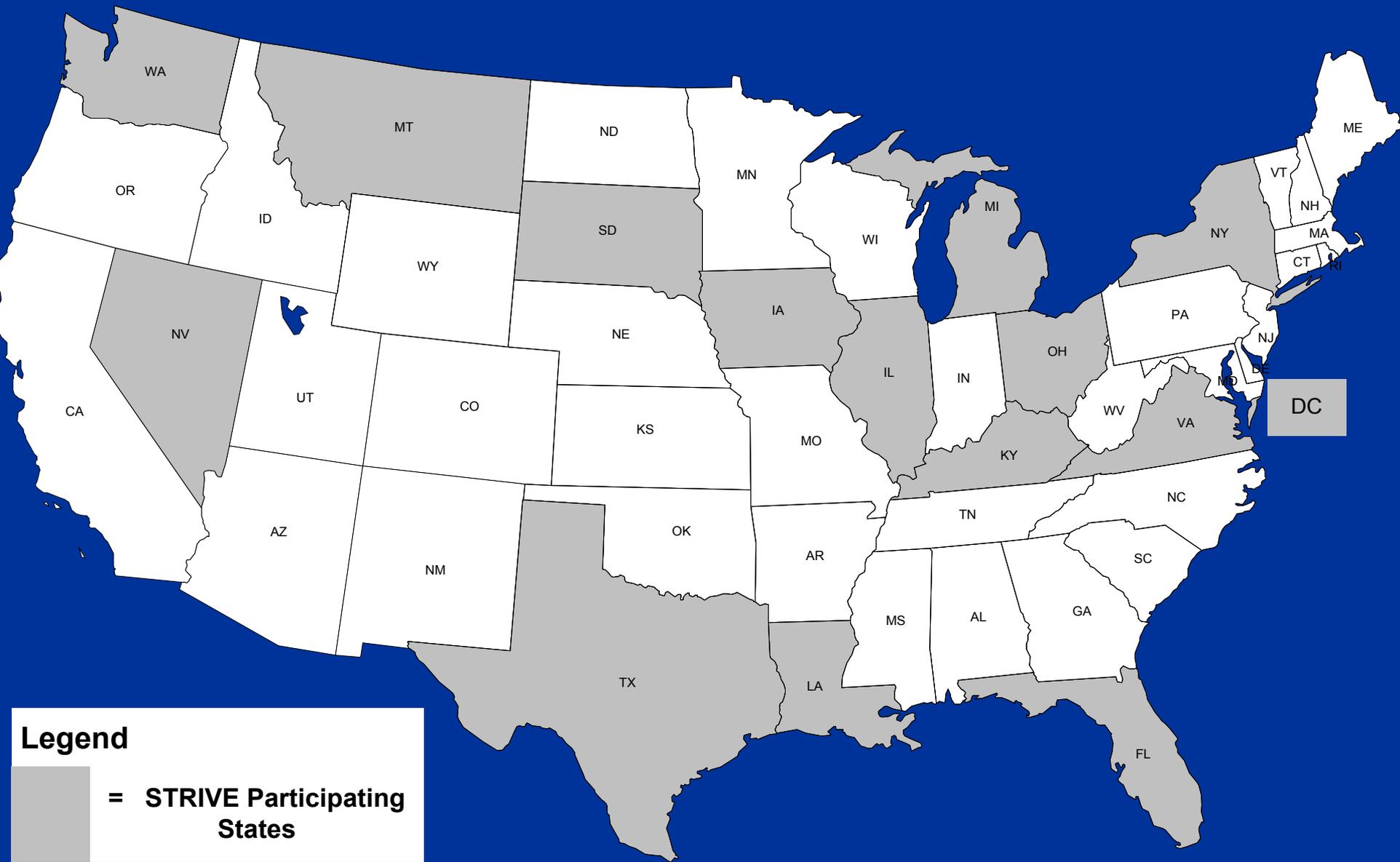
- Two-stage cluster sample within each state
 - Stratified random sample of facilities (selected with probability proportional to size)
 - Selected unit(s) within each facility for inclusion in time study
- Strata (over-sample special populations)
 - Hospital-based
 - High concentration of ventilator residents
 - (12%+ ventilator/ respirator residents)
 - High concentration of HIV residents
 - (10%+ HIV residents)
 - High concentration of Medicare residents
 - (20%+ Part A residents)
 - All other facilities

Sampling Procedures

- Define population
 - Enlist states to participate in study
 - Create sampling frame of certified facilities
 - Use QI/QM and OSCAR deficiency data to eliminate worst-performing facilities (5-10%)
 - Apply geographic restrictions (in four states)
 - Classify facilities into strata

Sampling Procedures (cont)

- Select initial sample
 - Determine target number of facilities for each stratum within state
 - Select over-sample within each stratum
 - Sample lists reviewed by State agencies and CMS regional offices to identify
 - Additional poor quality facilities
 - Facilities with special problems (emergencies, recent change of ownership, etc.)



Facility Sample Fulfillment

| Population Group | Facilities | Percent of Total |
|---|-------------------|-------------------------|
| Certified facilities -15 states | 6,493 | 100.0% |
| Data exclusions (poor quality) | 563 | 8.7% |
| Statewide eligible | 5,930 | 91.3% |
| Facilities outside of geographic study areas (FL, IL, LA, TX) | 1,153 | 17.8% |
| Eligible facilities in study areas | 4,777 | 73.6% |

Facility Sample Fulfillment

| Eligible Facilities by Stratum | | |
|--------------------------------|------------|---------|
| Stratum | Facilities | Percent |
| All Facilities | 4,777 | 100.0% |
| Hospital-based | 368 | 7.7% |
| Hi-Vent | 52 | 1.1% |
| Hi-HIV | 15 | 0.3% |
| Hi-Part A | 793 | 16.6% |
| Other | 3,549 | 74.3% |

Facility Sample Fulfillment

| State/Regional Office Review Results | | |
|---|-------------------|----------------|
| Facility Group | Facilities | Percent |
| Randomly selected for review | 837 | 100.0% |
| Eliminated by State agencies/ CMS regional offices | 100 | 11.9% |
| Remaining: eligible for invitation | 737 | 88.1% |

Facility Sample Fulfillment

| Facility Participation | | |
|-----------------------------------|------------|---------|
| Facility Group | Facilities | Percent |
| Invited to participate | 523 | 100.0% |
| Declined to participate | 309 | 59.1% |
| Agreed to participate | 214 | 40.9% |
| Facilities with completed studies | 205 | 39.2% |

Sampling Weights

- Sample weights correct for unequal selection probabilities
- Probability of selection for each facility is product of:
 - A) Probability facility selected for initial list
 - B) Probability facility selected for inclusion in study
 - C) Probability each resident within facility included in study
- Sampling weight = inverse of probability, scaled to sample
- Assumes various factors are random (e.g., facility refusals, unit selection)
- Comparison with population on selected variables increases confidence in sampling procedures

Margin of Error: Mean Staff Time

| Subgroup | 95/97 Study | STRIVE Projected | STRIVE Actual |
|--------------------------------------|-------------|------------------|---------------|
| <i>Medicare Residents</i> | | | |
| Nursing time | ±4.5% | ±3.1% | ±3.0% |
| Therapy time | ±3.1% | ±2.2% | ±2.5% |
| <i>Non-Medicare Residents</i> | | | |
| Nursing time | ± 2.1% | ±1.3% | ± 2.4% |
| Therapy time | ±12.5% | ±7.8% | ±4.2% |

Note: Margins of error reflect expected sampling error for mean staff time with the effect of case mix removed. Margins of error based upon 95% confidence interval.

Procedures in Facility

- Staff Time Measurement
 - Collected using PDA (2 days nursing, 3 days therapy) and paper tools (7 days therapy)
 - All nursing, therapy, and ancillary staff
- Predetermined protocol for unit selection based on facility size selected entire facility or entire units
 - Specialty population units, if applicable
 - Hi-Part A units
 - Remaining units
 - Some “supplemental units”
- STRIVE MDS
 - Partial MDS 2.0 and Addendum

Agenda

- X Welcome & Introductions
- X Study Design / Sampling / Data Collection
 - **Assembling the Analytic Dataset**
 - Therapy Imputation
 - Preliminary Analytic Results
 - Special Care Units
 - Special populations
 - Refining RUGs
 - Drug Costs
 - Recap / Next Steps
 - Observer Comment Period
 - Adjourn

Assembling Analytic Database

- Post-Collection Additions
 - Wage weights
 - Using MDS Repository data
 - Identifying Part A residents
 - Drug data
- Data Cleaning
 - Final sample determination
 - Determining therapy times

Final Sample Determination: Residents Used for CMI

10,486 Study Residents



10,136 Study Residents
with MDS/RPT



9,721 Study Residents with MDS/RPT
and 48 hrs of Nursing Staff Time

Therapy Adjustments

Adjusting Therapy Times

- Data collected with paper (vs. PDAs) appears incomplete
 - Less supervision
 - Often different staff on weekends
- Did not match national distribution of RUG-III rehabilitation groups

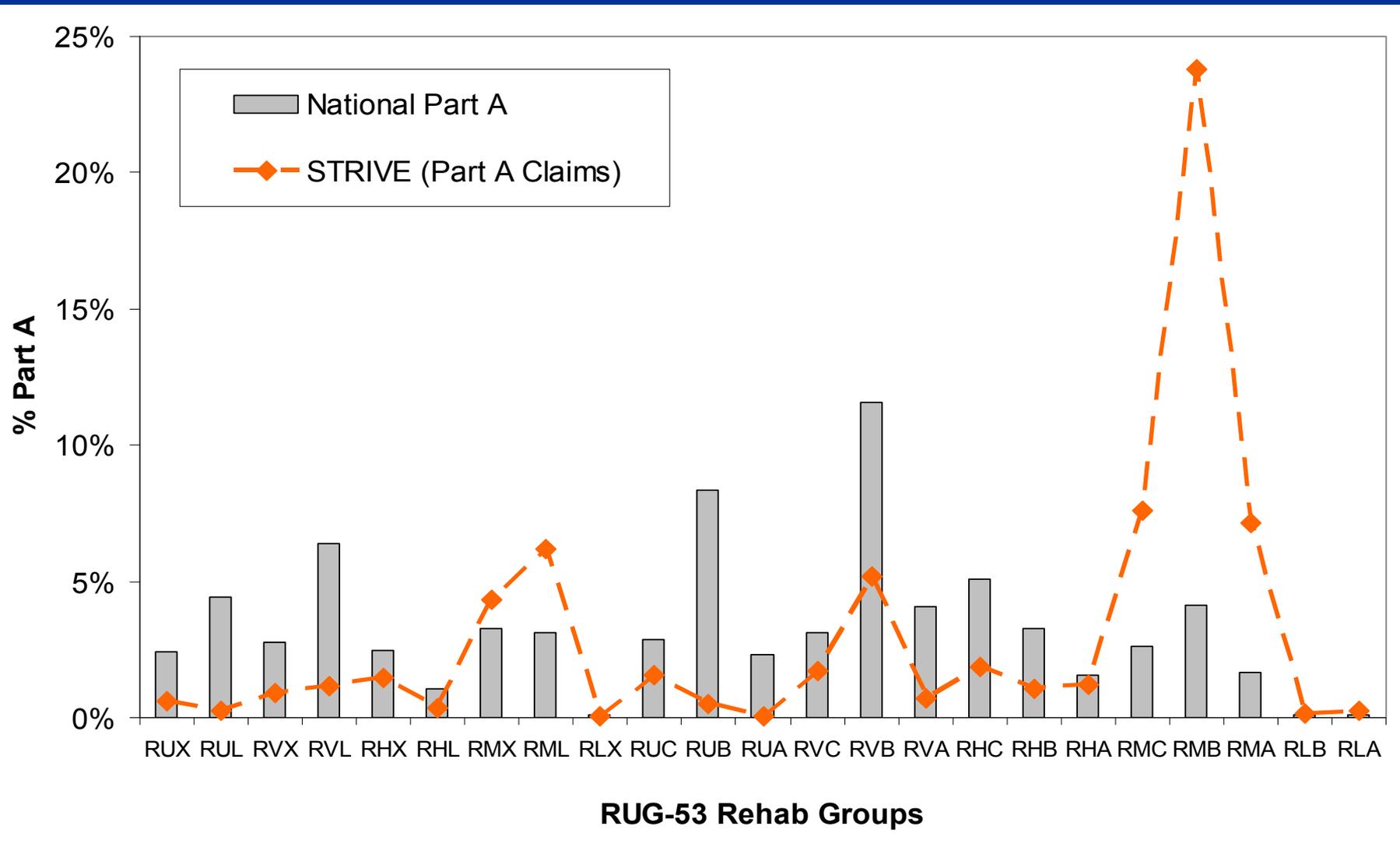
Adjusting Therapy Times

| Collection Schedule | N | Tu | We | Th | Fr | Sa | Su | Mo | Tu |
|---------------------|------|-----|-----|-----|-----|----|----|-----|----|
| A | 8012 | 26% | 25% | 22% | 12% | 2% | 1% | 12% | -- |
| B | 1193 | 25% | 27% | 26% | 12% | 1% | 0% | 10% | -- |
| C | 516 | -- | 30% | 26% | 21% | 1% | 1% | 12% | 9% |
| Total | 9721 | 24% | 26% | 23% | 13% | 2% | 1% | 12% | 1% |

Coding: **PDA data collection** Paper data collection

Note: Analysis includes only individuals present for full 7 days of study

Fitting National Distribution: Part A Claims Unadjusted Therapy Times



Determining Therapy Times: Adjustment Method

- Resident time for each discipline:
 - Physical Therapy, Occupational Therapy, Speech-Language Pathology
- Calculate **average therapy session** based on PDA days with ≥ 15 minutes
- Estimate number of **days of therapy**
 - Inflate PDA days with ≥ 15
 - Add non-PDA weekend days with ≥ 15 minutes
- Calculate **adjusted weekly therapy minutes**
 - Adjusted weekly therapy minutes =
(Average therapy session) x (Days of therapy)

Determining Therapy Times

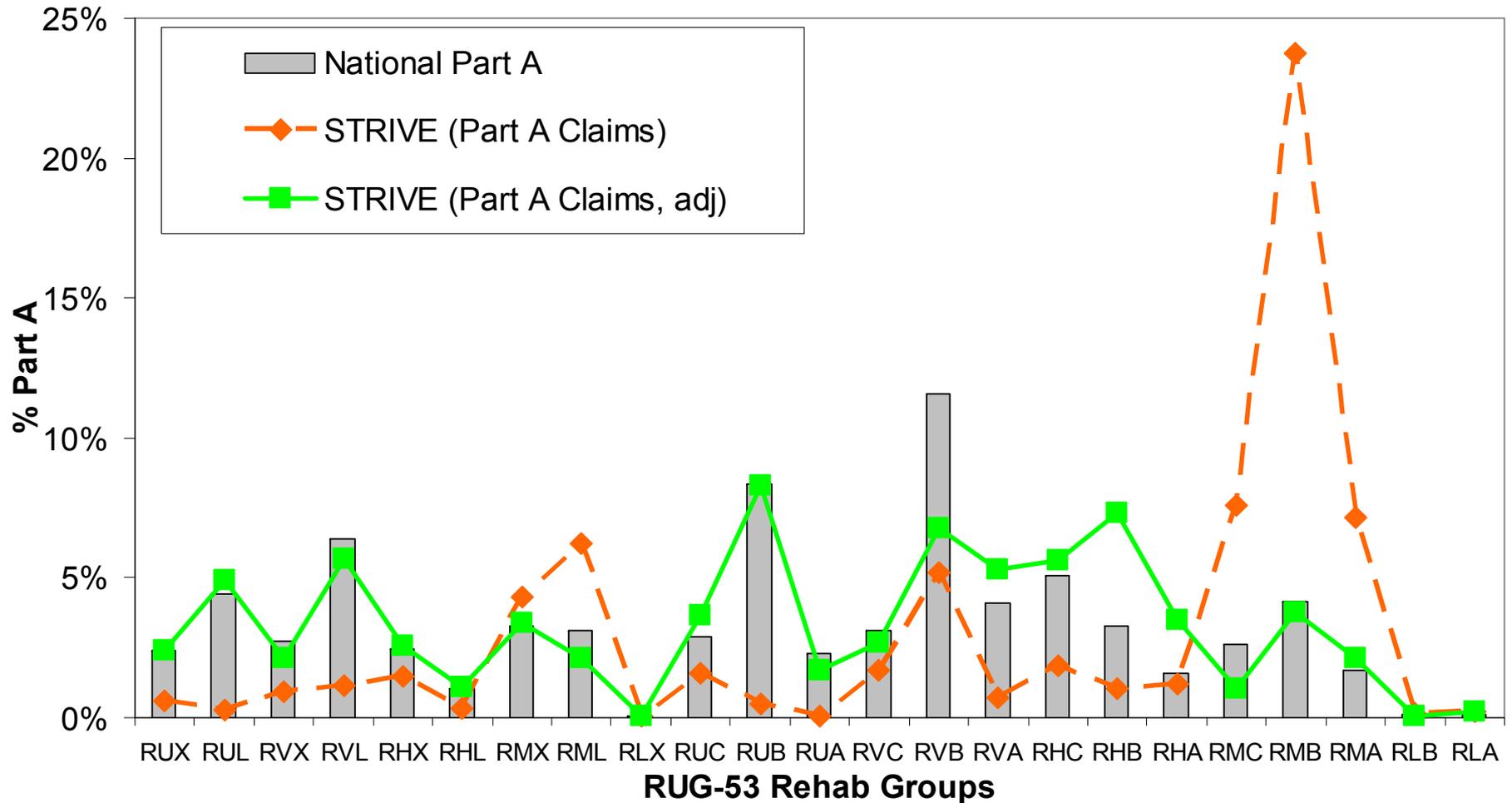
Example

| | Tu | We | Th | Fr | Sa | Su | Mo | Total Time | Avg Therapy session | Days 15+ min |
|-----------------|----|----|----|----|----|----|----|------------|---------------------|--------------|
| Observed | 45 | 40 | 40 | 0 | 0 | 0 | 0 | 125 | 42 | 3 |
| Assumed | X | X | X | X | 0 | 0 | X | 210 | 42 | 5 |

ESTIMATED DAYS of THERAPY* = 5

ADJUSTED WEEKLY MINUTES = 5 x 42 = 210 min

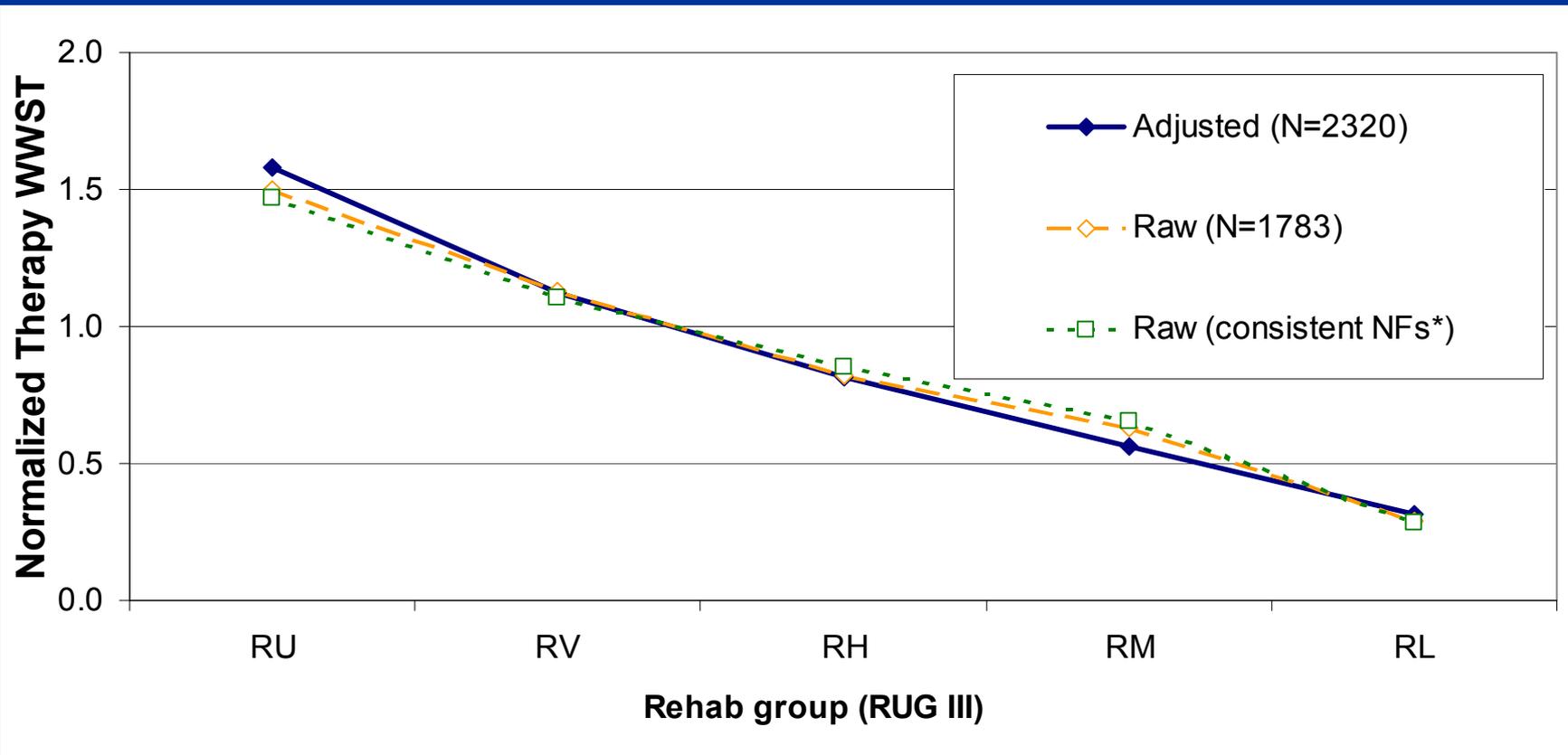
Fitting National Distribution: Part A Claims Adjusted Therapy Times



Effect of Therapy Adjustment on Normalized Therapy WWST

- Compare adjusted and raw therapy WWST
- Estimate “therapy CMIs” by normalizing therapy wage-weighted staff time
- Examine “therapy CMIs” for NFs where the therapy collection appeared consistent across the entire week:
 - therapy collection on unsupervised days was >50% of supervised days

