

ACTIVITIES OF DAILY LIVING: TOOLS TO MEASURE FUNCTIONAL LOSS

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A previous report in this *Journal* focused on the medical aspects of long term care insurance (LTC) risk selection.¹ That article highlighted the key underwriting considerations inherent in LTC risk segmentation. Since publication of that report nearly two years ago, LTC products have evolved to include coverage for a wide variety of insureds, including employer groups, individuals, and communities for the elderly. Currently, LTC products provide personal risk protection against financial loss resulting from significant functional incapacitation. In order to quantify that functional loss, a tool was needed which had proven validity, easy reproducibility and wide acceptance. Activities of Daily Living are the basic functions we humans perform each day in order to maintain an independent quality of life and the index of Activities of Daily Living (ADLs) has become the tool which quantifies those functions.

This report reviews the development, history and implication of ADLs for long term care insurance. It is prudent that those individuals involved in LTC fully understand this tool. Physicians, as well as product designers, marketers, underwriters, benefits specialists, public policy makers and regulators need to have a working knowledge of the scientific basis for the index in order to use these measures correctly. Medical directors in particular are in the unique position to combine their knowledge of medicine and risk management to advise others regarding the scientific basis and utility of the index of Activities of Daily Living.

The Need to Quantify Functional Loss

A significant number of Americans are dysfunctional to the point of being unable to perform the most basic of day-to-day activities.² In many cases their ability to maintain an acceptable quality of life is not dependent upon the successful treatment of their illness, but instead upon the maximization of their functional abilities. As a result, over the last several decades the focus of medical care has shifted away from simply the prolongation of life and increasingly toward the improvement of functionality. In part, this trend has occurred because the average life expectancy has increased.

Conservative estimates in the mid-80s predicted that by the 21st century the number of individuals living past the age of 65 will have increased by six million.³ Census Bureau projections indicate that there will be more than thirty-five million Americans over the age of 65 by the turn of the century, accounting for nearly one-seventh of the population.⁴ When people live longer, their risk of developing a chronic, debilitating condition increases. Indeed, demographic projections indicate that the size of the elderly population that is chronically dysfunctional or who require institutionalization will increase significantly.⁵

By its very nature, quality of life is difficult to measure.⁶ What is perceived as high quality by one individual may be unacceptable to another. There is common agreement, however, that the ability to remain independent in the day-to-day functions of life is a basic requirement. When people become dependent in the basic functions of everyday existence, various resources - medical, financial, social and family - are required to maintain quality of life. The availability and cost of these resources are major issues facing society today.

At present, several potential sources of assistance exist. Eighty percent of those individuals over age sixty-five who are significantly dysfunctional continue to live in the community setting because of assistance provided by family and friends. The remaining twenty percent require some form of institutional care. Whether living at home, residing in a nursing home or other facility, significant financial resources are required to maintain an acceptable quality of life.⁷ These resources may include family, friends, charitable organizations or government programs such as Medicare and Medicaid. Medicare, however, typically provides only short-term acute assistance and then only if the individual resides in a skilled nursing home and receives care according to Medicare's requirements.

In 1985, approximately forty-five percent of individuals admitted to a nursing home either had Medicaid at the time of admission or became Medicaid eligible as a result of asset depletion while residing in the nursing home.⁸ For individuals over age seventy, more than three quarters exhaust their financial resources within

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one year of nursing home admission.⁹ To qualify for Medicaid benefits, an individual must spend down his or her assets to the poverty level. Thus, a significant number of the dysfunctional elderly are at risk of losing assets accumulated over a lifetime just to meet their basic long term care needs.

On a personal level, individuals are recognizing that significant functional loss places them at a financial risk and are seeking alternatives for long term care financing which will allow them to maintain an acceptable quality of life while protecting their assets and avoiding dependence on their families. In response to this need private insurance programs have become more widely available as the industry has developed long term care products that protect against this financial risk.

