

# Functional Outcome: An Introduction

Reg L. Warren

This special section was formed to address growing concerns regarding how rehabilitators determine the functional significance of changes in patients' communication skills. Concerns focus on extensive use of the Functional Independence Measure (Granger & Hamilton, 1985), or FIM, which is used as a program evaluation measure in more than 250 rehabilitation programs. FIM has accumulated data on approximately 140,000 patient outcomes.

FIM (Figure 1) uses a seven-point ordinal scale to assess self-care, mobility, locomotion, communication, social/cognition, and sphincter control across eighteen daily-life activities. A look at the FIM scale used to assess expressive language (Figure 2) will help illustrate the scoring system used. There are two levels of overall function: independent, for which no help is required, and dependent, for which some degree of help is necessary. Within the independent category there are two levels: complete (score of 7), in which a patient must be able to express complex or abstract ideas intelligently and fluently, and modified (score of 6), wherein the patient uses an augmentative device or performs the task slowly. In either case, to communicate the patient does not require another individual. Thus, costs associated with this communication level remain low. Conversely, there are five levels of dependence, each requiring an increasing degree of help; they thus have increasing associated costs. Level five (standby prompting) represents a patient who can express basic needs and concepts of daily living more than 90% of the time but who requires prompting about 10% of the time. Accordingly, levels four, three, two, and one apply to patients who need an increasing amount of assistance from another individual.

Scales such as the FIM are intended to describe disability by measuring relative levels of functional independence. But a clear consensus within our profession is that the FIM scales for communication fall far short of that objective.

## FUNCTIONAL INDEPENDENCE MEASURE

### FIM

|  |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
|--|---|--------------------------|--------------------------|---|--|---|---|---|---|--|---|---|---|---|---|---|--|---|--|---|--|
| <b>L<br/>E<br/>V<br/>E<br/>L<br/>S</b> | <b>7 Complete Independence (Timely, Safely)</b><br><b>6 Modified Independence (Device)</b>  | <b>NO<br/>HELPER</b>     |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
|  | <b>Modified Dependence</b><br><b>5 Supervision</b><br><b>4 Minimal Assist (Subject = 75%+)</b><br><b>3 Moderate Assist (Subject = 50%+)</b><br><b>Complete Dependence</b><br><b>2 Maximal Assist (Subject = 25%+)</b><br><b>1 Total Assist (Subject = 0%+)</b>  | <b>HELPER</b>            |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Self Care</b>                       |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
|  | <b>ADMIT</b>  | <b>DISCHG</b>            | <b>FOL-UP</b>            |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>A. Feeding</b>                      | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>B. Grooming</b>                     | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>C. Bathing</b>                      | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>D. Dressing-Upper Body</b>          | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>E. Dressing-Lower Body</b>          | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>F. Toileting</b>                    | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Sphincter Control</b>               |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>G. Bladder Management</b>           | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>H. Bowel Management</b>             | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Mobility</b>                        |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Transfer:</b>                       |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>I. Bed, Chair, W/Chair</b>          | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>J. Toilet</b>                       | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>K. Tub, Shower</b>                  | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Locomotion</b>                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>L. Walk/wheel Chair</b>             | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">w</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">c</td><td style="width: 20px; height: 15px;"></td></tr> </table>   | w                        |                          | c |  | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">w</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">c</td><td style="width: 20px; height: 15px;"></td></tr> </table> | w |   | c |  | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">w</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">c</td><td style="width: 20px; height: 15px;"></td></tr> </table> | w |   | c |   |   |  |   |  |   |  |
| w                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| c                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| w                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| c                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| w                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| c                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>M. Stairs</b>                       | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Communication</b>                   |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>N. Comprehension</b>                | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">a</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">v</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">n</td><td style="width: 20px; height: 15px;"></td></tr> </table> | a                        |                          | v |  | n   |   | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">a</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">v</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">n</td><td style="width: 20px; height: 15px;"></td></tr> </table> | a |  | v   |   | n |   | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">a</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">v</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">n</td><td style="width: 20px; height: 15px;"></td></tr> </table> | a |  | v |  | n |  |
| a                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| v                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| n                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| a                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| v                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| n                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| a                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| v                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| n                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>O. Expression</b>                   | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">a</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">v</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">n</td><td style="width: 20px; height: 15px;"></td></tr> </table> | a                        |                          | v |  | n   |   | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">a</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">v</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">n</td><td style="width: 20px; height: 15px;"></td></tr> </table> | a |  | v   |   | n |   | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="text-align: center;">a</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">v</td><td style="width: 20px; height: 15px;"></td></tr> <tr><td style="text-align: center;">n</td><td style="width: 20px; height: 15px;"></td></tr> </table> | a |  | v |  | n |  |
| a                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| v                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| n                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| a                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| v                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| n                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| a                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| v                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| n                                      |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Social Cognition</b>                |   |                          |                          |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>P. Social Interaction</b>           | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Q. Problem Solving</b>              | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>R. Memory</b>                       | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |
| <b>Total</b>                           | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> |   |  |   |   |   |   |  |   |   |   |   |   |   |  |   |  |   |  |