Comparison of Normalized Therapy WWST: Adjusted vs. Raw



*therapy collection on unsupervised days was >50% of the supervised days

Individual, Concurrent & Group Therapy

Individual

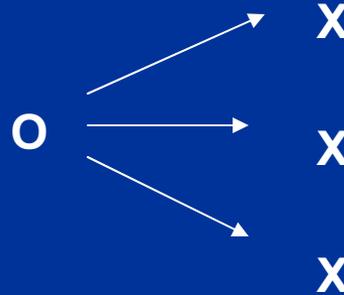
Therapist works with only 1 resident



Unallocated= 30 minutes

Concurrent

Therapist works with 2+ residents, different modalities

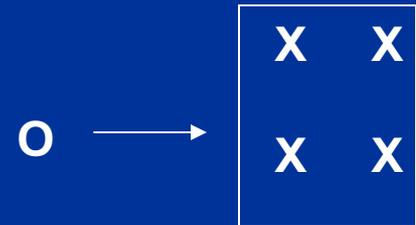


Unallocated= 30 minutes

Allocated = 30 minutes/3
= 10 minutes

Group

Therapist works with 2+ residents, same modality



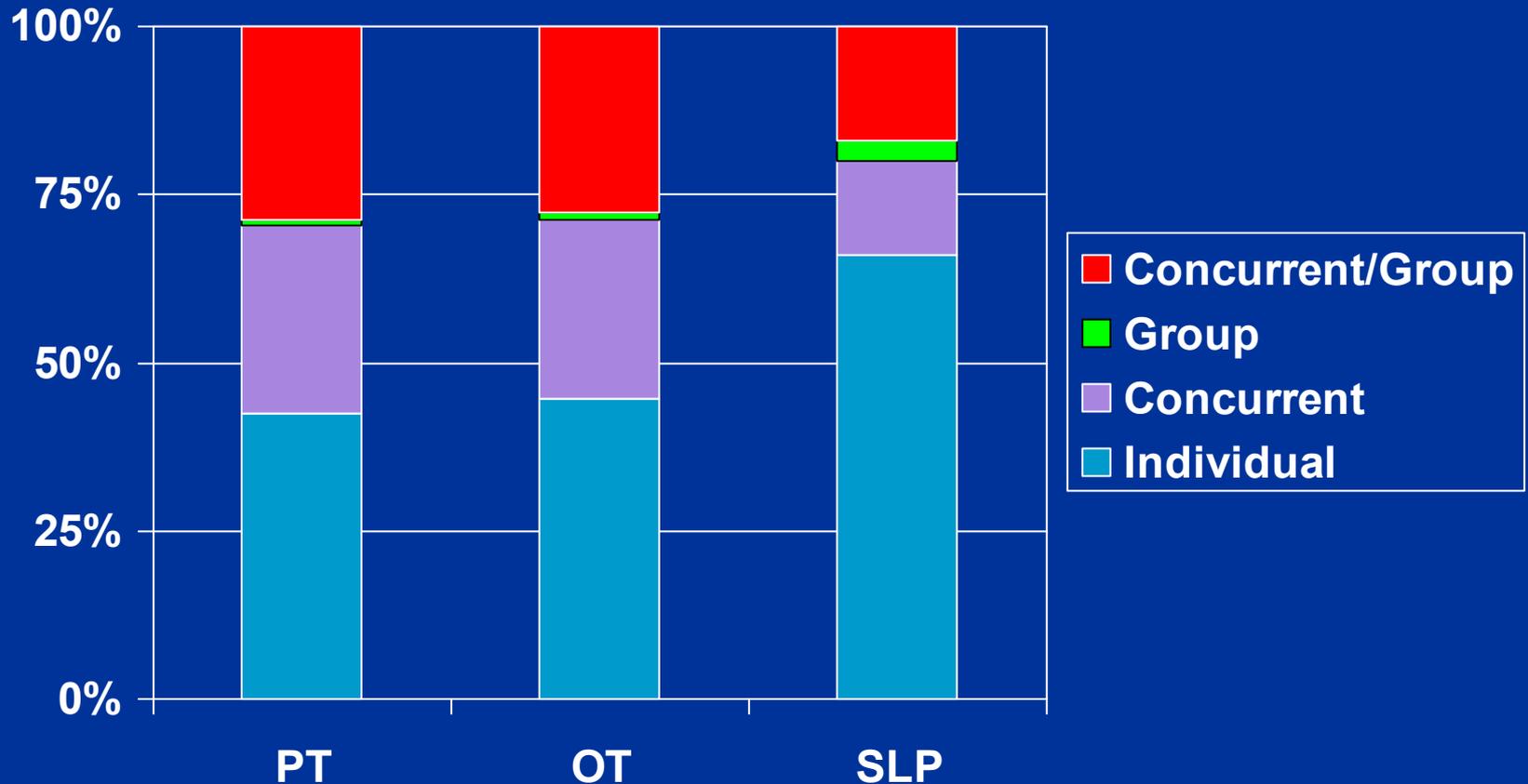
Unallocated= 30 minutes

Allocated = 30 minutes/4
= 7.5 minutes

O = Therapist

X= Resident

Individual, Concurrent & Group Time



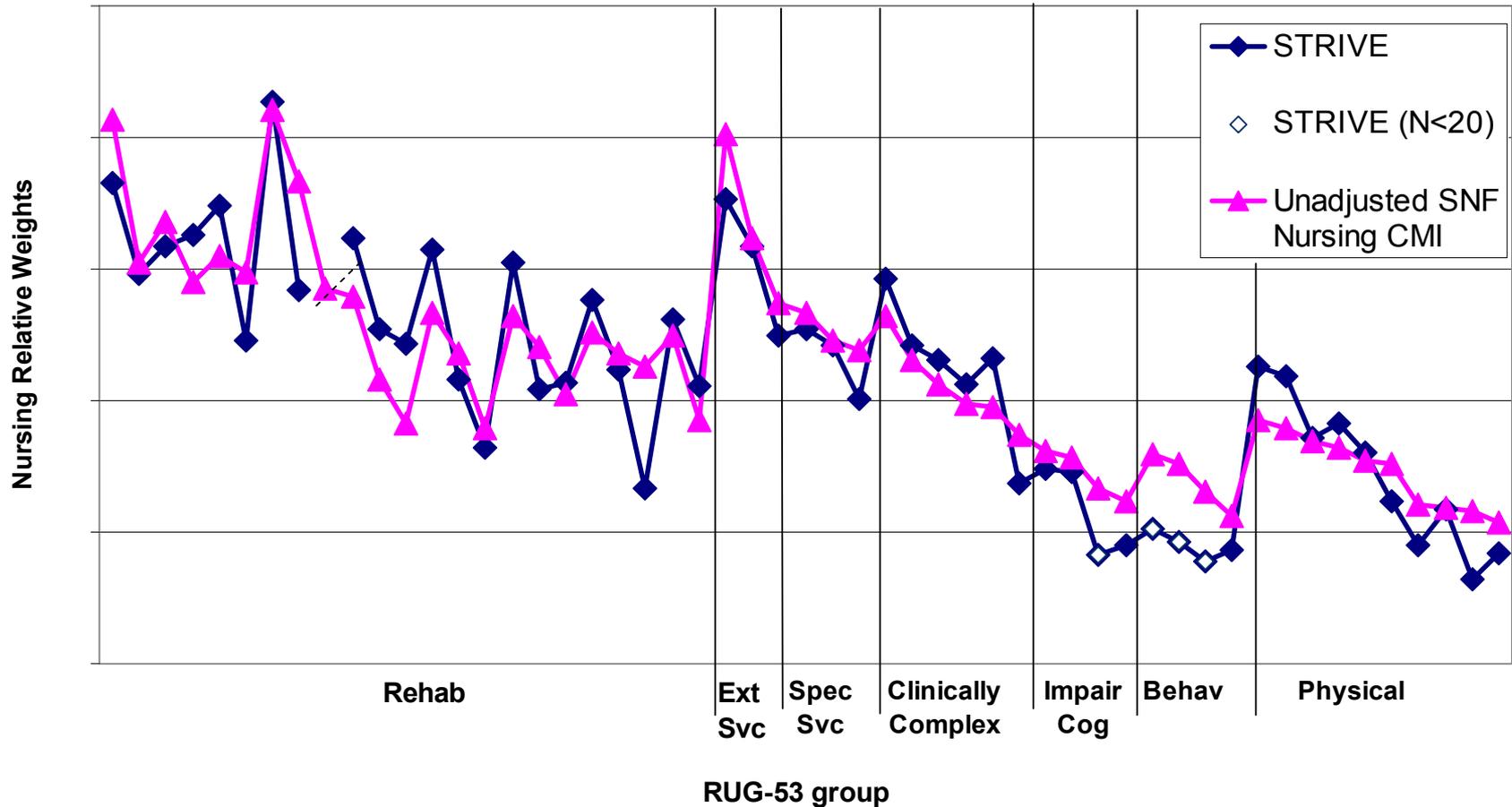
Therapy Time: Summary

- Therapy adjustments:
 - Match national Part A distribution of RUG-III rehabilitation groups
 - Use all information collected (MDS, PDA, paper tools)
 - Credit maximum likely therapy time
- Concurrent therapy frequently utilized

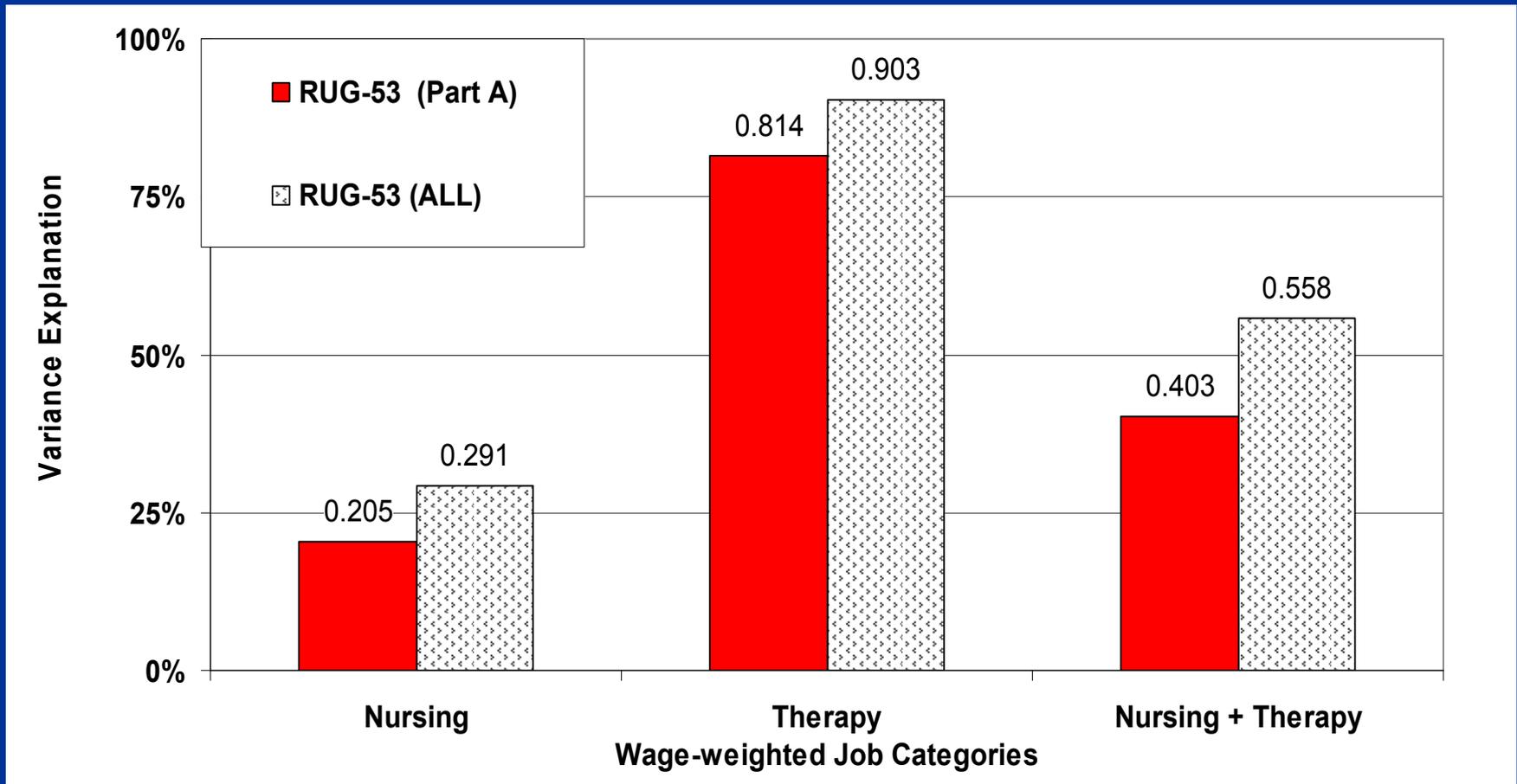
Agenda

- X Welcome & Introductions
- X Study Design / Sampling / Data Collection
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Initial RUG-53 Nursing Relative Weights (STRIVE) vs. Current Unadjusted SNF Nursing CMI



Preliminary Analysis: Variance Explanation of RUG-53



Notes About Analyses

- Analytic (N=6454 residents) vs. validation (N=3253) samples
 - Most analyses use only analytic sample
 - Results replicated on validation sample
 - Use full sample when have small sample sizes
 - Use full sample and sample weights to derive case-mix indexes (CMIs)

Notes About Analyses

- Primary dependent variable: wage-weighted staff time = “WWST”
 - Wages normalized to average CNA salary
 - Considered both (nursing+therapy) and nursing
 - Generally, similar results obtained for log WWSTs
 - **Note: WWST are not rates**
- Mean WWSTs (analytic sample):
 - Nursing: 148.19
 - Nursing + Therapy: 184.75

Notes About Analyses

- Only displaying portion of analyses run
- Almost all analyses interact
 - Example: Refinement to “upper” RUG hierarchy affects “lower” categories
 - Implication: Use caution in comparing analyses performed at different stages of model development

Notes About Analyses

- Decisions made on multiple criteria:
 - Statistics
 - Variance explanation
 - Substantiality of differences
 - Increase overall range of group means
 - Make groups more homogeneous
 - Increase differences between groups
 - Replication of results in prior studies
 - Clinical sense
 - Incentives
 - Avoid items vulnerable to “gaming”
 - Encourage selected services
 - Consider impact on Medicare and Medicaid

Special Populations Identified

| Special Population | Residents |
|---------------------|-----------|
| Alzheimers | 1313 |
| SMI-All | 3003 |
| SMI-Schizophrenia | 679 |
| SMI- Bipolar | 279 |
| SMI- Other | 2045 |
| Deafblind | 169 |
| Deaf | 935 |
| Blind | 870 |
| Under Age 18 yrs | 5 |
| 19-40 years | 133 |
| 41-64 years | 1324 |
| Respiratory Therapy | 329 |

| Special Population | Residents |
|----------------------------------|-----------|
| Suctioning | 362 |
| Physical/Verbal Abuse | 59 |
| Burns | 30 |
| Chemotherapy | 49 |
| Traumatic Brain Injury | 112 |
| Surgical Wound Care | 653 |
| Dialysis | 176 |
| Hospice | 282 |
| RUG 44- BA/BB | 73 |
| Bariatric (weight \geq 300lbs) | 72 |
| Palliative Care | 370 |
| Pain (> no pain) | 3805 |

Pain

Pain Scale

- Considered five pain scales
 - MDS 2.0 Pain Scale
 - MDS 3.0 Resident Pain interview
 - Cronbach's Alpha: 0.77
 - MDS 3.0 Facility Pain Indicator
 - Cronbach's Alpha: 0.71
 - MDS 3.0 Combined Pain interview and Facility Pain scales
 - If resident can self report on pain then use Pain interview scale. Otherwise, use Facility Pain scale
 - Pain Control item – in STRIVE Addendum

Variance Explanation (VE) of Pain Scales

| Dependent Variable | Therapy+Nursing WWST | | | |
|--------------------------------|----------------------|------------------|-----------|-----------------------|
| | N | VE of (RUG+Pain) | VE of RUG | VE(RUG+Pain) -VE(RUG) |
| MDS Pain | 6,167 | 0.5584 | 0.5488 | 0.0096 |
| Pain Interview | 2,049 | 0.6143 | 0.6084 | 0.0059 |
| Facility Pain | 5,410 | 0.5573 | 0.5476 | 0.0097 |
| Pain Interview Facility | 5,411 | 0.5562 | 0.5476 | 0.0086 |
| Pain Control | 5,657 | 0.5601 | 0.5481 | 0.0120 |

Tested Pain Control Item

- PAIN CONTROL (Note: Always ask the person about pain frequency, intensity, and control. Observe person and ask others who are in contact with the person)
 - Adequacy of current therapeutic regimen to control pain (from person's point of view).
 - Code for the last 3 days:
 - 0 = No issue of pain
 - 1 = Pain intensity acceptable to person, no treatment regimen or change in regimen required
 - 2 = Controlled adequately by therapeutic regimen
 - 3 = Controlled when therapeutic regimen followed, but not always followed as ordered
 - 4 = Therapeutic regimen followed, but pain control not adequate
 - 5 = No therapeutic regimen being followed for pain; pain not adequately controlled

Summary

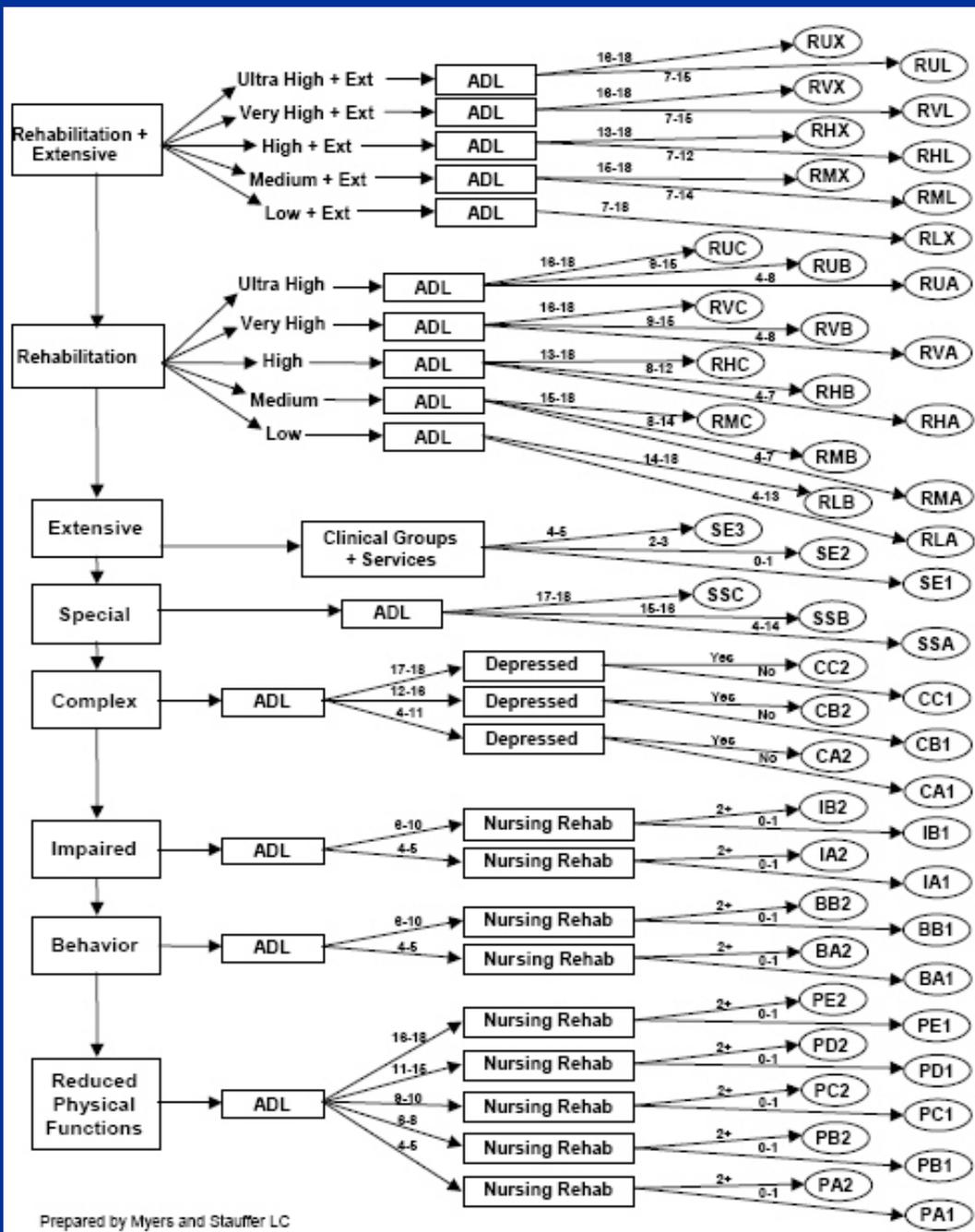
- Small variance explanation for RUG 53 residuals
- Alternate pain measures identify different individuals
- It is not clear how to implement pain scale into RUG
- Other initiatives will address pain, e.g., as part of quality monitoring

Questions for Panel

- Comments?

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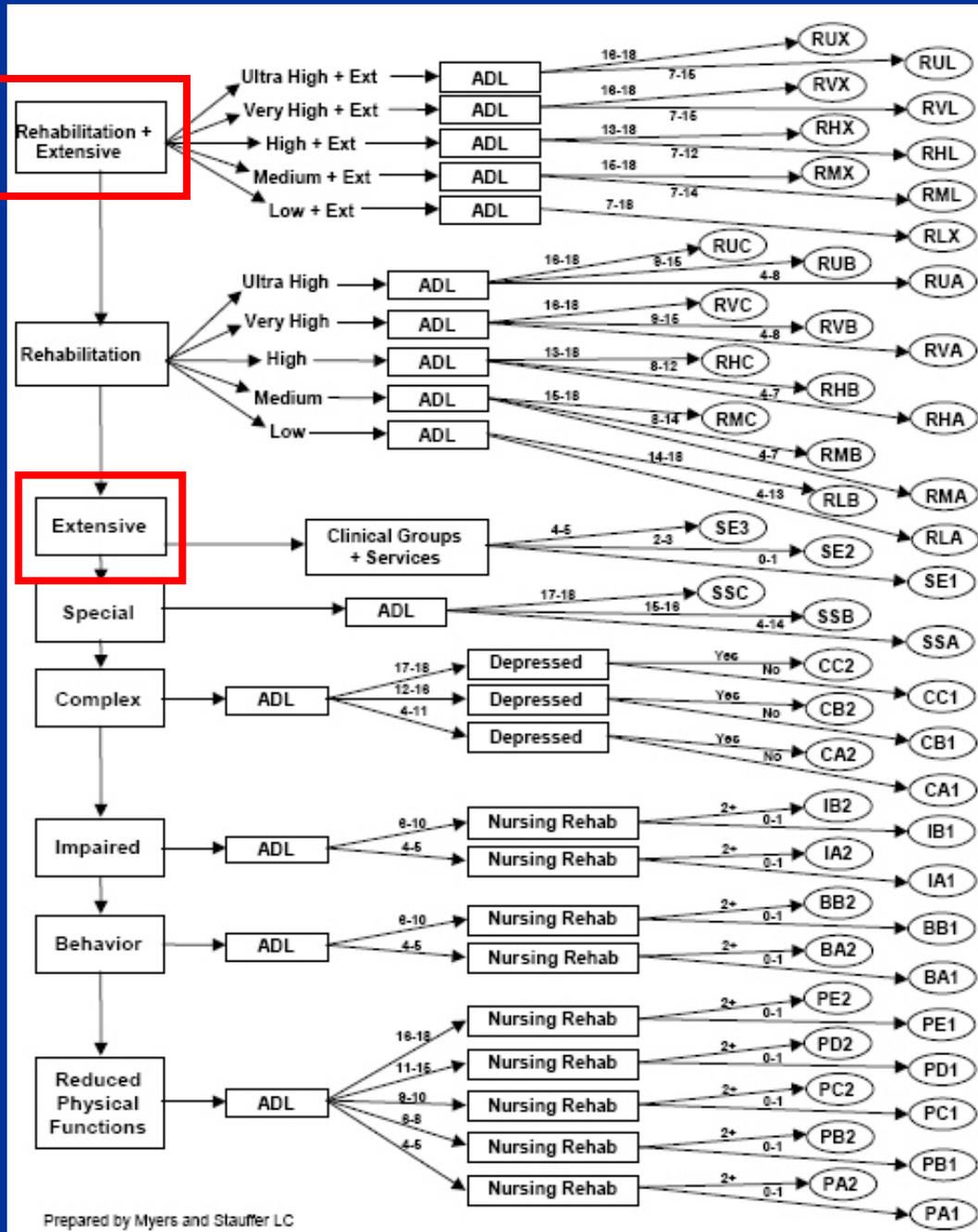


RUG-III 53-Group
(Version 5.20)

Refining RUGs

- Hierarchy categories
- Secondary splits
- Tertiary splits

Structure of Extensive Services Category



RUG-III 53-Group
(Version 5.20)

Extensive Services - Main Issues

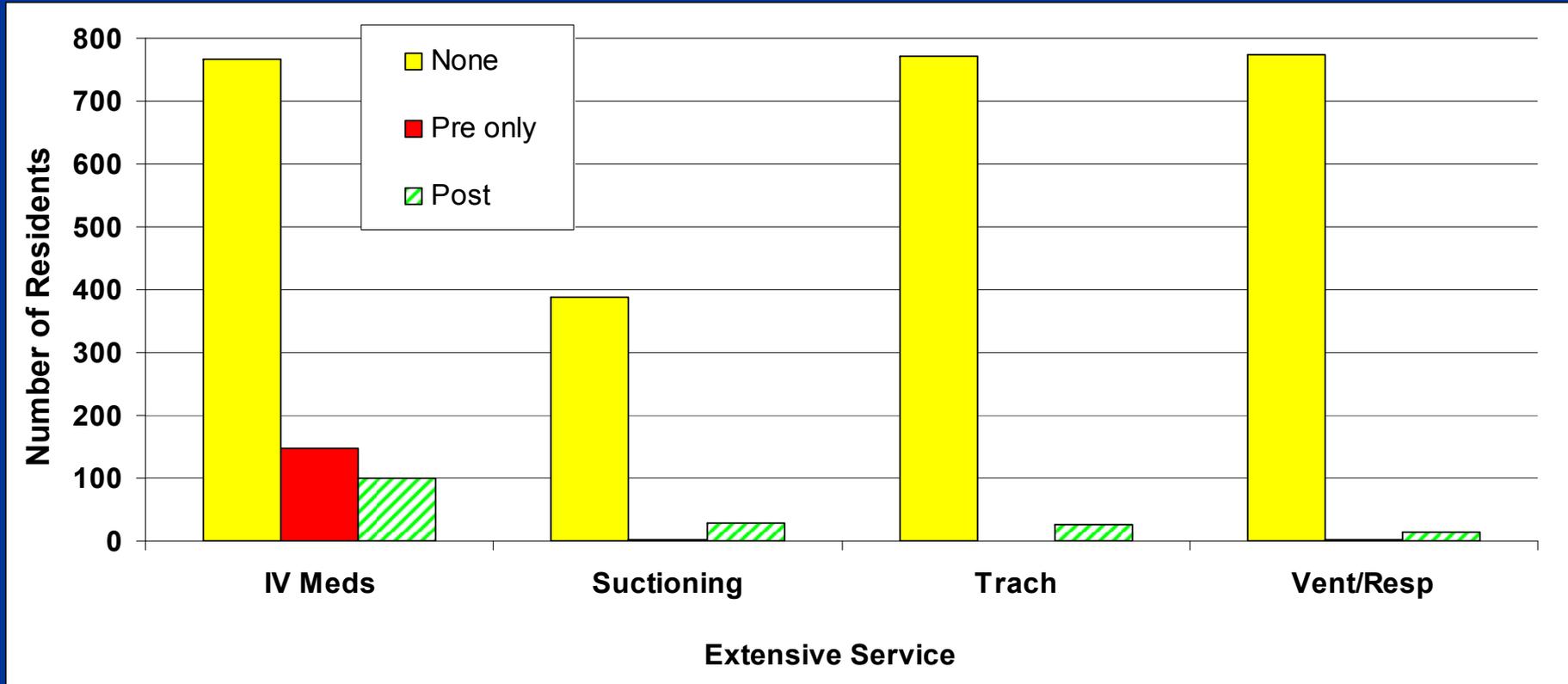
- Pre- vs. Post-admission Extensive Services
- Structure of Extensive Services
 - Current qualifiers
 - New qualifiers
 - Splitting

Pre- vs. Post-Admission Extensive Services

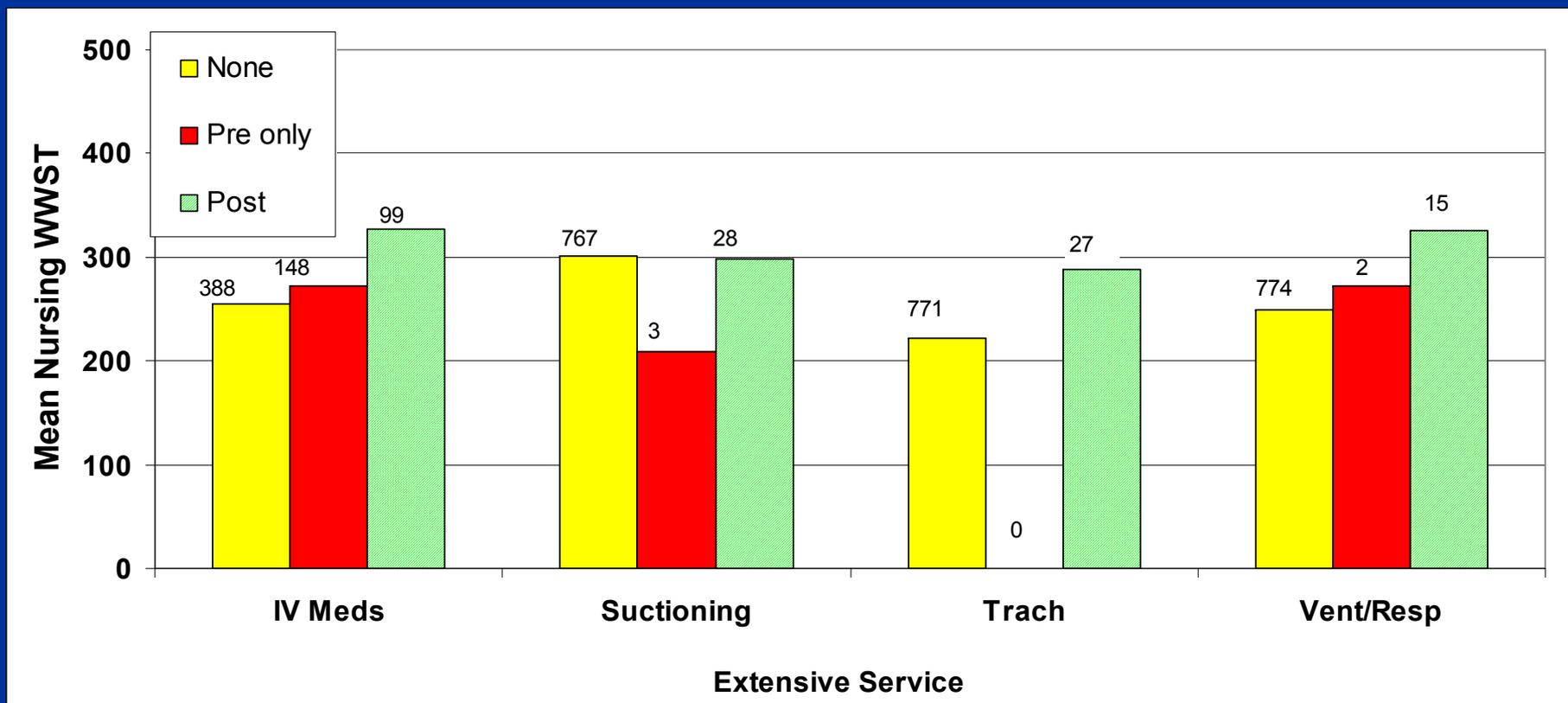
Pre- vs. Post-admission Extensive Services

- **Issue:** Are there significant differences in resource use among early-stay residents who received:
 - No extensive services
 - Pre-admission extensive services only
 - Post-admission extensive services
- **Population:** 802 residents with days of stay ≤ 7 days.

Numbers of Pre/Post Extensive Service



Mean Nursing WWST by Pre/Post Extensive Service



Analysis of individuals with LOS ≤ 7 days

Extensive Services Category

Extensive Services

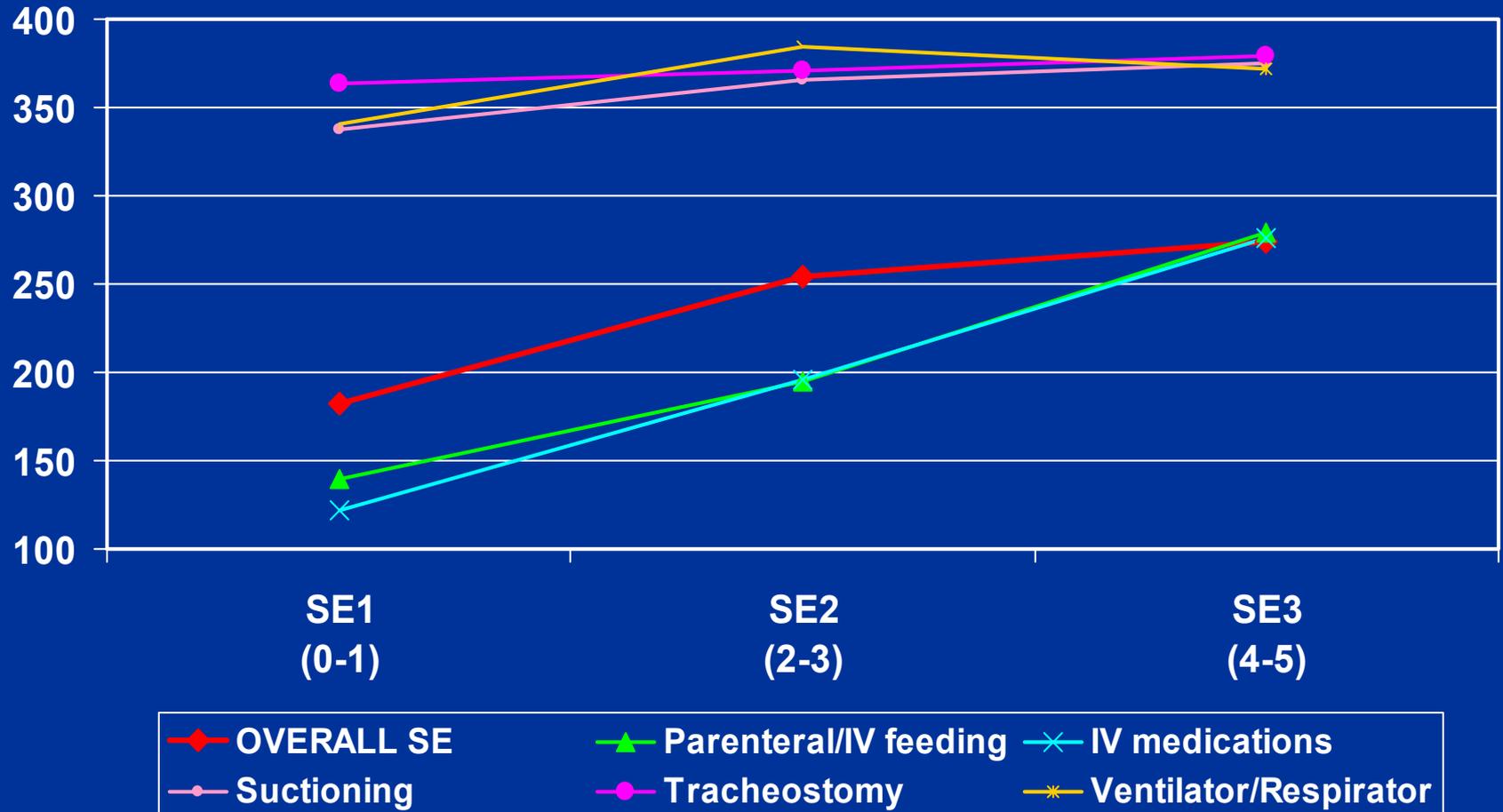
- **Issues:**
 - Are the items used to qualify for extensive services appropriate?
 - Does the extensive services count work to split the extensive category?
- **Population:** 6454 residents in the derivation sample

RUG-III Extensive Services Count

| | SE Qualifier | SE count |
|----------------------------------|--------------|----------|
| Parenteral/IV feeding | Y | Y |
| IV medications | Y | Y |
| Suctioning | Y | -- |
| Tracheostomy | Y | -- |
| Ventilator/Respirator | Y | -- |
| | | |
| Qualify for Special Care | -- | Y |
| Qualify for Clinically Complex | -- | Y |
| Qualify for Cognitive Impairment | -- | Y |
| | | |
| ADL ≥ 7 | Y | -- |

Extensive Services WWST

by RUG-III Count and Item



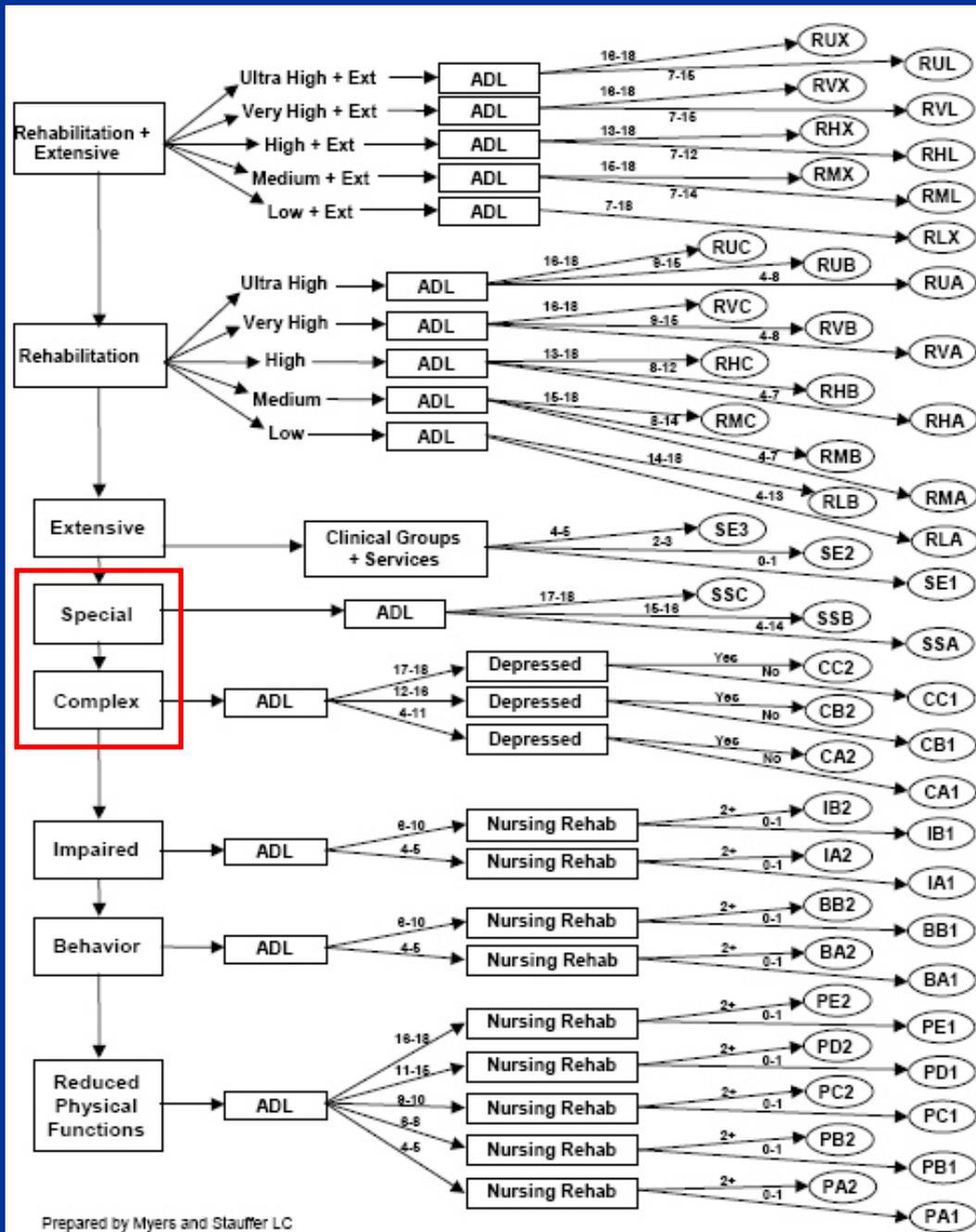
Summary of Analysis of Extensive Services Category

- Post-admission extensive services more resource intensive than pre-admission; pre-admission similar to “no service”
- Parenteral feeding and IV meds have lower resource use than other Extensive qualifiers
- Current Extensive Services count (including qualifiers of major categories) not effective

Questions for Panel

- Comments?

RUG-III 53-Group (Version 5.20)



Evaluating RUG-III Special Care Qualifiers

| Qualifier for Special Care (Full RUG-III criteria) | Change in R2 when dropped | ALL Special Care | | | Within Special Care, ONLY that Qualifier | |
|--|---------------------------|------------------|----------------|--------------------|--|----------------|
| | | N | Mean Nurs WWST | Mean Nurs residual | N | Mean Nurs WWST |
| ALL | | 608 | 190.5 | | | |
| Pressure Ulcers | -0.0030 | 247 | 205.9 | 14.3 | 183 | 190.6 |
| Feeding tubes | 0.0002 | 58 | 179.6 | -31.1 | 40 | 189.7 |
| Surgical wounds | 0.0010 | 166 | 183.7 | -2.6 | 112 | 157.7 |
| Respiratory Therapy | -0.0008 | 33 | 196.8 | 11.2 | 24 | 191.6 |
| Cerebral palsy | -0.0001 | 37 | 168.6 | -21.3 | 28 | 171.9 |
| Fever | -0.0004 | 29 | 260.1 | 56.7 | 12 | 213.5 |
| MS | 0.0000 | 65 | 183.3 | -12.8 | 48 | 171.3 |
| Quadriplegia | -0.0003 | 39 | 213.1 | 9.0 | 19 | 199.8 |
| Radiation Therapy | 0.0002 | 4 | 120.9 | -49.9 | 3 | 87.2 |
| Qualify for Extensive | 0.0003 | 10 | 115.1 | -47.2 | 10 | 115.2 |

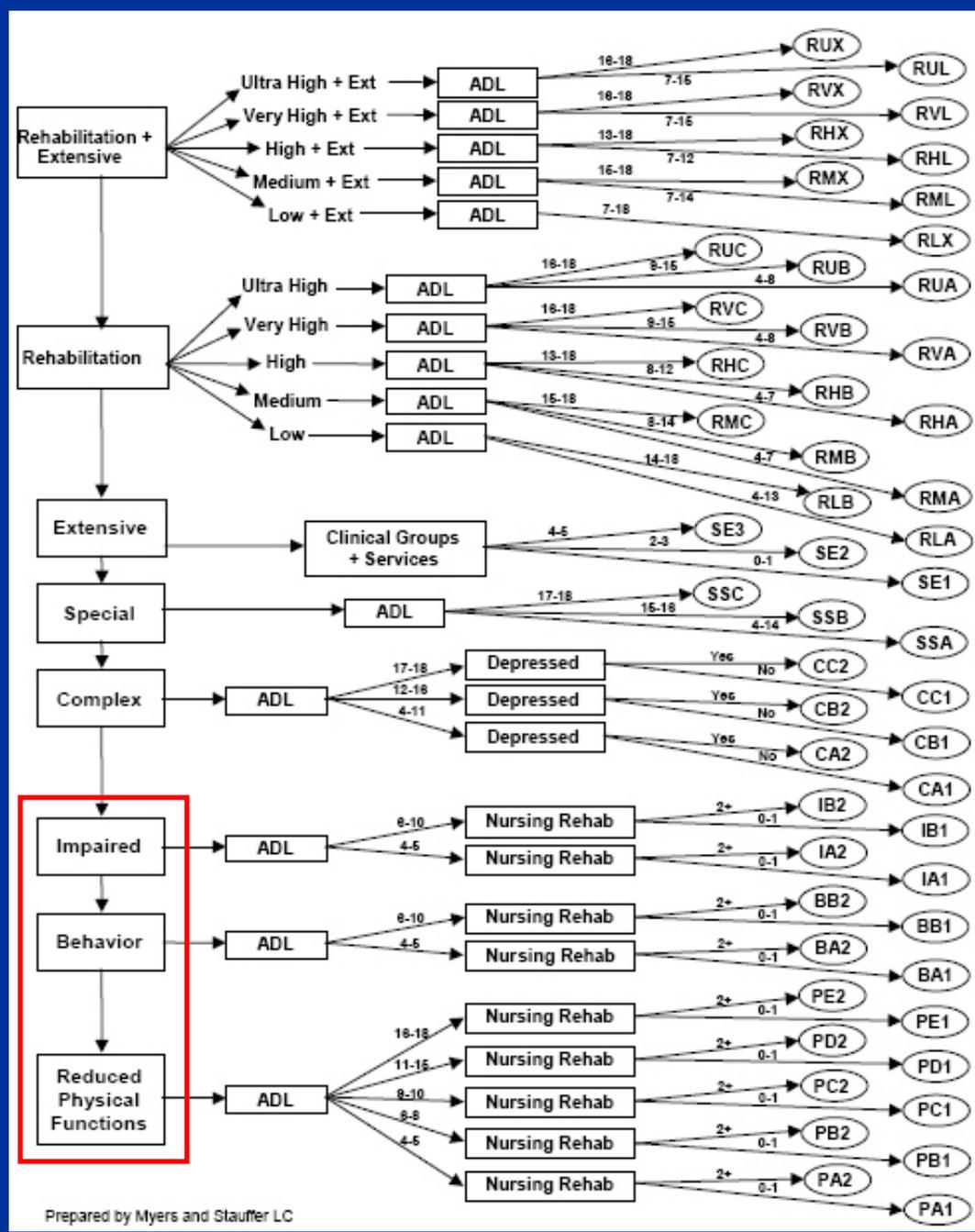
Evaluating RUG-III Clinically Complex Qualifiers

| | | | | | | |
|--------------------------------------|----------------|-------------|--------------|---------------|------------|---------------|
| ALL | | 1290 | 145.5 | | | |
| Feeding Tube | -0.0004 | 131 | 184.8 | 11.14 | 73 | 163.92 |
| Comatose | 0 | 3 | 250.6 | 58.97 | 0 | -- |
| Septicemia | 0 | 3 | 108.7 | -7.88 | 0 | -- |
| Burns | 0 | 9 | 137.8 | -29.26 | 5 | 125.14 |
| Dehydration | 0 | 8 | 289.9 | 92.70 | 2 | 143.13 |
| Hemiplegia | 0.0018 | 350 | 149.5 | -8.58 | 250 | 137.95 |
| Internal Bleeding | 0 | 12 | 205.8 | 50.88 | 5 | 128.79 |
| Pneumonia | 0.0008 | 73 | 142.2 | 5.35 | 23 | 94.40 |
| Chemotherapy | 0 | 14 | 88.3 | -42.84 | 8 | 90.08 |
| Dialysis | -0.0003 | 47 | 128.7 | 1.17 | 23 | 122.58 |
| Physician order changes 4+ | -0.0007 | 232 | 168.3 | 24.07 | 63 | 137.36 |
| Physician order changes 2+/2+ | 0 | 270 | 153.0 | 16.69 | 89 | 113.56 |
| Diabetes | -0.0012 | 184 | 168.5 | 27.99 | 66 | 150.80 |
| Transfusions | 0.0002 | 20 | 166.1 | 21.99 | 7 | 103.96 |
| Oxygen Therapy | -0.0007 | 383 | 149.7 | 2.99 | 233 | 132.76 |
| Foot infections | -0.0007 | 43 | 131.9 | -6.17 | 20 | 127.98 |
| Qualify for Extensive | -- | 0 | -- | -- | 0 | -- |
| Qualify for Special | -0.0004 | 59 | 128.9 | 14.72 | 26 | 114.74 |
| | | | | | | |
| | | | | | | |

Questions for Panel

- Comments?