Note: If item is not testable, enter level 1.

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Figure 1. Functional Independence Measure (Granger and Hamilton, 1985).

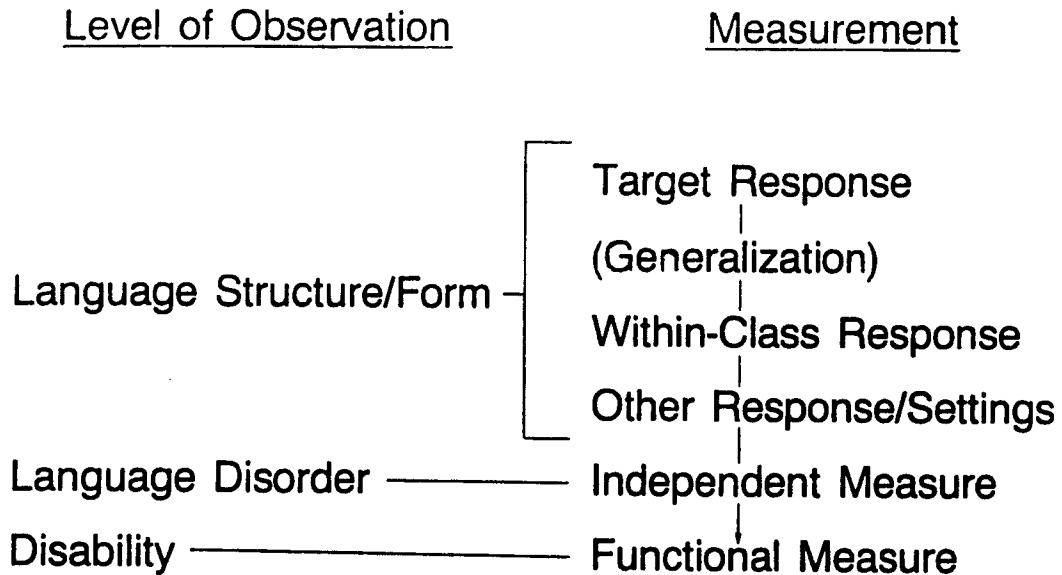
# FIM

| <u>Score</u> | <u>Expression</u>   |                            | <u>Cost</u> |
|--------------|---------------------|----------------------------|-------------|
|              | <u>Independence</u> | <u>No Helper</u>           |             |
| 7            | Complete            | Expresses Complex Ideas    | \$          |
| 6            | Modified            | Augmentative Device/Slow   |             |
|              | <u>Dependence</u>   | <u>Helper</u>              |             |
| 5            | Standby Prompting   | Basic Needs ▶90% of time   | \$\$\$      |
| 4            | Minimal Prompting   | Basic Needs 75-90% of time |             |
| 3            | Moderate Prompting  | Basic Needs 74-50% of time |             |
| 2            | Maximal Prompting   | Basic Needs 25-49% of time |             |
| 1            | Total Assistance    | ◀25%                       |             |

**Figure 2.** Expression Scale, Functional Independence Measure (Granger and Hamilton, 1985).

Specifically, assigning levels of independence to the frequency of assistance needed is arbitrary, raising issues about the validity of the scale. Some disagree with describing a patient who uses an augmentative device as less than completely independent. Reliable use of such a scale appears questionable. Adamovich (1990) compared FIM ratings of patients' communication by nurses and speech pathologists and found that nurses consistently rated communication at a higher functional level than speech-language pathologists. Interestingly, the reciprocal exists between ratings of mobility and locomotion by nurses and physical therapists. Finally, there is a general fear that such a scale would not adequately represent functional changes in communication that occur as a result of treatment during rehabilitation.