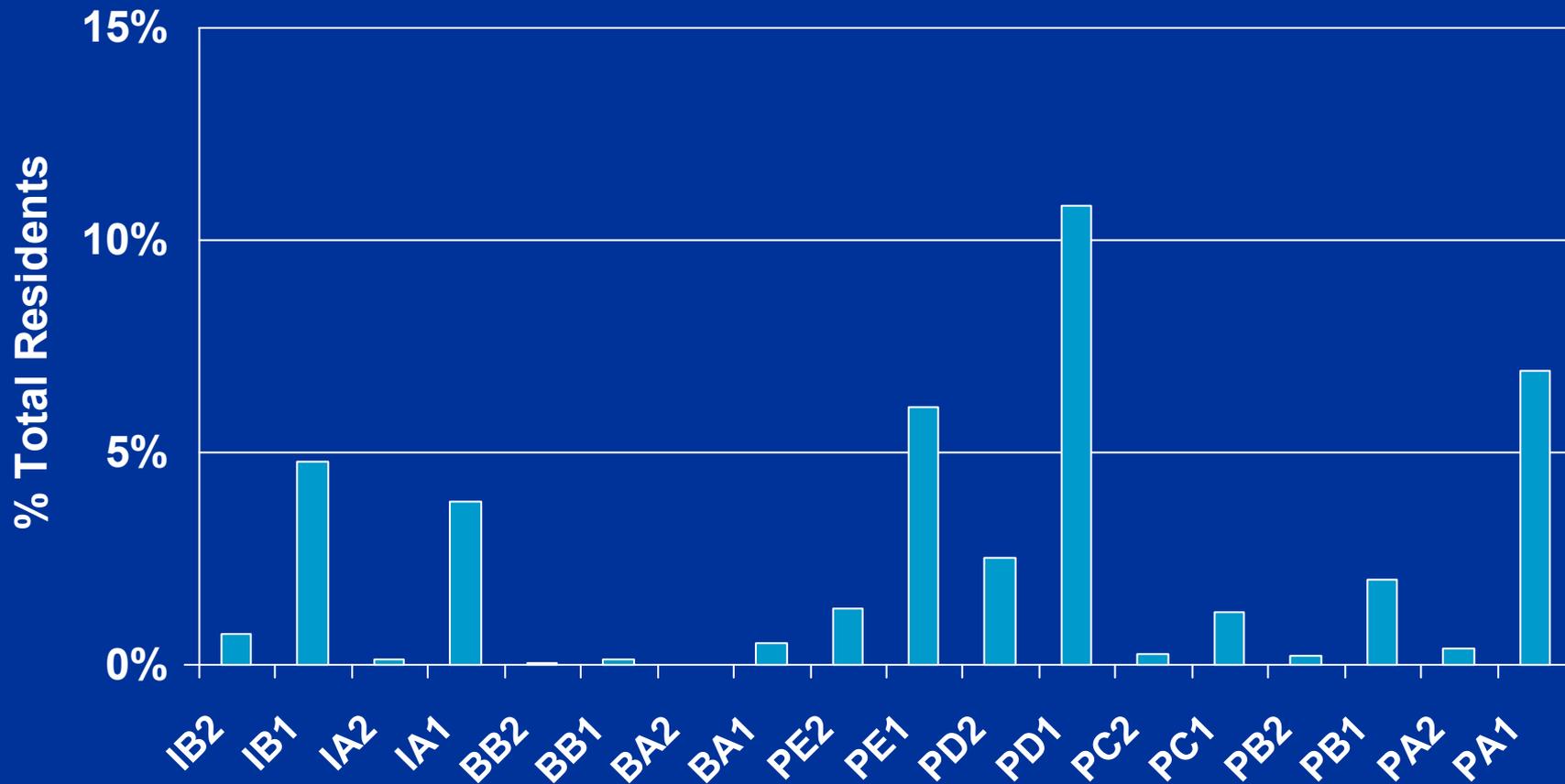
RUG-III 53-Group (Version 5.20)



Refining RUGs – Hierarchy Categories

- Lower Hierarchy
 - Impaired
 - Behavior
 - Reduced Physical Function

Distribution of RUG-III Lower Hierarchy Groups



Questions for Panel

- Are there reasons to combine or retain Behavior category?
- Violence was not a predictor of resource use. Why?
- Comments?

ADL Scale

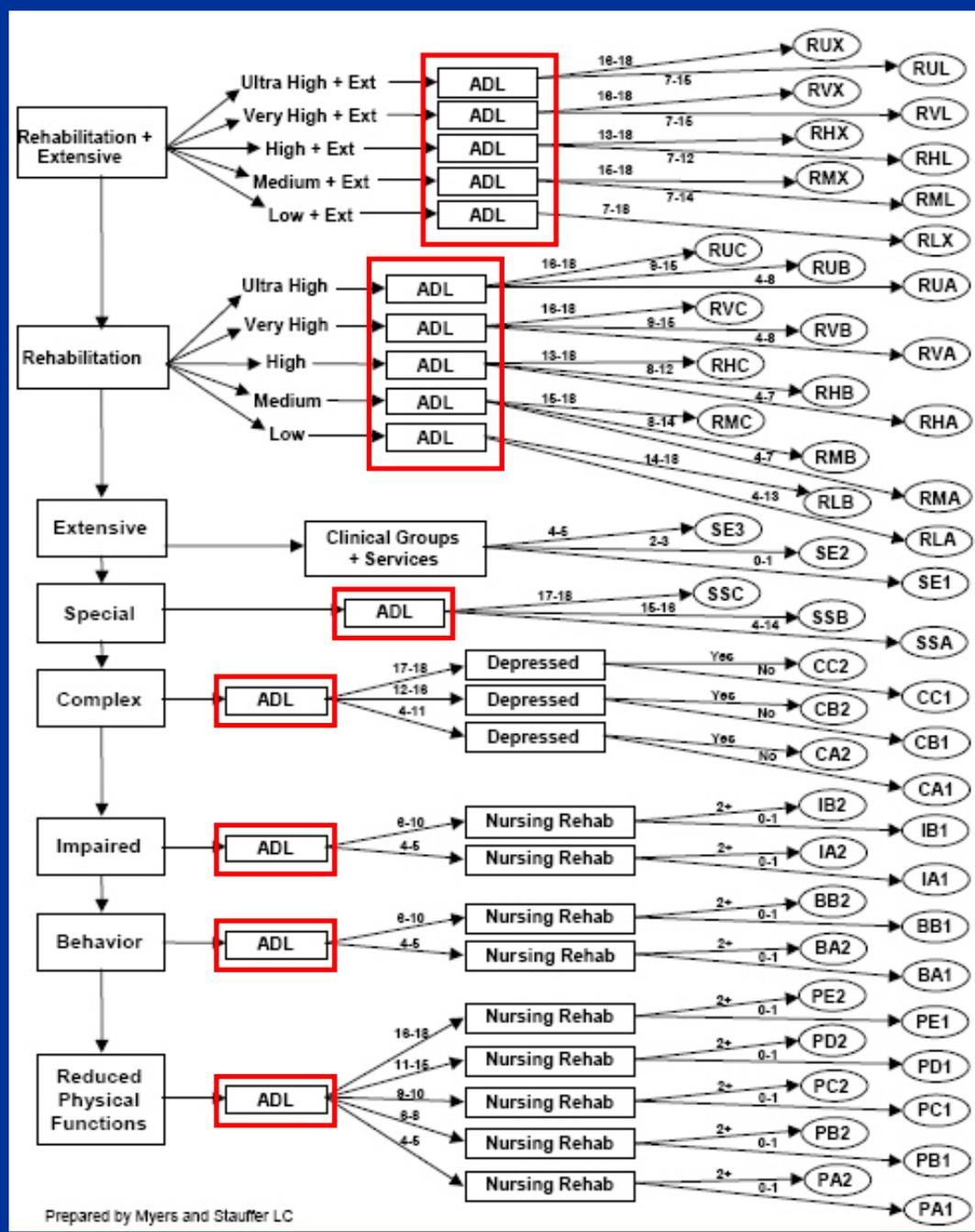
ADL Scale

- **Issue:**
 - Can the ADL Scale be improved so:
 - similar residents get similar scores (fit)
 - scores are more proportional to impairment (linearity)
- **Population:** 6454 residents in the derivation sample

ADL Scale

- Used in RUG-III for splits of each Major Group except for 'Extensive'
- Based on 4 ADLs
 - Bed mobility
 - Transfer
 - Toilet use
 - Eating, including 'Feeding':
 - Parenteral/IV nutrition
 - Feeding Tube nutrition
 - with >50% daily calorie intake OR
 - with >25% daily calorie intake and >500cc daily fluid intake

RUG-III 53-Group
(Version 5.20)



Note: Also used as category qualifier

ADLs to Scale Values

Bed mobility, Transfer, Toilet use

| Current | | | |
|-----------------------------|----------------|--------------|--------------|
| | Support | | |
| Performance | None/ Setup | 1- person | 2- person |
| Independent/ Supervision | 1 | | |
| Limited Assistance | 3 | | |
| Extensive Assistance | 4 | | 5 |
| Total Dependence | 4 | | 5 |

| Alternative | | | |
|-----------------------------|----------------|--------------|--------------|
| | Support | | |
| Performance | None/ Setup | 1- person | 2- person |
| Independent/ Supervision | 0 | | |
| Limited Assistance | 1 | | |
| Extensive Assistance | 2 | | 4 |
| Total Dependence | 3 | | 4 |

ADLs to Scale Values

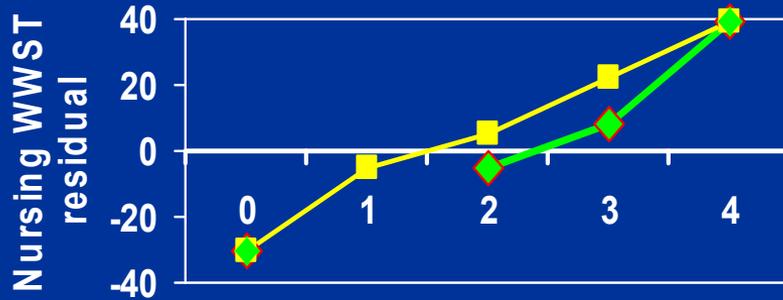
Eating

| Current | | | |
|-----------------------------|--|--------------|--------------|
| | Support | | |
| Performance | None/ Setup | 1- person | 2- person |
| Independent/ Supervision | 1 | | |
| Limited Assistance | 2 | | |
| Extensive Assistance | 3 | | |
| Total Dependence | Including Parenteral/IV/Tube Feeding | | |

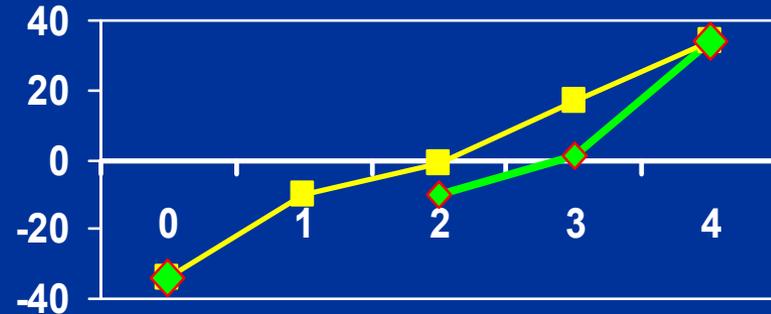
| Alternative | | | |
|-----------------------------|----------------|--------------|--------------|
| | Support | | |
| Performance | None/ Setup | 1- person | 2- person |
| Independent/ Supervision | 0 | 2 | |
| Limited Assistance | | | |
| Extensive Assistance | 2 | 3 | |
| Total Dependence | | 4 | |

More Linear; More Responses

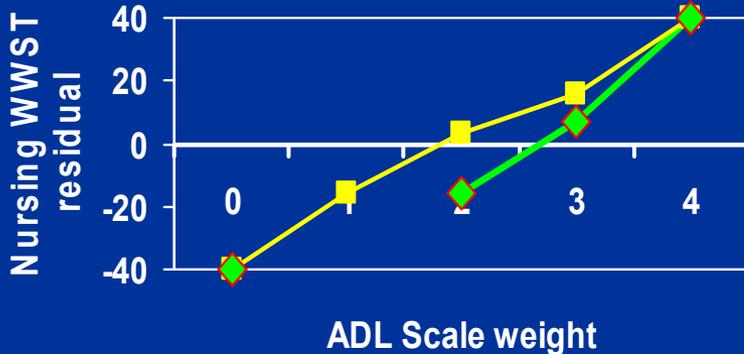
Bed Mobility



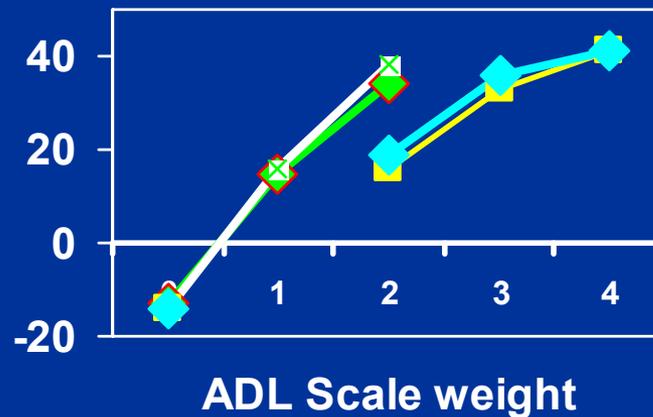
Transfer



Toilet Use



Eating



Note: for comparative purposes,
Original scoring is scaled from 0-4
STRIVE TEP March 11, 2009

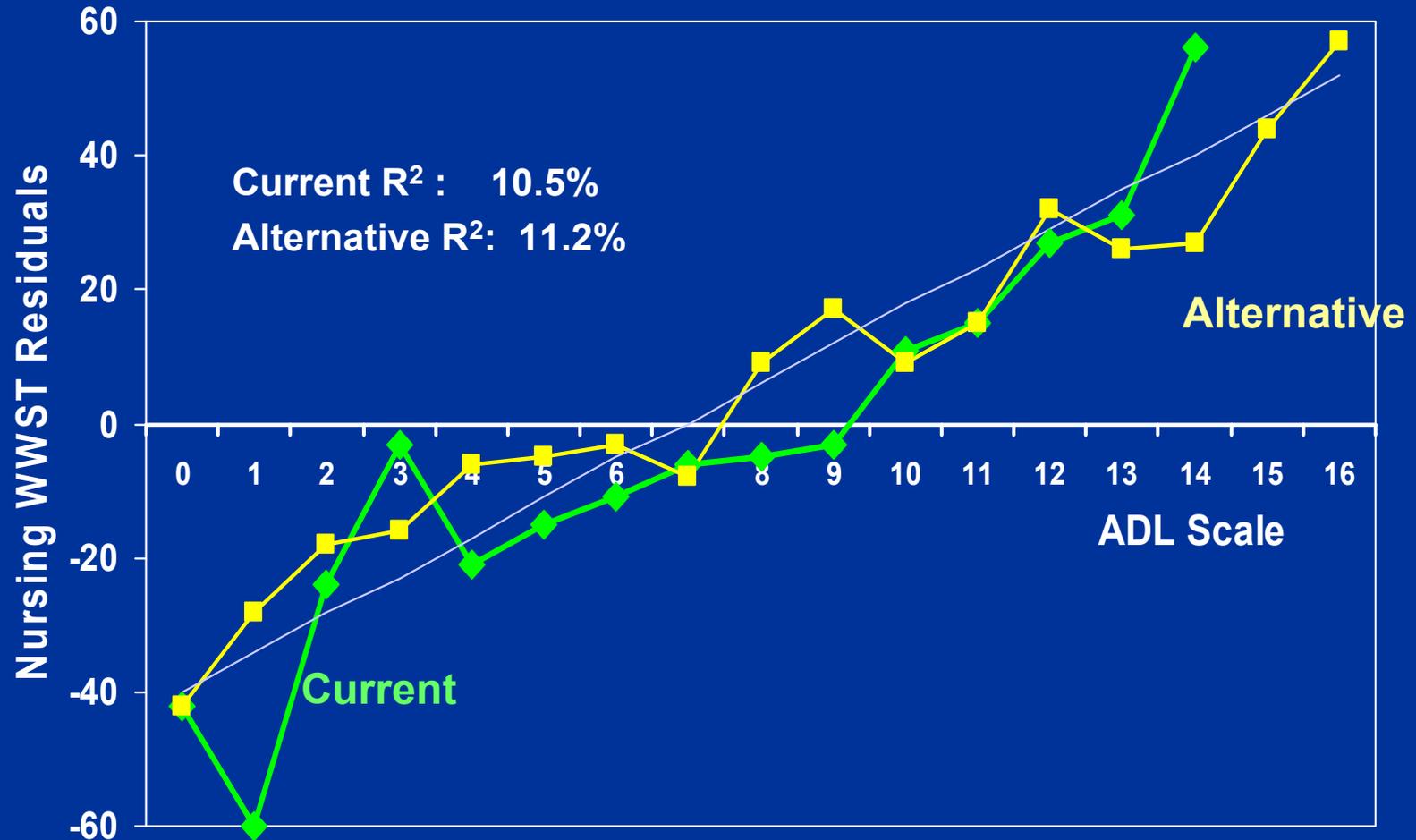
Parenteral, IV, and Tube Feeding

- Used in RUG-III Scale
- “Feeding” not needed when use Eating Support:
 - With adjustment, little difference with vs. without “feeding”
 - “Feeding” residents vary greatly in Eating Performance/Support
 - Even without “feeding” as qualifier, 82% place at an equal or higher Scale Weight as with the Current Scale

Alternative ADL Index

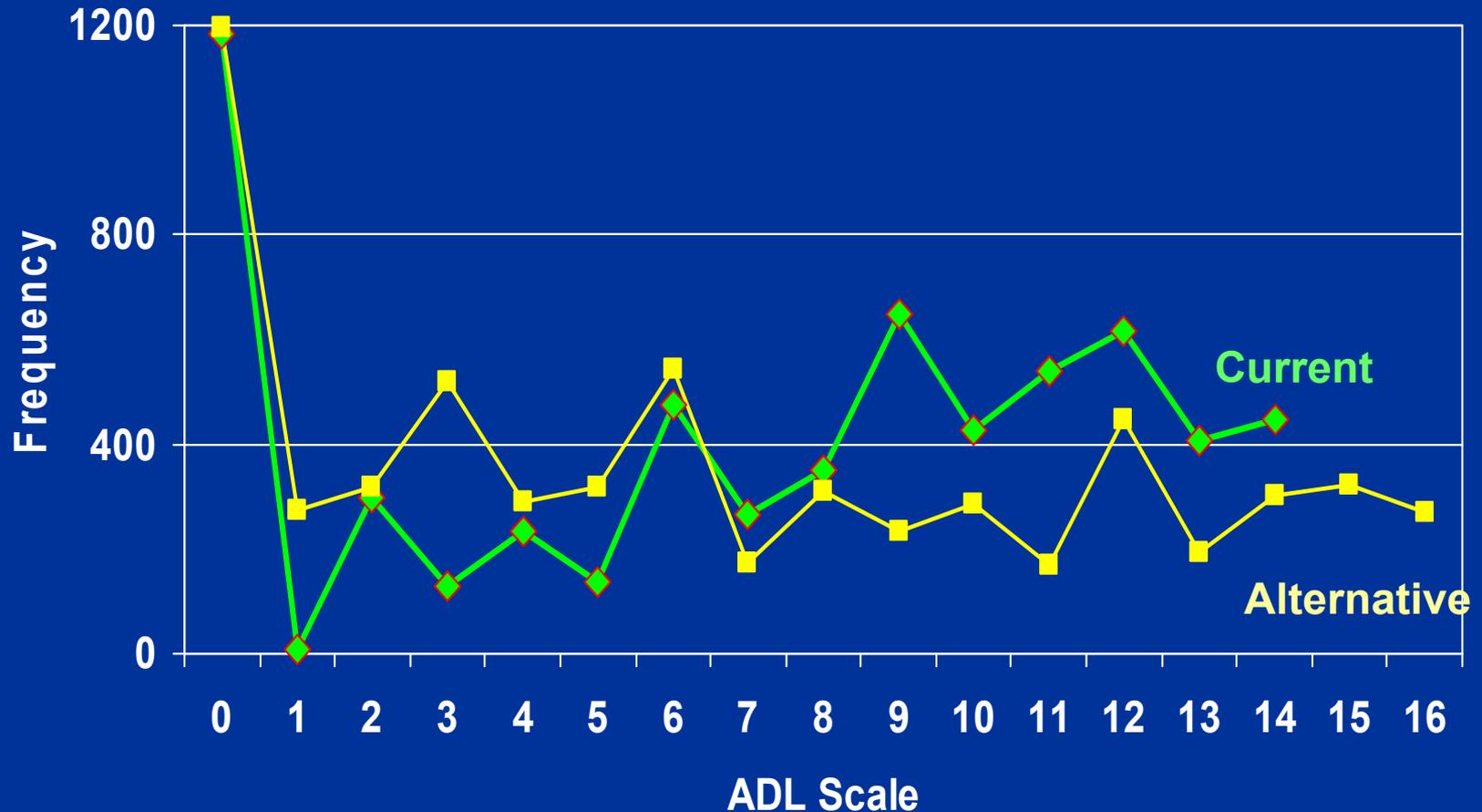
- Sum of scale values for 4 ADLs
- Scale ranges from 0-16

Improved Fit (More homogeneous)



Note: for comparative purposes, Original scoring is scaled from 0-12

Greater Range, Flatter Distribution



Note: for comparative purposes, Original scoring is scaled from 0-12

Hierarchy Categories - Approach

- Consider ADL Thresholds for qualifiers
- Consider ADL Thresholds for categories

Secondary Splits

- Examined:
 - ADL Index
 - Count of categories
 - Count of all category qualifiers
 - Count of “below” category qualifiers
- None as strong as ADL splits, or useful after ADL splits

RUG-III ADL Cut Points

| RUG Category | Rehab | ADL | | | | | | | | | | | | | |
|--------------------------------|------------|---------|---|---|-----|-----|----|-----|----|----|---------|---------|---------|---------|--|
| | | 4-5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17-18 | |
| Rehab+Extens | Ultra High | ADL | | | | | | | | | | | NOT ADL | | |
| | Very High | ADL | | | | | | | | | | | NOT ADL | | |
| | High | ADL | | | | | | | | | | | NOT ADL | | |
| | Medium | ADL | | | | | | | | | | | NOT ADL | | |
| | Low | ADL | | | | | | | | | | | NOT ADL | | |
| Rehabilitation | Ultra High | ADL | | | | ADL | | | | | | NOT ADL | | | |
| | Very High | ADL | | | | ADL | | | | | | NOT ADL | | | |
| | High | ADL | | | ADL | | | | | | NOT ADL | | | | |
| | Medium | ADL | | | ADL | | | | | | NOT ADL | | | | |
| | Low | ADL | | | | | | | | | NOT ADL | | | | |
| Extensive | | NOT ADL | | | | | | | | | | | | | |
| Special | | ADL | | | ADL | | | | | | NOT ADL | | | | |
| Complex | | ADL | | | | | | ADL | | | | | | NOT ADL | |
| Impaired | | ADL | | | ADL | | | | | | NOT ADL | | | | |
| Behavior | | ADL | | | ADL | | | | | | NOT ADL | | | | |
| Reduced Physical Funct. | | ADL | | | ADL | | | | | | NOT ADL | | | | |

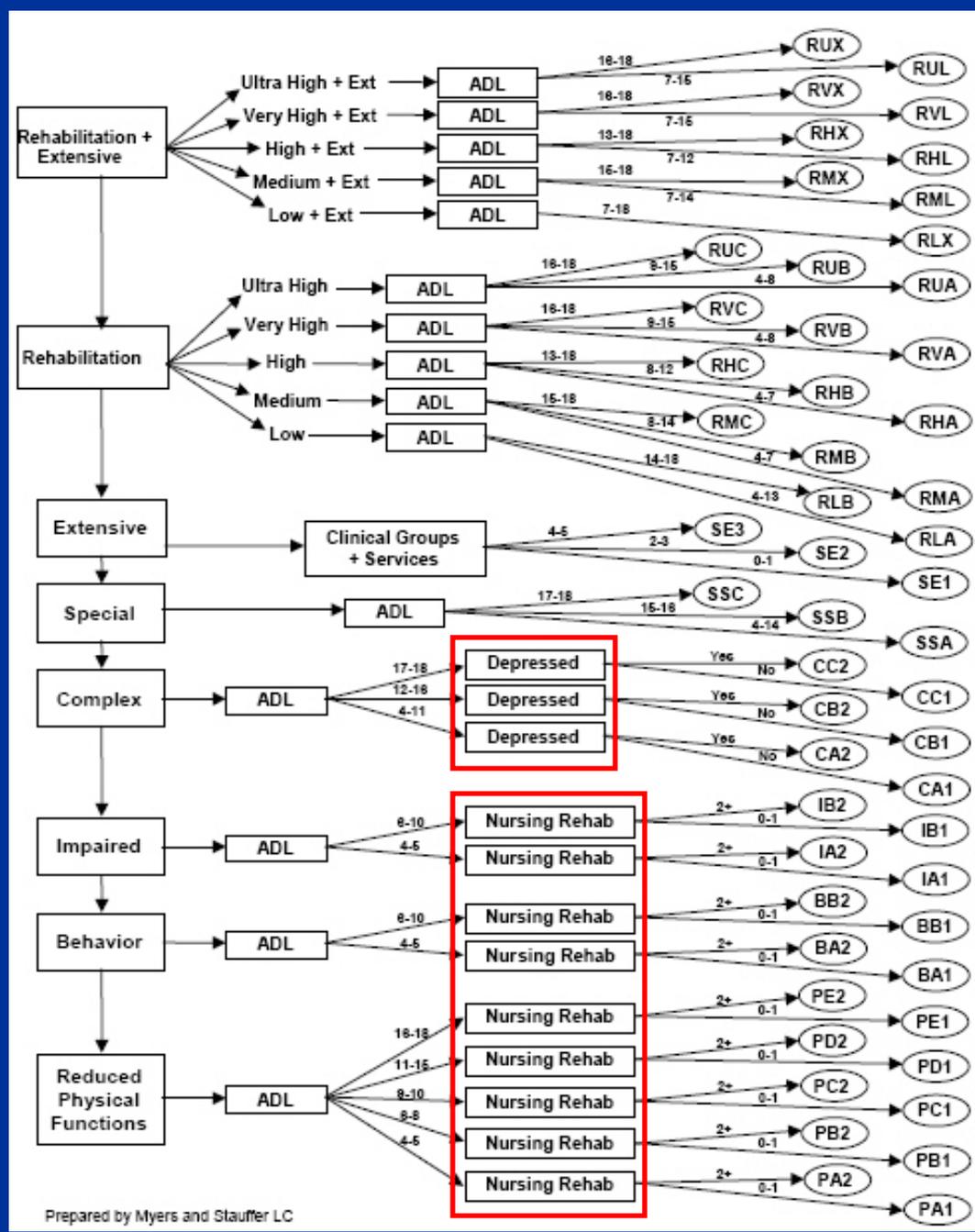
Possible ADL Cut Points:

| RUG Category | RUG Group | ADL | | | | |
|---------------------------|------------|-----|-----|------|-------|-------|
| | | 0-1 | 2-5 | 6-10 | 11-14 | 15-16 |
| Rehab+Extensive | Ultra High | | | | | |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| Rehabilitation | Ultra High | | | | | |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| Extensive | | | | | | |
| Special | | | | | | |
| Clinically Complex | | | | | | |
| Impaired | | | | | | |
| Behavior | | | | | | |
| Reduced Physical | | | | | | |

Questions for Panel

- Reasonable to use ADL as secondary split (except for Extensive)?
- Is it reasonable to restrict structure of ADL splits?
- Comments?

RUG-III 53-Group (Version 5.20)



Refining RUGs – Tertiary Splits

- Depression used in RUG-III as tertiary split for Clinically Complex category
 - Split was not large, not consistent
 - Preliminary evidence that this finding will be repeated
- Analysis based on MDS 2.0 “Depression Rating Scale”

Nursing Rehabilitation

- Uses the following (primarily: 2+ activities provided 6+ days for 15+ min.):
 - passive range of motion (p3a) or active range of motion (p3b)
 - bed mobility (p3d) or walking (p3f) training
 - splint or brace assistance (p3c)
 - transfer training (p3e)
 - dressing or grooming training (p3g)
 - eating or swallowing training (p3h)
 - amputation/prosthesis care (p3i)
 - communication training (p3j)
 - scheduled toileting plan (h3a) or bladder retraining program (h3b)

Nursing Rehabilitation

| Categories | N | Increase R2 | Average Category WWST | Average WWST difference | Significant difference (p) |
|---------------------|------|-------------|-----------------------|-------------------------|----------------------------|
| Impaired & Behavior | 672 | 0.001 | 85 | 6.62 | 0.46 |
| Physical | 2044 | 0.000 | 115 | 1.38 | 0.74 |

Based on RUG-III System

Nursing Rehabilitation Splits: Example

| RUG Category | Nursing Rehabilitation | N | Average Nursing WWST |
|--------------|------------------------|-----|----------------------|
| Physical E | Yes | 82 | 157.7 |
| | No | 396 | 159.0 |
| Physical D | Yes | 153 | 129.6 |
| | No | 691 | 125.5 |
| Physical C | Yes | 17 | 105.4 |
| | No | 88 | 100.5 |
| Physical B | Yes | 14 | 73.1 |
| | No | 117 | 82.6 |
| Physical A | Yes | 24 | 60.7 |
| | No | 462 | 62.2 |

Questions for Panel

- Should nursing rehabilitation be retained as a split for the lower categories?
- Comments?

Agenda

- X Welcome & Introductions
- X Study Design / Sampling / Data Collection
- X Assembling the Analytic Dataset
 - Therapy Imputation
- X Preliminary Analytic Results
 - Special Care Units
 - Special populations
- X Refining RUGs
 - Drug Costs
 - Recap / Next Steps
 - Observer Comment Period
 - Adjourn

Drug Data

- Unable to obtain drug profiles at time of STM data collection
- Requested Medication Administration Records (MARs) – 56 facilities in 14 states responded
- Hand-keyed Medicare residents

Drug Data

- Information keyed:
 - NDC code (look-up)
 - Frequency, dose, strength
 - When administered during week
 - PRN

Drug Data

- STRIVE drug data from resident MAR forms for week of data collection
- 87.9% of Residents are Part A
- N=428 residents with STRIVE data
 - 56 facilities
 - 14 states plus DC
 - 7,237 drugs = 16.9 drugs per person
 - Note: includes TB tests, vitamins, etc.

Drug Data

- Total of 7,237 drugs:
 - 92.2% daily and weekly drugs
 - 0.1% monthly drugs
 - 2.8% drugs given once or twice
 - 0.6% “other” drugs
 - 2.9% unknown drug frequency

Drug Data

- Issues:
 - which drugs are covered in Medicare Part A
 - daily dose – how much is used each time
 - Problems: inhalers, salve tubes, “sliding scale” (e.g., insulin, anti-coagulants)
 - daily use
 - Problems: drugs provided monthly (0.1%)
 - selection of cost basis

Calculating Drug Cost

- Use “AWP” (Average Wholesale Price) in First DataBank
- Select lowest of 3 Dec 2007 AWP’s for each drug
- Use lowest cost “generic sequence number” (GSN) for each drug
- Use only drugs administered daily/weekly (92% of prescriptions) and not salves/sliding scale
- Compute average number of times/day drug administered during study week
- Compute:
$$\text{cost} = \text{number times} * \text{drug quantity} * \text{AWP}$$
- Sum across drugs for resident

Descriptive Statistics on Number and Cost of Drugs*

| Statistic | Count of Prescriptions | Daily Drug Cost** |
|-----------|------------------------|-------------------|
| Mean | 15.72 | \$34.16 |
| Median | 15 | \$14.00 |
| SD | 6.59 | \$56.45 |
| Minimum | 1 | \$0.00 |
| Maximum | 40 | \$421.97 |

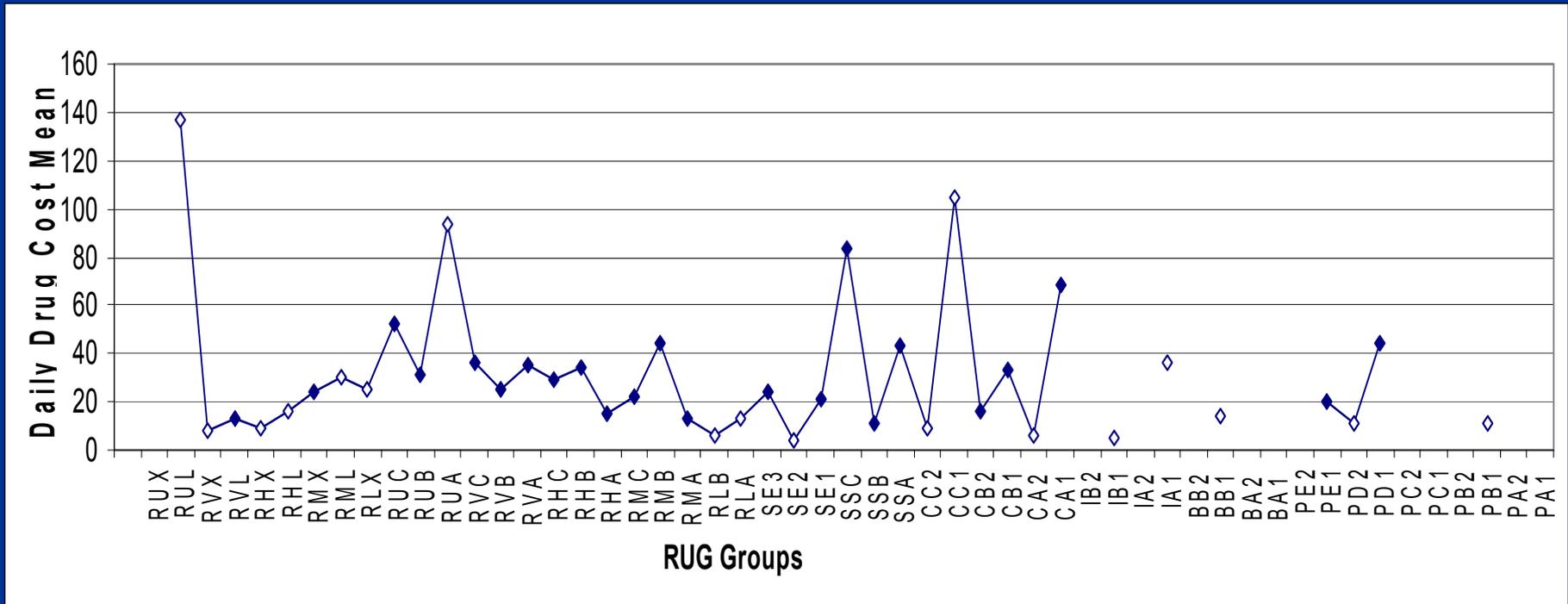
Notes: *Only Daily and Weekly Drugs
 **2 high outlier costs omitted

Variance Explanation of Daily Drug Cost

| Predictive Variable | Variance Explanation | p |
|----------------------------|-----------------------------|----------|
| Therapy + Nursing CMI | 0.0000 | 0.93 |
| Nursing CMI | 0.0001 | 0.88 |
| CPS Scale | 0.0011 | 0.52 |
| ADL Index | 0.0025 | 0.32 |

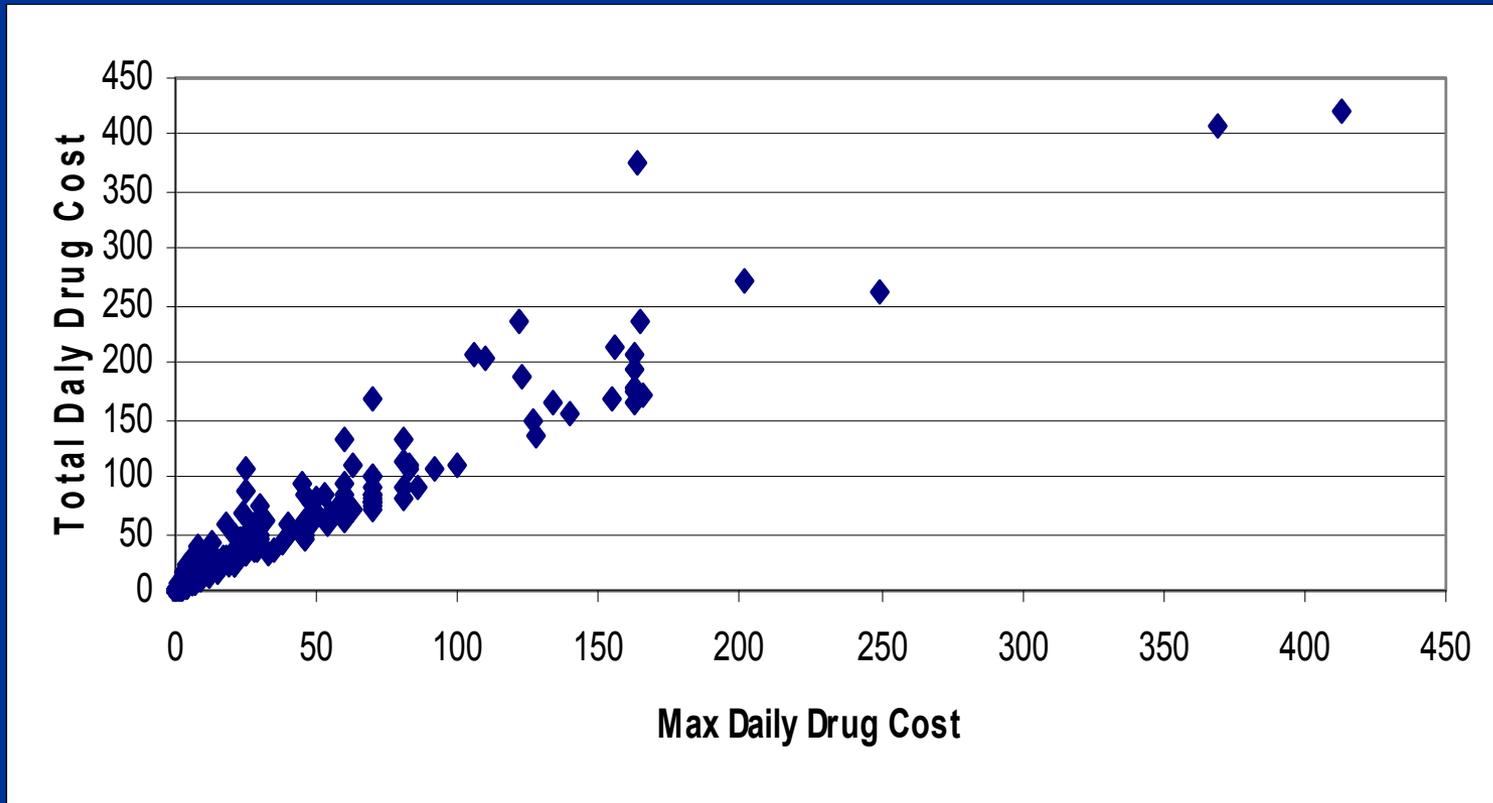
**Note: 395 Residents with MAR data, Full STM (48 hrs), MDS, and RUG classified
2 high outlier costs omitted**

Resident Daily Drug Cost Mean by RUG Group



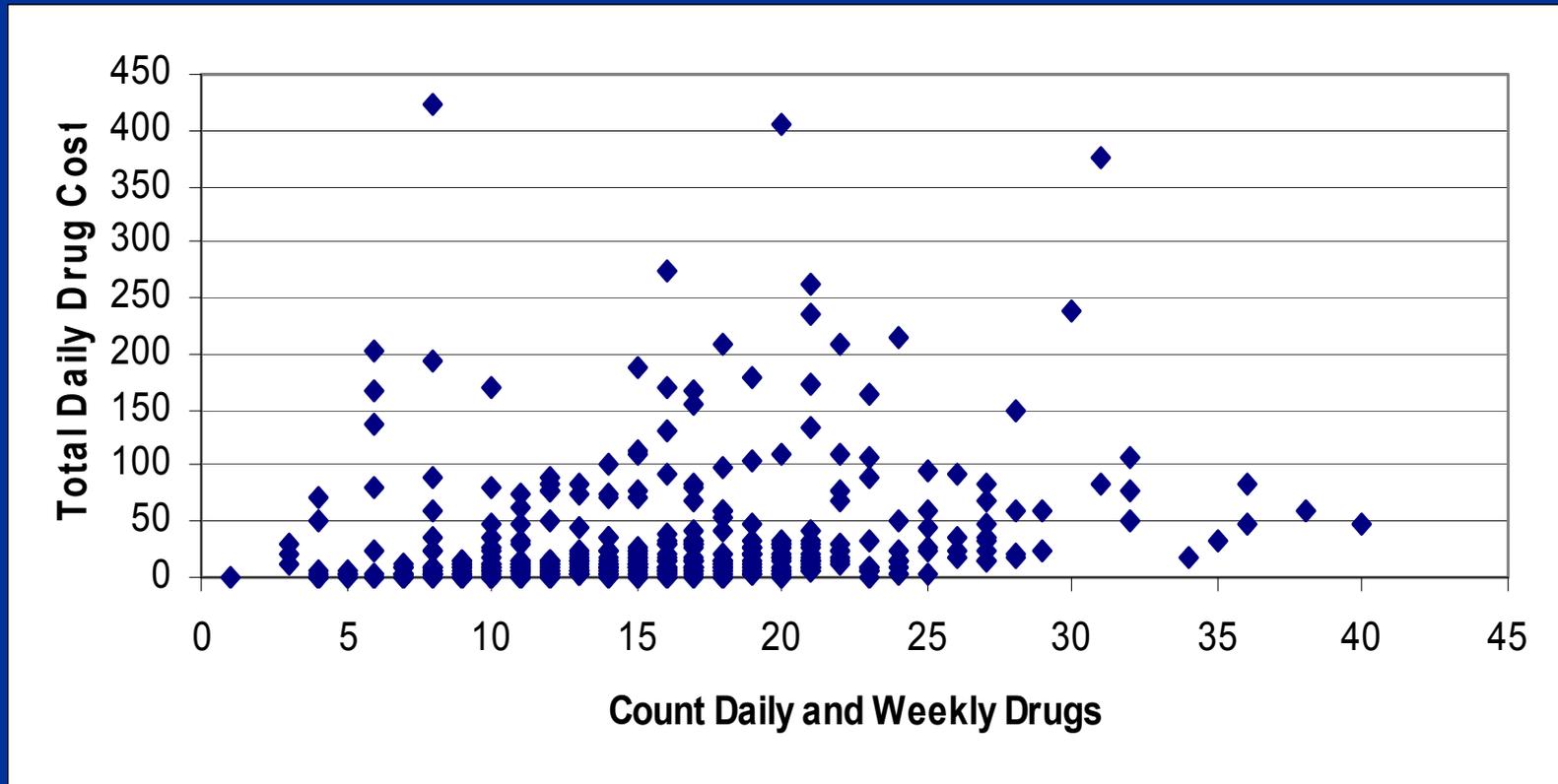
Note: 395 Residents, see before. Open symbols represent points with <5 observations

Highest Daily Drug Cost by Total Daily Drug Cost



N=395

Count of Daily and Weekly Drugs by Total Daily Drug Cost



N=395

Conclusions

- RUGs do not explain drug cost well
- High daily drug cost from one (or 2) high cost drugs, not high number of drugs.