Warren, Loverso, and DePiero (1989) suggested that we begin to pay attention to such measures because our ability to demonstrate that our treatments cause patients to become less dependent on others for communication may someday determine how we are reimbursed. We suggested that our notion of accountability should include not only treatment's influence upon language and generalization of treatment effects, strengthened further by parallel improvements in tests of language disorder, but



**Figure 3.** The relationship between level of observation and measurement (Warren, et al., 1989).

should be extended to include the observation of disability by measuring functional communication skills (Figure 3). Dr. Kearns' remarks (Kearns, 1993) on methodology will be most relevant in this regard.

## REIMBURSEMENT

In 1983 Congress passed public law 98-21, creating Diagnostic Related Groups, or DRGs. The traditional notion that reimbursement for health-care should be based on its cost was set aside. Reimbursement systems based on cost induce providers to generate high cost and are not equitable to more efficient providers of healthcare, resulting in little, if any, financial or clinical accountability.

Rehabilitation hospitals and units remained exempt from DRGs in the belief that diagnosis was not an appropriate indicator of resource use in rehabilitation. The Wisconsin-Rand study commissioned by Health Care Finance Administration (HCFA) in 1984 (Hosek, et al., 1986), the Coopers and Lybrand study (National Association of Rehabilitation Facilities, 1985), and a Tufts University School of Medicine study (McGinnis, & Osberg, 1987) support this idea. On average, diagnosis accounts for only 12% of the variation of total charges in rehabilitation. Rehabilitation hospitals were exempted with the assumption that a meaningful alternative would be found. Eight years later, HCFA is still searching for an adequate reim-

bursement mechanism and, in fact, is expected to make a recommendation to Congress by April 1992 [at press time, HCFA had not been able to make a definitive recommendation to Congress]. HCFA may choose a classification system that will predict resource allocation (costs) to be used for prospective reimbursement (perhaps similar to DRGs but based on function).

In contrast to cost-based reimbursement, Batavia (1988) suggests that a model based on functional improvement would give providers incentive to provide access to care, reduce costs, enhance scope and quality of services, produce better outcomes, and rationally allocate capital and labor costs. Reimbursement based on changes in functional status between admission and discharge would directly address the efficiency of services provided. That is, the most efficient providers would be those who produce the greatest amount of functional improvement over the shortest period of time for the least cost. However, reimbursement based on functional change requires valid and reliable measurement of such change. Bush (1993) comments on reimbursement, with specifics regarding developments within Medicare.

## DEVELOPMENT OF FUNCTIONAL SCALES BY ASHA

In May 1990 a report was submitted to the American Speech-Language-Hearing Association (ASHA) from an advisory group that made recommendations pertaining to its review of ASHA's Functional Communication Measure. Based on these recommendations, the measure was revised in December 1990 by a panel of experts including Kathy Yorkston, Cindy Thompson, and me. The revision reduced from 13 to 8 the number of communication domains addressed (Figure 4): speech production, comprehension of language (other than reading), production of language (other than writing), reading, writing, pragmatics of communication, and hearing. A swallowing scale was proposed as a supplemental measure. This revision was considered an initial attempt to develop a more sensitive, valid, and reliable measure of functional communication. A seven-point multi-dimensional scale across eight parameters of response was constructed (Figure 5). The parameters are: intent to communicate; the level of independence as determined by the amount of assistance required; promptness, efficiency, and completeness of communication; the effort observed; the absence of distracting features of the response; and consistency. A plus sign indicates that the dimension is present in the observer's rating; a minus sign indicates that it is not. At this time, the measure continues to undergo revision and therefore is currently unavailable.

The response parameters were intended to provide a basis for improved reliability, validity, and sensitivity. Carol Frattali (the ASHA project direc-

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Speech Production  
 Comprehension of Language (other than reading)  
 Production of Language (other than writing)  
 Reading  
 Writing  
 Pragmatics of Communication  
 Hearing  
 Swallowing (Supplemental Measure)

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**Figure 4.** Functional Communication Measure draft—adults (ASHA, 1991).