Agenda

- X Welcome & Introductions
- X Study Design / Sampling / Data Collection
- X Assembling the Analytic Dataset
 - Therapy Imputation
- X Preliminary Analytic Results
 - Special Care Units
 - Special populations
- X Refining RUGs
- X Drug Costs
 - **Recap / Next Steps**
 - Observer Comment Period
 - Adjourn

**Thank you
for your participation
&
attendance**

Appendix A

Special Care Units

Research Questions

- If Special Care Units (SCUs) have different staffing levels, should there be an adjustment before calculating RUGs?
- 4 types of SCUs
 - Alzheimer's/Dementia - 14 facilities in 8 states
 - Ventilator/Respirator - 12 facilities in 8 states
 - TBI - 1 facility
 - HIV/AIDS - 2 facilities in 1 state
- Analysis:
 - N = 9,707 residents with full STM (48 hrs), MDS, and RUG classifications
 - Dependent Variable: Nursing WWST

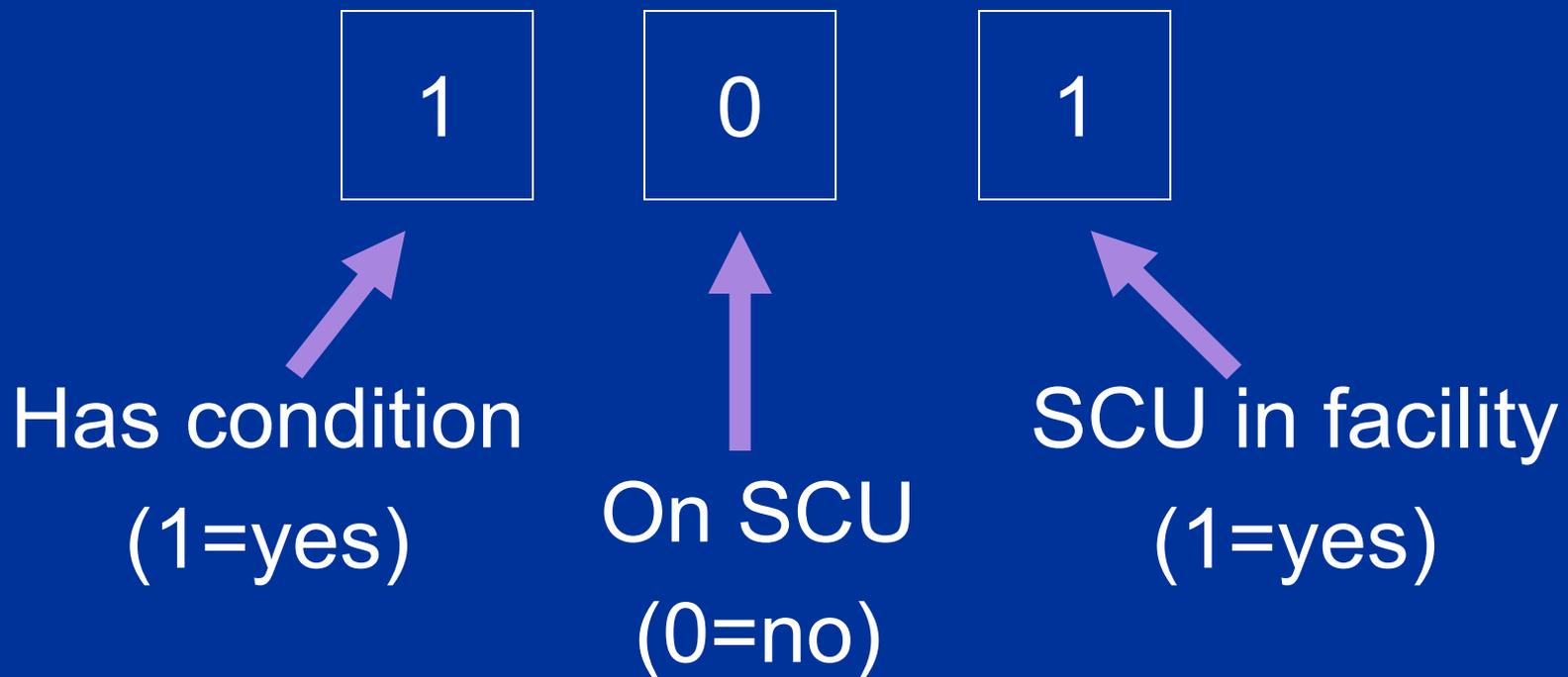
Special Care Units (from Facility Profiles)

| | Frequency | Percent |
|------------------------------|-----------|---------|
| 1. LTC | 2686 | 27.68 |
| 2. Skilled Nursing | 4796 | 49.43 |
| 3. Rehabilitation | 919 | 9.47 |
| 4. Alzheimer's | 365 | 3.76 |
| 5. Open Mental Hlth | 68 | 0.7 |
| 6. Locked Mental Hlth | 76 | 0.78 |
| 7. Ventilator | 334 | 3.44 |
| 8. TBI | 26 | 0.27 |
| 9. Other | 300 | 3.09 |
| 10. HIV/AIDS | 133 | 1.37 |

N=4 missing

Coding SCU Populations and Comparisons

- 3-digit Code used in following graphs:

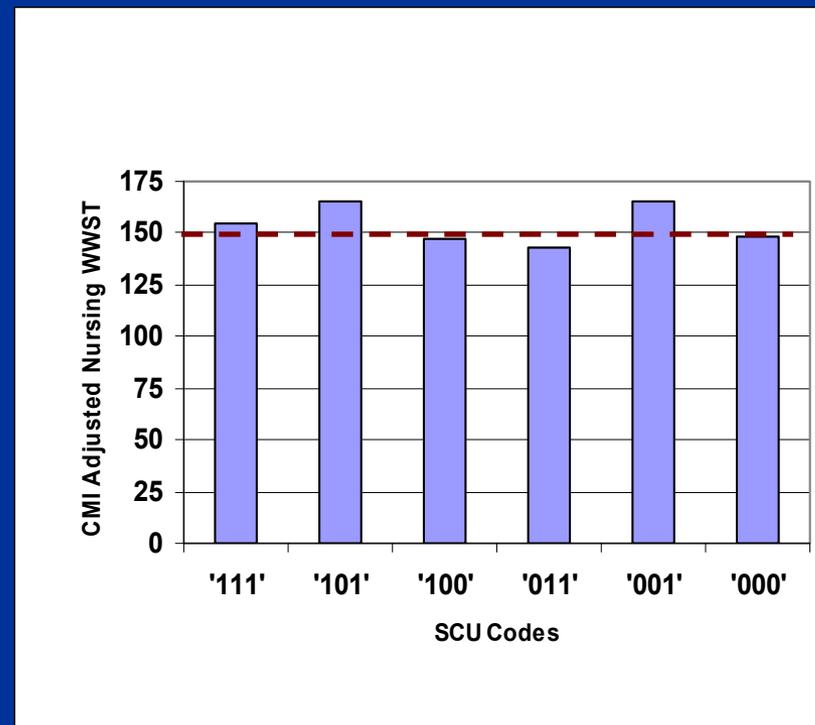
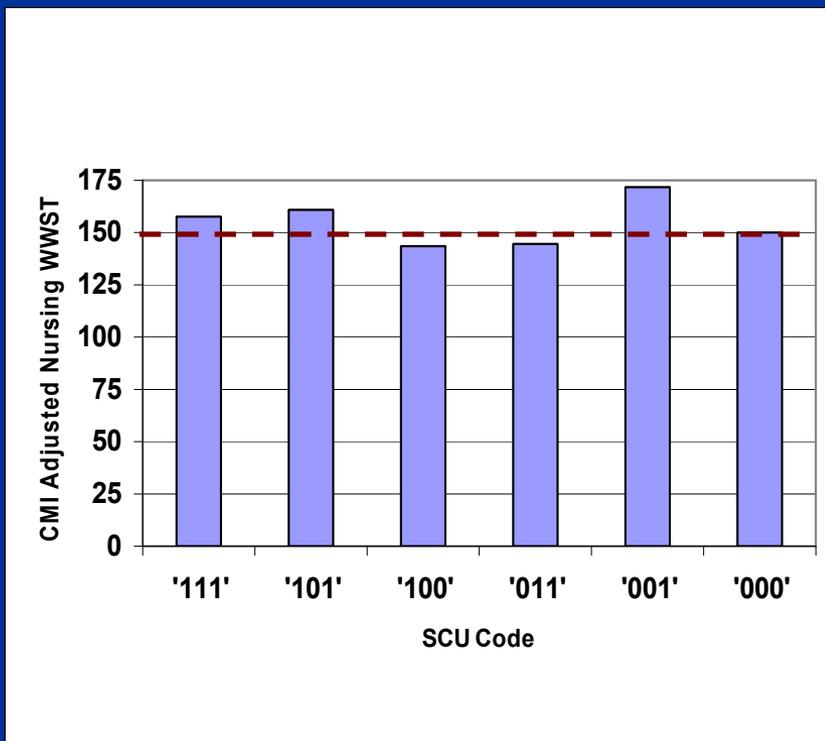


SCU Results

Alzheimer's and Dementia:

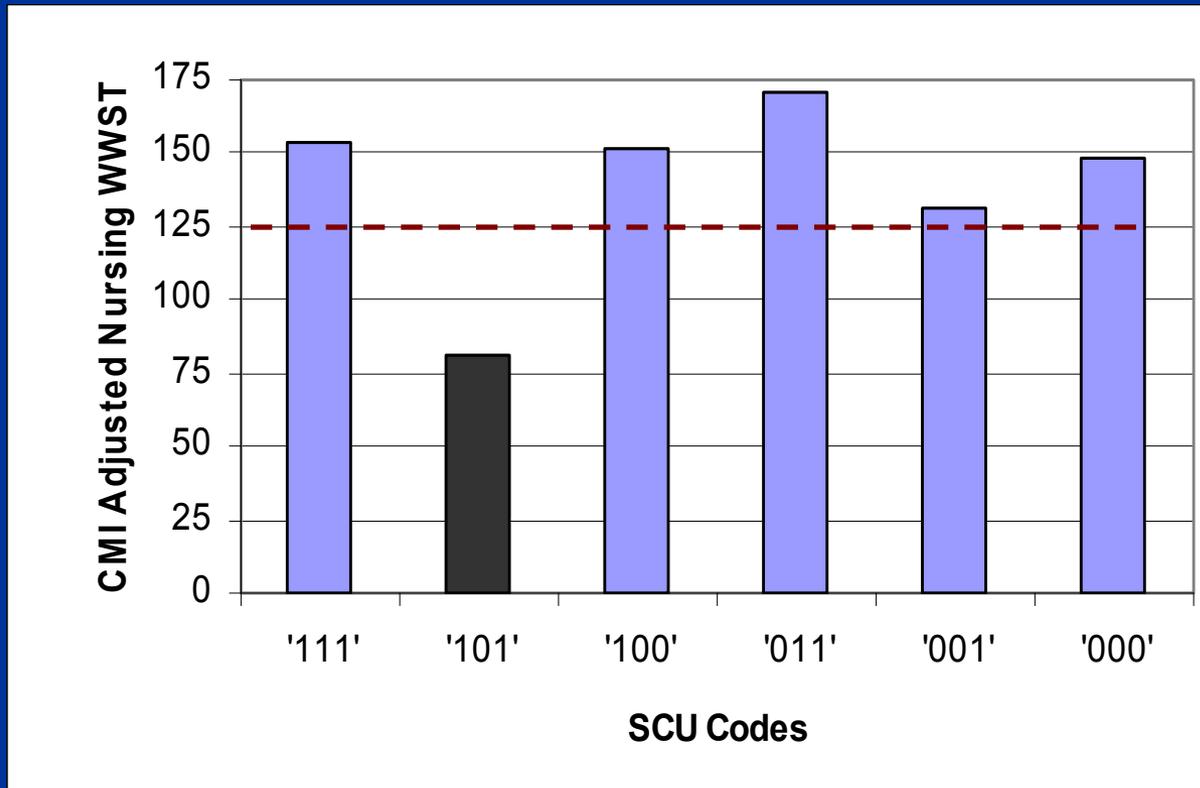
Condition from Diagnoses

Condition from CPS



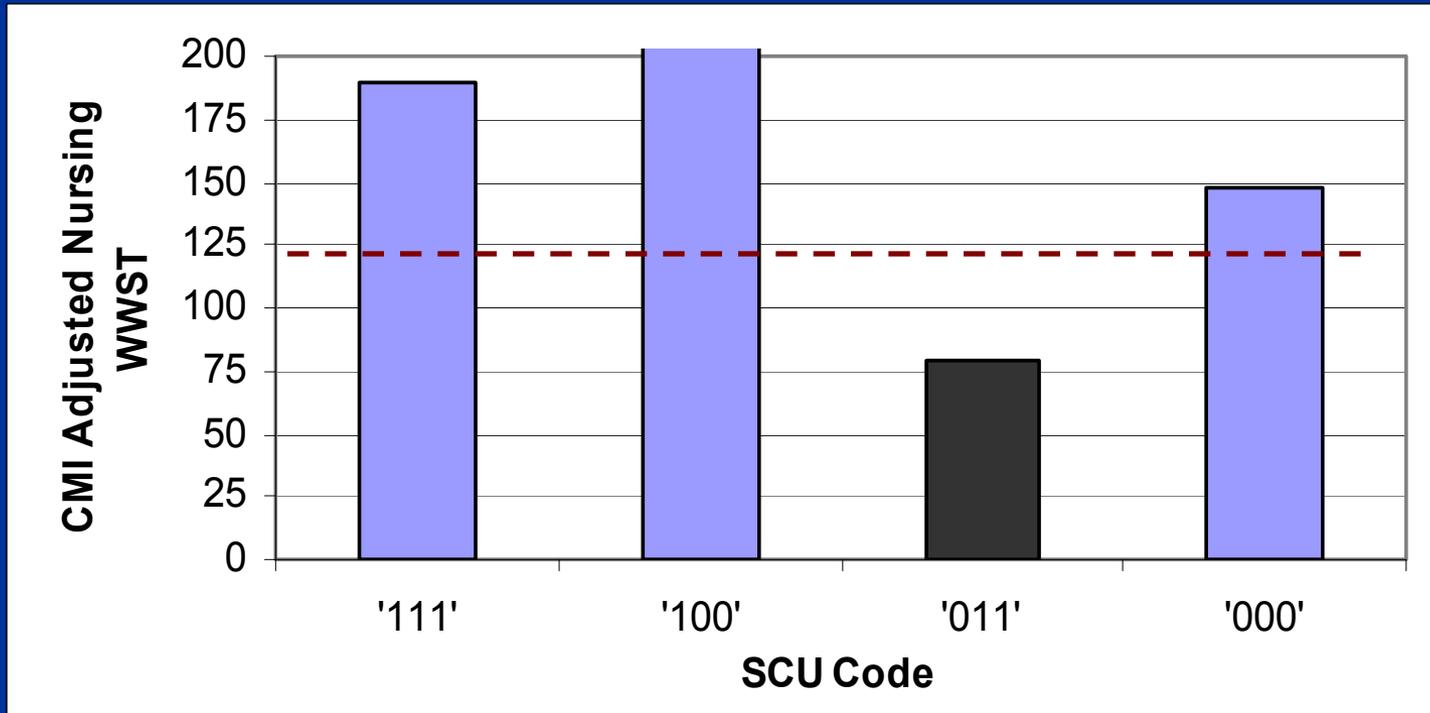
Red dotted line: overall Nursing Mean (148.3). Codes: Condition, SCU, Facility

SCU Results: Ventilator or Respirator



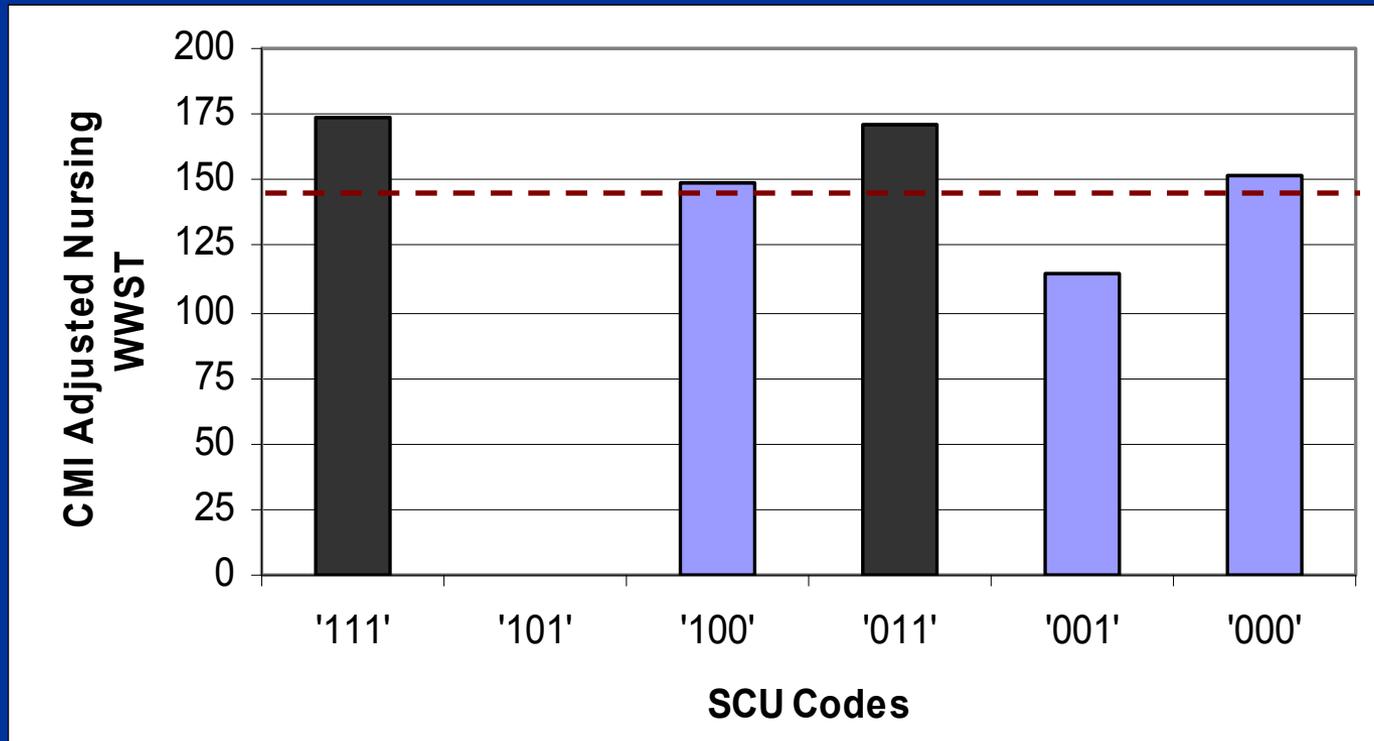
Red Line: overall Nursing Mean (148.3). Black bar: <20 residents. Codes: Condition, SCU, Facility

SCU Results: HIV/AIDS



Red Line: overall Nursing Mean (148.25). Black bar: <20 residents. Codes: Condition, SCU, Facility

SCU Results: Traumatic Brain Injury



Red Line: overall Nursing Mean (148.25). Black bar: <20 residents. Codes: Condition, SCU, Facility

SCU Conclusions

- WWST not different in SCUs or SCU facilities
- Notes:
 - Did not check hospital-based units.
 - Did not consider state differences.

Higher-Weight Persons

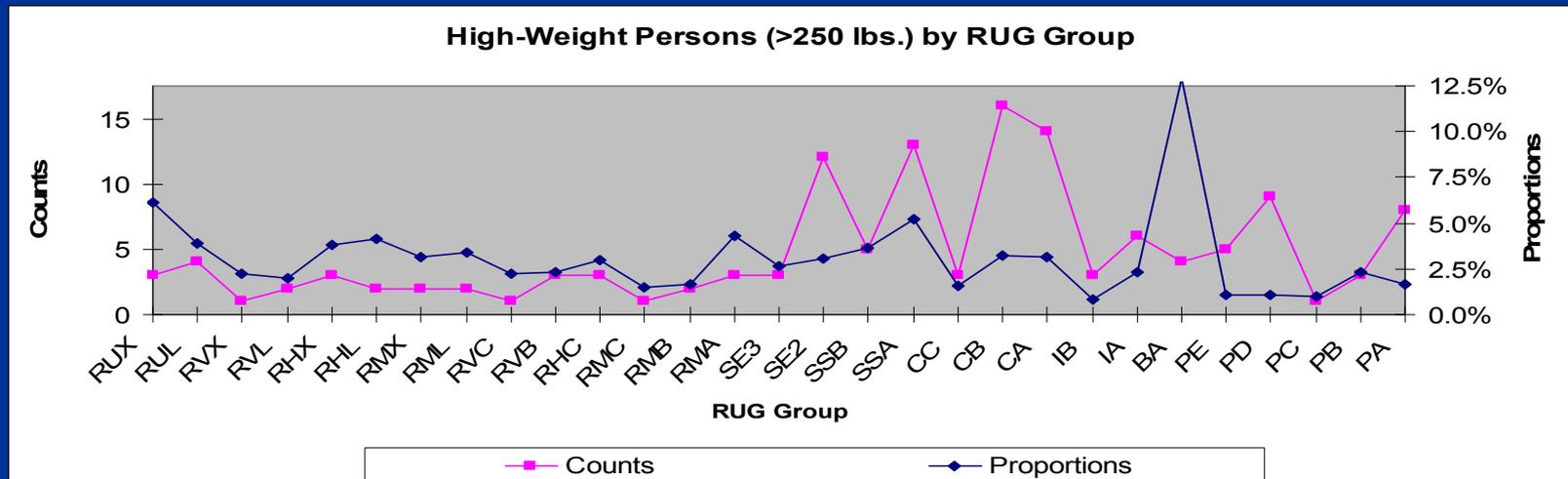
Higher-Weight Persons

- Alternative definitions:
 - Weight (“Bariatric”)
 - Body Mass Index (“Obese”)
- Better results obtained based on weight
- Reasonable thresholds:
 - >250 lbs.
 - >300 lbs.

Higher-Weight Persons

Few Higher-Weight persons (> 250 lbs.)

- 137 (2.4%) (analytic sample)
- Most frequent RUG-III categories: Clinically Complex, Special Care, Extensive

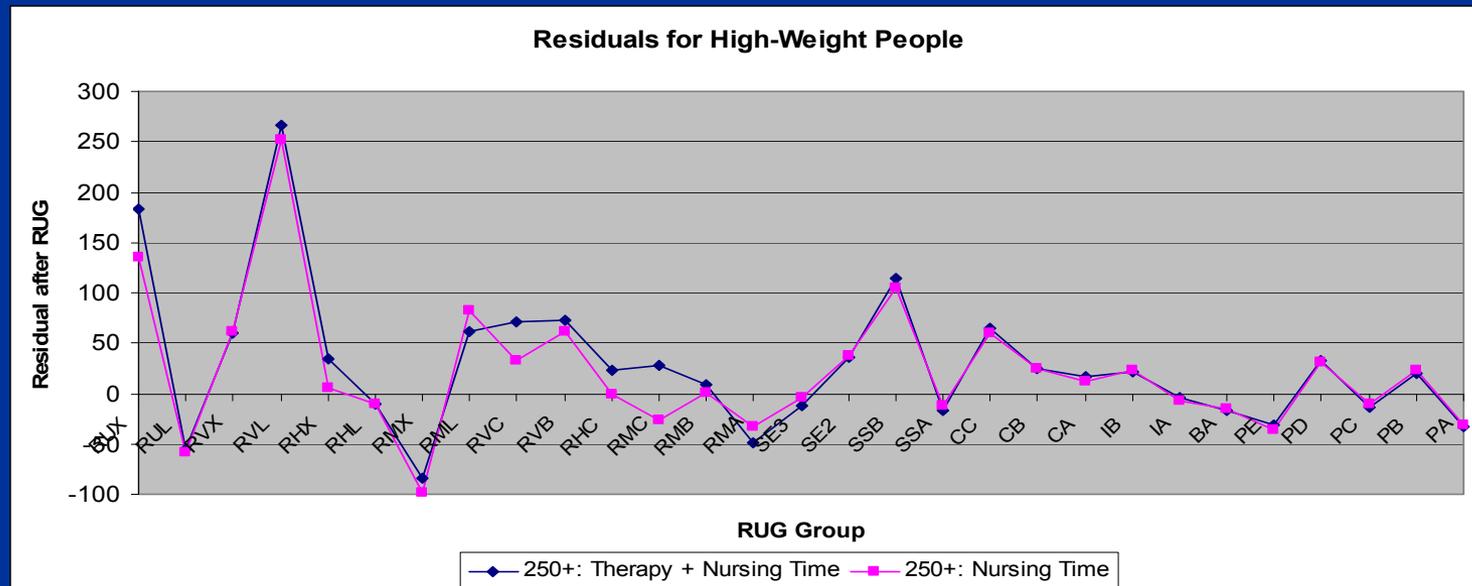


Higher-Weight Persons

- Alternative ways to include Higher-Weight persons in RUGs
 - Modification of ADL Index
 - Tertiary (or other) split within category
- As always, evaluate by:
 - Statistics
 - Clinical sense
 - Incentives

Higher-Weight Persons

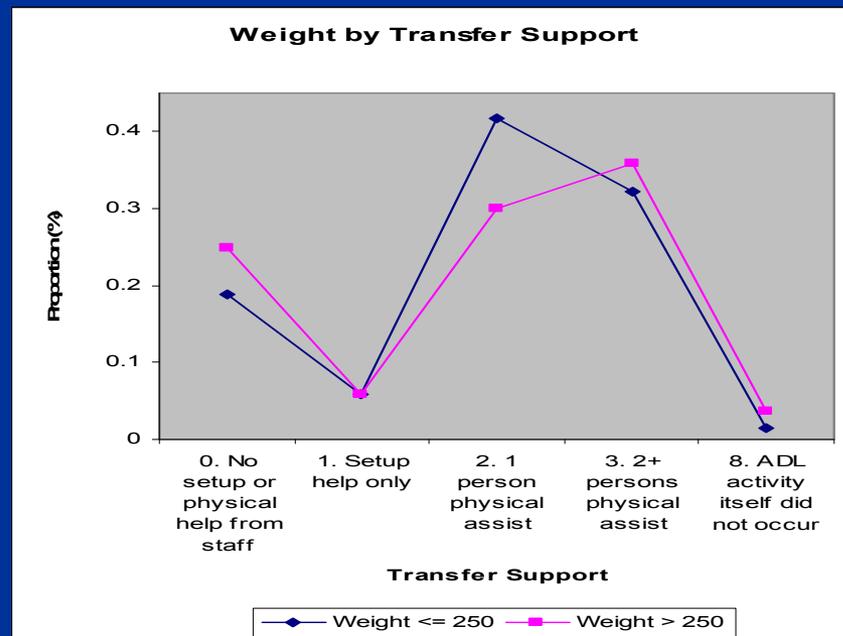
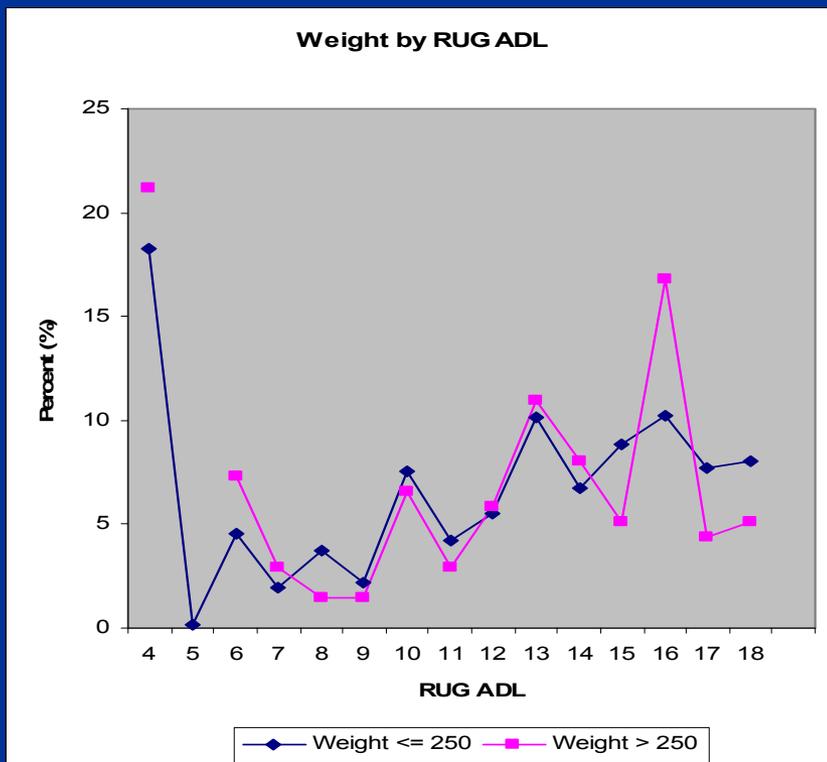
- 17 more average Nursing WWST only slightly higher than overall average (165 vs. 148)
- Could explain < 0.1% additional variance
- WWST not consistently higher across RUG groups; also, small part of WWST



Higher-Weight Persons (>250 lbs)

Not different in ADL Index

...nor receive more 2-person transfers



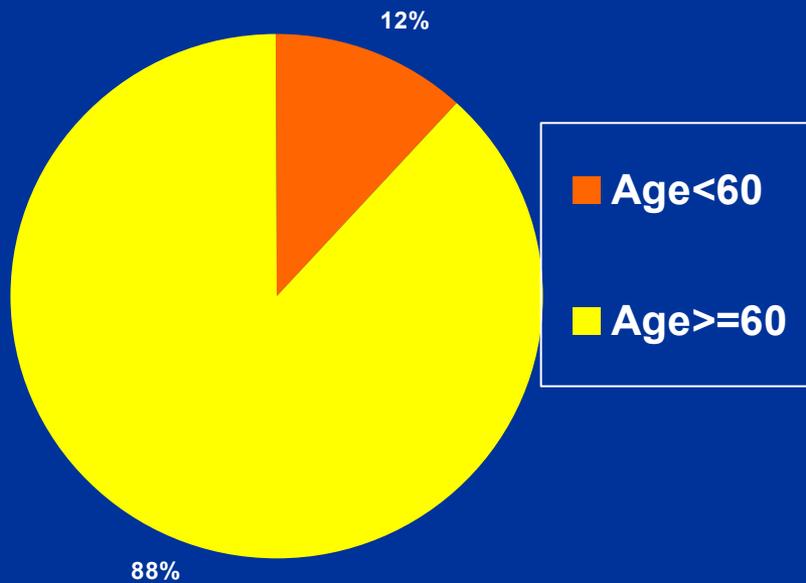
Higher Weight Persons - Conclusions

- Use only slightly more (weighted) staff time
- Not in specific RUG categories
- Do not use more two-person assist
- Sufficiently handled in RUGs

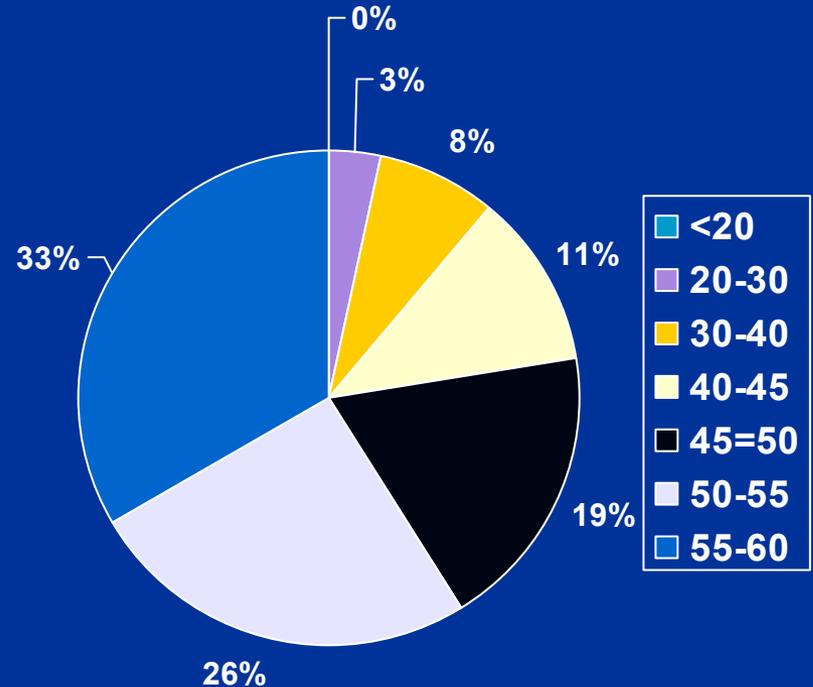
Young Population

Age Distribution

Overall



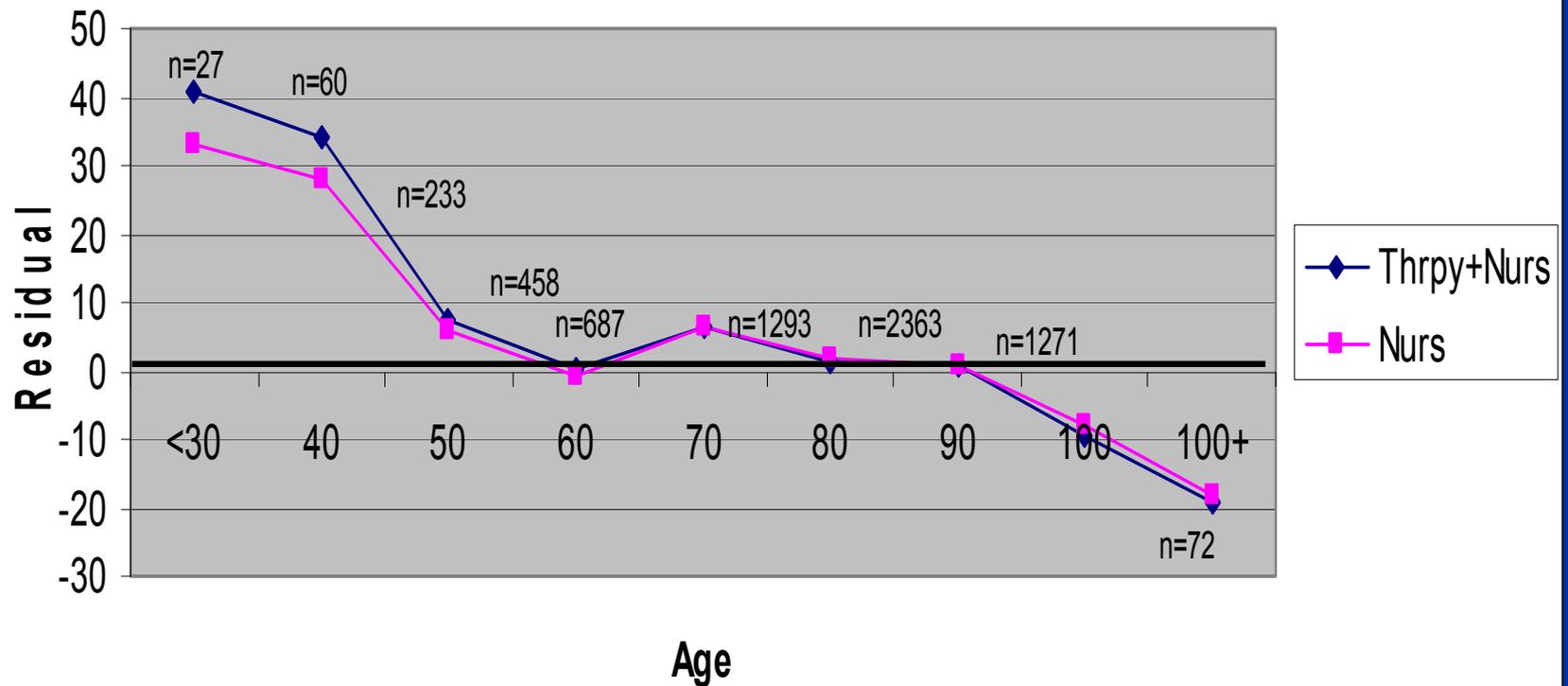
Under age 60



Comparing Residual WWST by Age Thresholds

| Age Threshold X | Number (Age<X) | Mean Residual WWST | | | | | |
|--------------------|----------------|--------------------|----------|------|---------|----------|------|
| | | Therapy+Nursing | | | Nursing | | |
| | | Age < X | Age >= X | Diff | Age < X | Age >= X | Diff |
| 60 | 778 | 6.6 | -0.9 | 7.5 | 4.6 | -0.6 | 5.3 |
| 55 | 519 | 8.9 | -0.8 | 9.7 | 6.3 | -0.5 | 6.8 |
| 50 | 320 | 15.2 | -0.8 | 16.0 | 12.2 | -0.6 | 12.8 |
| 45 | 175 | 24.9 | -0.7 | 25.6 | 21.9 | -0.6 | 22.5 |
| 40 | 87 | 36.0 | -0.5 | 36.5 | 29.5 | -0.4 | 29.9 |

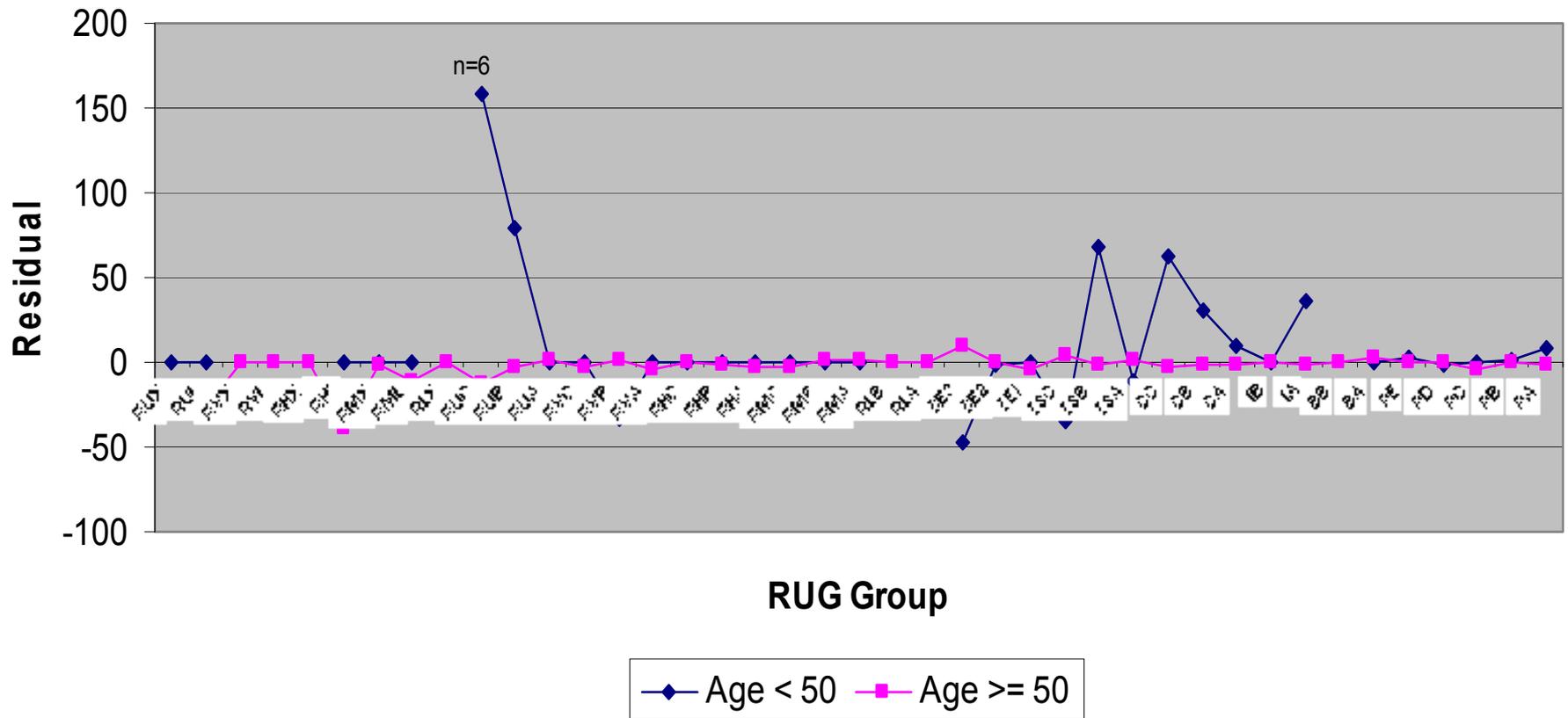
Mean Residual by Age after RUG



RUG Variance Explanation (VE) of Young Population

| Sample | Therapy + Nursing | | | | | | | |
|--------------------------|-------------------|--------|--------|--------|--------|------------|---------|---------|
| | All | Age<30 | Age<40 | Age<45 | Age<50 | 50<=Age<60 | Age>=50 | Age>=60 |
| N | 6,454 | 27 | 87 | 175 | 320 | 456 | 6,134 | 5,678 |
| Therapy + Nursing | | | | | | | | |
| Mean | 184.8 | 298.9 | 245.9 | 209.7 | 195.7 | 170.1 | 184.2 | 185.3 |
| VE on CMI | 0.585 | 0.576 | 0.584 | 0.597 | 0.636 | 0.585 | 0.582 | 0.581 |
| Nursing | | | | | | | | |
| Mean | 148.2 | 246.5 | 210.0 | 181.7 | 164.2 | 145.6 | 147.4 | 147.5 |
| VE on CMI | 0.370 | 0.342 | 0.418 | 0.463 | 0.477 | 0.478 | 0.362 | 0.348 |

RUG Residual of Therapy+Nursing WWST after RUG



| <i>DISEASE DIAGNOSES</i> | <i>Age < 50</i> | <i>50<=Age <60</i> | <i>Age>=50</i> | <i>Age>=60</i> |
|------------------------------------|---------------------------|---------------------------------|--------------------------|--------------------------|
| Cerebrovascular Accident (stroke) | 10% | 19% | 20% | 21% |
| Congestive Heart Failure | 3% | 10% | 24% | 25% |
| Alzheimer's | 0% | 3% | 14% | 15% |
| Dementia other than Alzheimer's | 9% | 14% | 33% | 34% |
| Parkinson's Disease | 0% | 2% | 6% | 6% |
| Head Trauma | 13% | 3% | 1% | 0% |
| Multiple Sclerosis | 3% | 6% | 1% | 1% |
| Hemiplegia/Hemiparesis | 10% | 14% | 10% | 10% |
| Hip Fracture | 1% | 2% | 5% | 6% |
| Osteoporosis | 3% | 9% | 20% | 21% |
| Cancer (not including skin cancer) | 3% | 5% | 8% | 8% |
| Diabetes | 24% | 33% | 32% | 32% |
| Emphysema/COPD/Asthma | 11% | 23% | 21% | 20% |
| Renal Failure | 4% | 7% | 8% | 8% |
| AIDS/HIV | 28% | 15% | 2% | 0% |

AIDS and TBI, by Age group

| Age | Number | AIDS | | TBI | |
|-------|--------|--------|-----|--------|------|
| | | Number | % | Number | % |
| <20 | 1 | 0 | 0% | 1 | 100% |
| 20-25 | 8 | 0 | 0% | 3 | 38% |
| 25-30 | 18 | 2 | 11% | 7 | 39% |
| 30-35 | 23 | 5 | 22% | 4 | 17% |
| 35-40 | 37 | 13 | 35% | 7 | 19% |
| 40-45 | 88 | 32 | 36% | 5 | 6% |
| 45-50 | 145 | 34 | 23% | 13 | 9% |
| 50-55 | 199 | 41 | 21% | 6 | 3% |
| 55-60 | 259 | 25 | 10% | 8 | 3% |
| 60+ | 5686 | 25 | 0% | 24 | 0% |

Results

- Young Population can be defined by age less than 50 or less than 45.
- Young age groups fit RUG system well.
- AIDS and TBI have high incidence rates in Young Population.