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| <i>Parameters</i>     | 1   | 2        | 3            | 4        | 5        | 6 | 7 |
|-----------------------|-----|----------|--------------|----------|----------|---|---|
| Intent to Communicate | -   | +        | +            | +        | +        | + | + |
| Independent           | N/A | Max<br>- | Mod/Max<br>- | Mod<br>- | Min<br>- | + | + |
| Prompt & Efficient    | -   | -        | -            | -        | -        | - | + |
| Complete              | -   | -        | -            | ±        | ±        | + | + |
| Accurate              | -   | ±        | +            | +        | +        | + | + |
| Effortless            | -   | -        | -            | -        | -        | - | + |
| Distraction-Free      | -   | -        | -            | -        | -        | - | + |
| Consistent            | -   | -        | -            | ±        | +        | + | + |

+ = Yes

- = No

Max = Maximal assistance

Mod = Moderate assistance

Min = Minimal assistance

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**Figure 5.** Response/scoring parameters for functional communication scales—adults (ASHA, 1990).

tor) and Cindy Thompson developed a grant proposal that was submitted to the National Institute on Disability and Rehabilitation Research to support further test development and field testing.

The ASHA expert panel revised the Functional Communication Measure for Adults, thinking that perhaps information obtained from it could be collapsed into a more general scale such as the FIM. Byron Hamilton (personal communication), one of the developers of the FIM and current director for research at the Center for Functional Assessment Research at

SUNY-Buffalo (which oversees the FIM data base) has indicated that perhaps ASHA's scale could be adopted as an actual part of a new version of the FIM rather than as a mere supplement to the existing FIM. Hamilton states that he is interested in a reliable and valid communication section that would have broader acceptance in the field and admits that the current scale of communication may be "too minimal." In fact, he went on to say that a scale showing more than two different dimensions of communication would not be out of the question.

FIM was designed to measure program evaluation, the process by which a rehabilitation setting evaluates the appropriateness, efficiency, and success of its services to patients.

In summary, concerns about the measurement of functional changes in communication with a scale such as the Functional Independence Measure, growing pressures upon HCFA to find a more equitable reimbursement mechanism, and a clear consensus that treatment should produce functional changes in communication skills provide the backdrop for Kearns and Busch (1993).

## REFERENCES

- Adamovich, B. (1990, June). A comparison of FIM evaluations by nurses and speech pathologists. Paper presented at the Clinical Aphasiology Conference, Santa Fe, NM.
- Batavia, A. I. (1988). *The payment of medical rehabilitation services, current mechanisms and potential models*. Chicago: American Hospital Association.
- Busch, C. R. (1993). Functional outcome: reimbursement issues. In M. Lemme (Ed.), *Clinical aphasiology* (Vol. 21, pp. 73-85). Austin, TX: PRO-ED.
- Granger, C. & Hamilton, B. (1985). *Functional independence measure (FIM)*. New York: The Task Force for Development of a Uniform Data System for Medical Rehabilitation. Project Office, Department of Rehabilitation Medicine, Buffalo General Hospital.
- Hosek, S., Kane, R., et al. (1986). *Changes and outcomes for rehabilitative care: implications for the prospective payment system*. Santa Monica, CA: Rand.
- Kearns, K. P. (1993). Functional outcome: methodological considerations. In M. Lemme (Ed.), *Clinical aphasiology* (Vol. 21, pp. 67-72). Austin, TX: PRO-ED.
- McGinnis, G. E., & Osberg, J. S. (1987). Predicting changes for inpatient medical rehabilitation using severity, DRG, age and function. *American Journal of Public Health*, 77, 826-829.
- National Association of Rehabilitation Facilities. (1985). A position paper on a prospective payment system for inpatient medical rehabilitation services and a study regarding a prospective payment system for inpatient medical rehabilitation services. Final report by Coopers and Lybrand.
- Warren, R. L., Loverso, F. L., & DePiero, J. (1989). The relationship between level of measurement, generalization and reimbursement. In T. E. Prescott (Ed.), *Clinical Aphasiology* (Vol. 19, 163-170). Austin, TX: PRO-ED.