Severe Mental Illness

Two Definitions of SMI

- SMI1: Any of 10 diagnostic categories
- SMI2: Any of 10 diagnostic categories
BUT exclude those with severe
dementia (CPS=5,6)

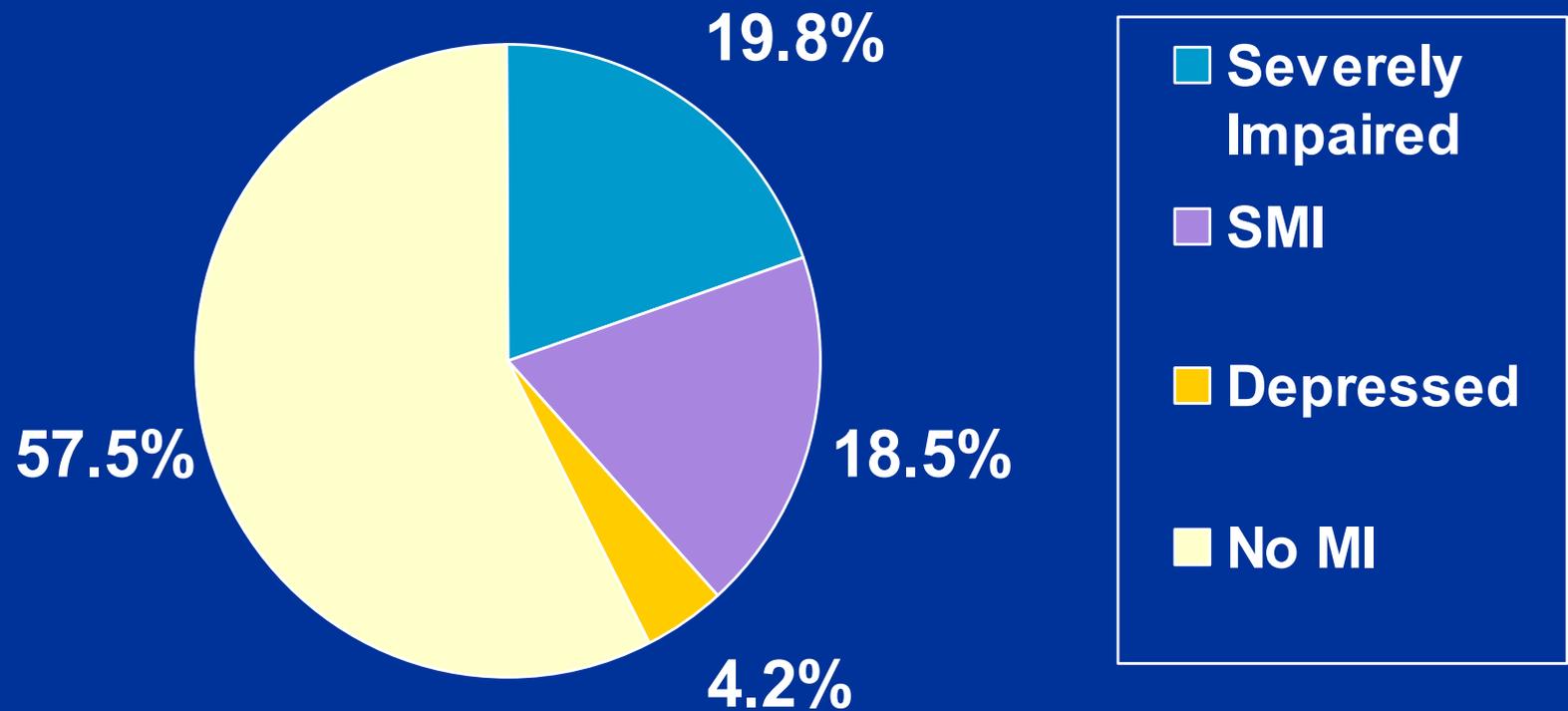
Prevalence of SMI Without Severe Cognitive Impairment

CATEGORY

National Prevalence

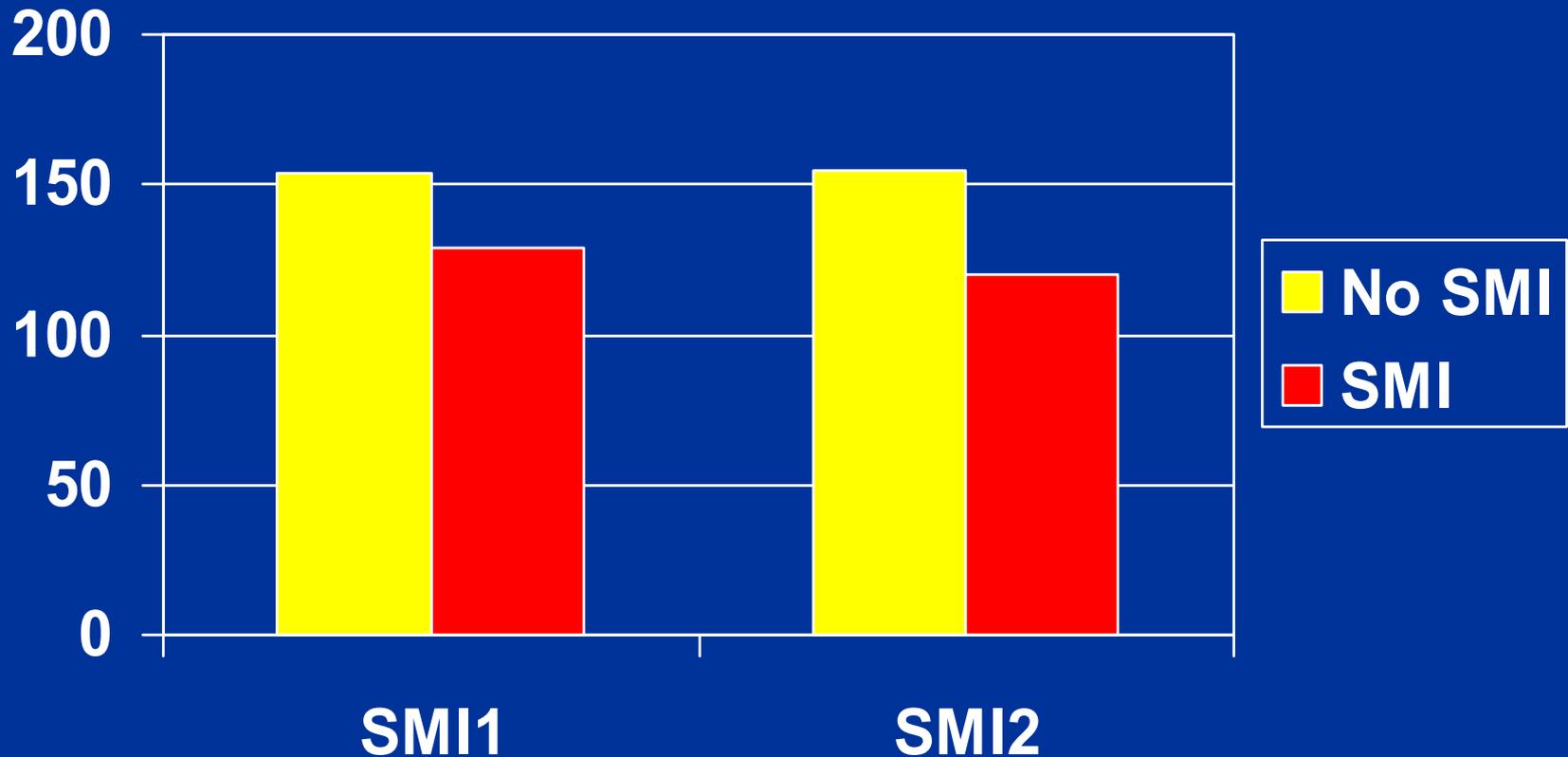
| | |
|---|------|
| Drug/Alcohol psychosis/dependency | 0.8% |
| Schizophrenia or delusions/hallucinations | 4.6% |
| Affective psychoses (bipolar) | 3.2% |
| Paranoid state | 0.5% |
| Other non-organic psychoses | 3.1% |
| Personality disorders | 0.1% |
| Other organic psychotic conditions | 6.7% |
| Psychosis, origin childhood | 0.1% |
| Anorexia, eating or sleep disorder | 0.2% |
| Organic brain damage | 0.3% |

Distribution of Mental Illness

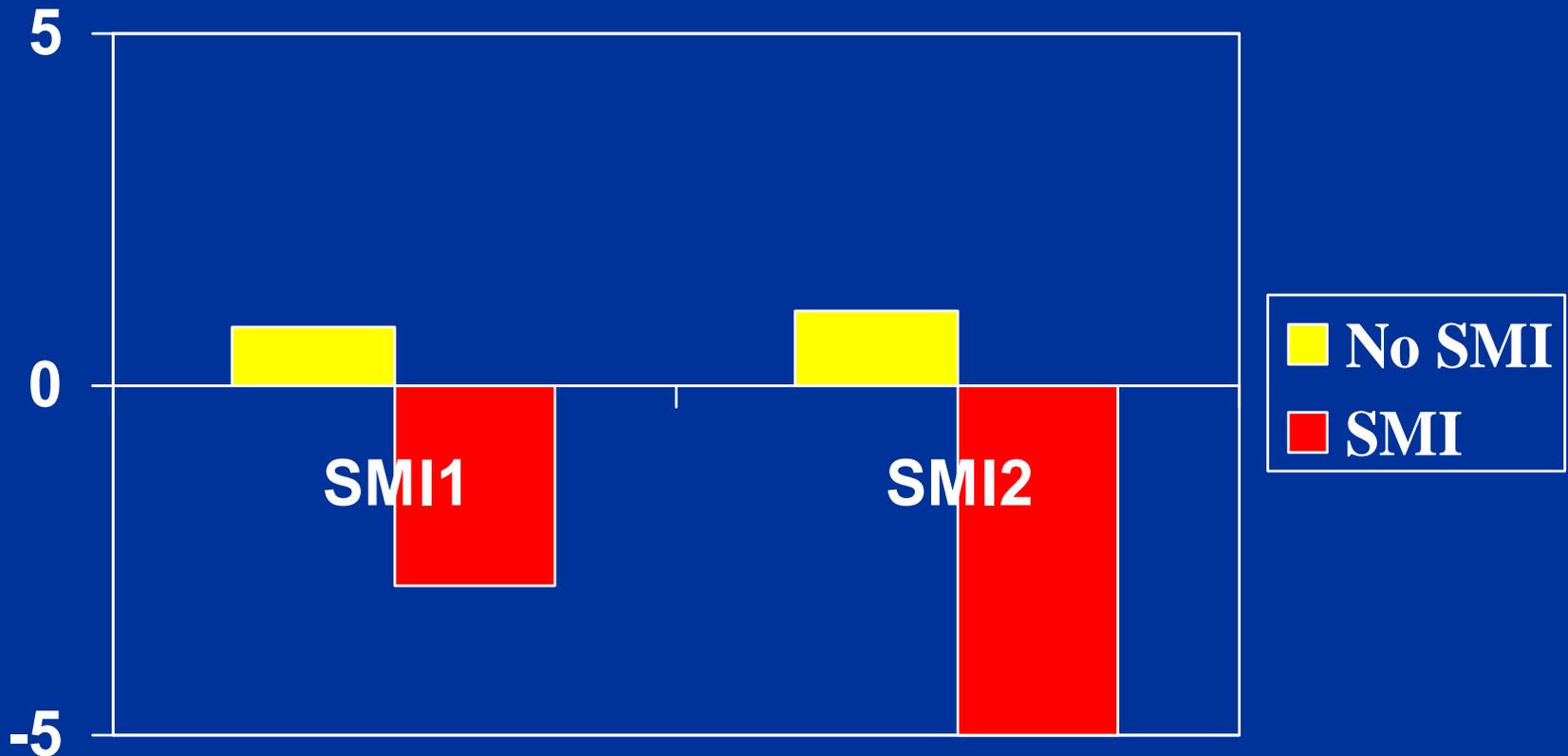


STRIVE – Weighted to national prevalence

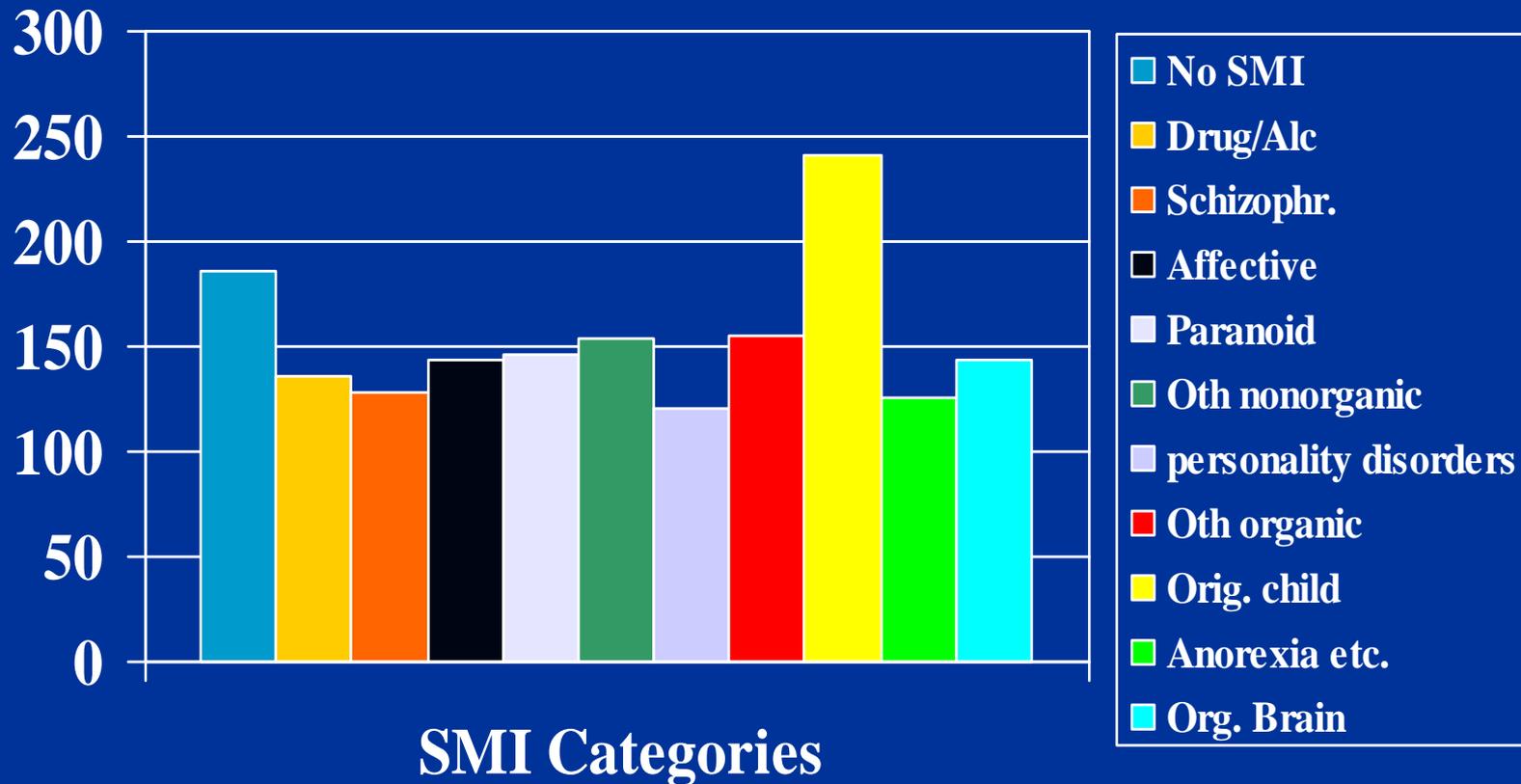
Mean Nursing WWST for 2 SMI Definitions



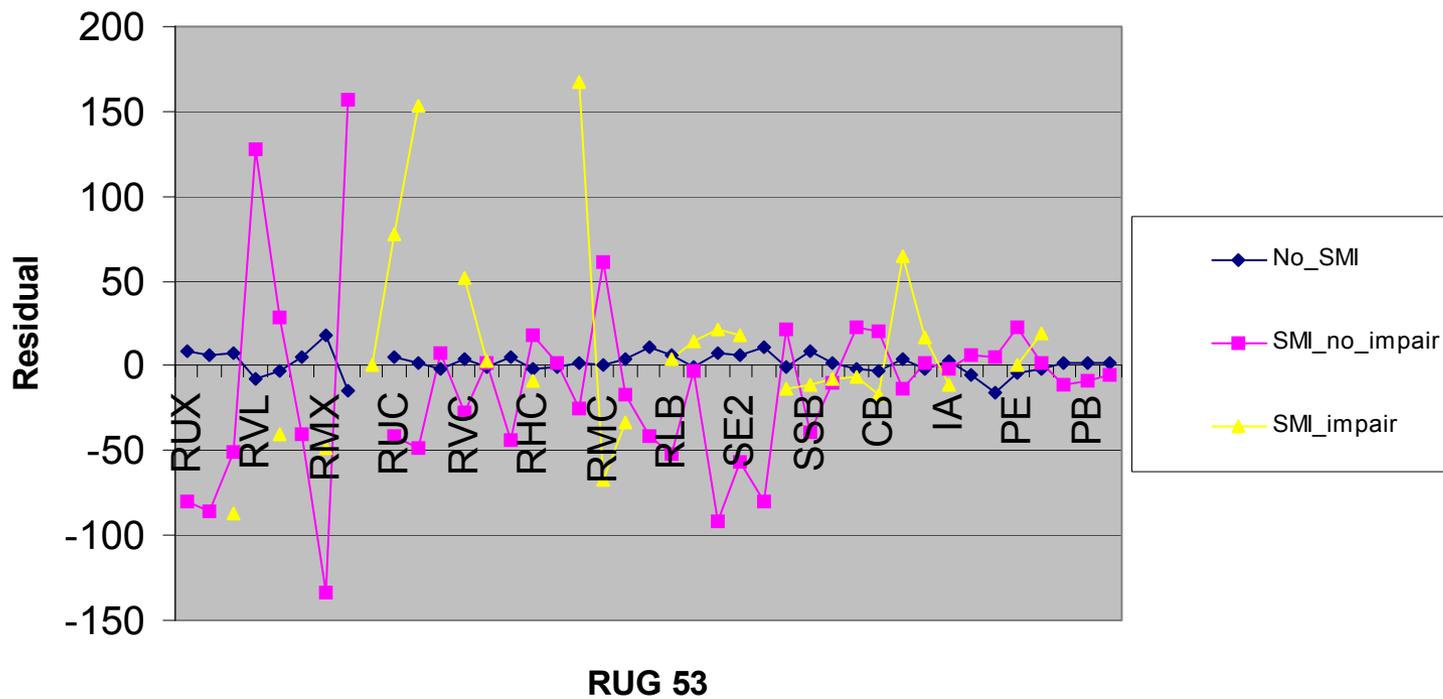
Nursing WWST Residuals (after RUG-III), for 2 SMI Definitions



Mean Nursing WWST by SMI Categories (excluding CPS 5,6)



Residual by RUG 53 (Dep=Thrpy+Nurs)



Results

- SMI group uses less WWST
- 10 SMI diagnostic categories each also use less WWST
- Almost no additional variance explanation (0.0005)
- No significant patterns across RUGs of difference between 'SMI' and 'No SMI' groups
- SMI no use as “lower hierarchy” category

Special Care/Clinically Complex Approach

- Keep criteria that work
- Evaluate new criteria, removing any candidate criteria with poor incentives
- Evaluate ADL thresholds for criteria
- Sort by WWST
 - Adjust for ADL
 - Adjust for overlap in criteria

Appendix B

Final Samples

Final Sample of Facilities

| State | Numbers of Facilities by Facility Sampling Stratum | | | | | |
|------------------|--|-----------|----------|-------------|-------|-------|
| | Hospital Based | High Vent | High HIV | High Part A | Other | Total |
| Dist of Columbia | 1 | 0 | 0 | 0 | 8 | 9 |
| Florida | 0 | 0 | 1 | 3 | 0 | 4 |
| Iowa | 1 | 0 | 0 | 7 | 13 | 21 |
| Illinois | 1 | 1 | 0 | 10 | 3 | 15 |
| Kentucky | 2 | 0 | 0 | 6 | 4 | 12 |
| Louisiana | 1 | 1 | 0 | 1 | 7 | 10 |
| Michigan | 0 | 1 | 0 | 3 | 1 | 5 |
| Montana | 3 | 0 | 0 | 1 | 5 | 9 |
| Nevada | 1 | 0 | 0 | 4 | 10 | 15 |
| New York | 2 | 5 | 6 | 5 | 3 | 21 |
| Ohio | 2 | 1 | 0 | 11 | 6 | 20 |
| South Dakota | 2 | 0 | 0 | 1 | 15 | 18 |
| Texas | 1 | 0 | 0 | 11 | 2 | 14 |
| Virginia | 2 | 1 | 0 | 11 | 3 | 17 |
| Washington | 2 | 1 | 0 | 8 | 4 | 15 |
| Total | 21 | 11 | 7 | 82 | 84 | 205 |

Final Sample of Residents

| State | Numbers of Residents by Facility Sampling Stratum | | | | | |
|------------------|---|-----------|----------|-------------|-------|--------|
| | Hospital Based | High Vent | High HIV | High Part A | Other | Total |
| Dist of Columbia | 54 | 0 | 0 | 0 | 341 | 395 |
| Florida | 0 | 0 | 55 | 151 | 0 | 206 |
| Iowa | 59 | 0 | 0 | 367 | 768 | 1,194 |
| Illinois | 37 | 75 | 0 | 630 | 187 | 929 |
| Kentucky | 79 | 0 | 0 | 337 | 211 | 627 |
| Louisiana | 57 | 48 | 0 | 61 | 417 | 583 |
| Michigan | 0 | 48 | 0 | 194 | 40 | 282 |
| Montana | 130 | 0 | 0 | 60 | 205 | 395 |
| Nevada | 15 | 0 | 0 | 135 | 457 | 607 |
| New York | 109 | 176 | 356 | 220 | 202 | 1,063 |
| Ohio | 45 | 19 | 0 | 525 | 271 | 860 |
| South Dakota | 54 | 0 | 0 | 44 | 617 | 715 |
| Texas | 59 | 0 | 0 | 590 | 95 | 744 |
| Virginia | 113 | 40 | 0 | 601 | 164 | 918 |
| Washington | 52 | 34 | 0 | 383 | 149 | 618 |
| Total | 863 | 440 | 411 | 4,298 | 4,124 | 10,136 |