Increasingly, long term care insurance is being seen as an extension of disability insurance. Just as standard income disability products provide financial protection when an individual loses work capacity,¹⁰ LTC policies provide benefits when the ability to function independently is lost. LTC insurance protects against asset depletion and provides resources for families to assist in caregiving, while maintaining the insured's choice in decisions concerning ongoing care.

At least two types of long term care insurance products presently exist.¹ Both generally use disability as a trigger for benefits, i.e., the insured by experiencing a loss of functional ability can not perform the essential functions of daily living, or has suffered a cognitive impairment which requires some degree of supervision to perform day-to-day activities. In effect, these people have become disabled for independent living. The chief difference between the two products is the reimbursement mechanism employed.

One type, the medical reimbursement model, provides benefits if the insured is disabled, incurs medical expenses and submits proof of those expenses. The products vary, but generally the insured is reimbursed for incurred medical expenses up to a specified, pre-determined maximum. The other product type provides a monthly disability indemnity amount for the duration of the policy, regardless of whether medical services are needed.

Much like a standard income disability product, benefit durations may vary in length. In the case of long term care insurance the duration may range from two years up to lifetime, but a three- to five-year period is typical. Regardless of the type of reimbursement mechanism utilized, the determination of disability requires the quantification of functional loss. To make this determi-

nation, a measurement tool which provides an assessment of the loss of the ability to perform independently the Activities of Daily Living is needed.

Development of the Index of Activities of Daily Living

Physicians have long recognized the relationship between chronic illness and functional loss. It has been only over the last thirty-five years, however, that efforts have been made to improve our understanding of the nature of these losses. In the 1950's the Social Security Administration through the Commission on Chronic Illness and the World Health Organization recognized the need to develop a tool which measures functional loss.¹¹ The efforts of this commission resulted in a classification system described as "lacking specificity" and thus not useful for quantifying functional loss.¹² Since those initial efforts, further progress has resulted in the development of a measurement system which has become widely accepted and continues to be refined.¹³

In the late 1950's, as a result of the need identified by the Commission on Chronic Illness, Dr. Sidney Katz and his colleagues at the Benjamin Rose Hospital in Cleveland, Ohio, published a series of papers reporting their experience in studying the effects of debilitating illness on the basic functions of day-to-day life.^{10,14,15,16} As a result of these studies they developed an index of the Activities of Daily Living which reliably measures an individual's functional loss.¹⁷

Initially, patients who had suffered a fracture of the hip were followed for a period of two years. The studies were later extended to include patients suffering from other chronic illness such as rheumatoid arthritis, cerebrovascular disease, cancer, osteoarthritis and coronary artery disease.¹⁸ This index of ADLs so developed addressed the lack of specificity inherent in previous measurement tools.

The index of Activities of Daily Living (ADLs) consists of six functions combined into seven hierarchically-ordered profiles. It covers the functional spectrum from complete independence to complete dependence in all six functions. The six activities as defined by Katz are:¹⁰

- Bathing - the ability to sponge, shower or tub bathe.
- Dressing - the ability to get clothes from closets or drawers, as well as the act of clothing oneself.
- Toileting - the act of getting to the toilet for purposes of excretion, as well as getting on and off the toilet, arranging clothes and cleaning the organs of excretion.

- Transfer - the movement of a person in and out of bed and in and out of a chair.
- Contenance - self-control of urination and defecation.
- Feeding - getting food from a plate into the mouth.

An individual is judged to be independent in the activity if he or she successfully performs the function without supervision, direction, or active assistance. Combining these activities into seven profiles results in the following index.

- A. Independent in bathing, dressing, toileting, transferring, continence, and feeding.
- B. Independent in all but one of these functions.
- C. Independent in all but bathing and one additional function.
- D. Independent in all but bathing, dressing and one additional function.
- E. Independent in all but bathing, dressing, toileting and one additional function.
- F. Independent in all but bathing, dressing, toileting, transferring and one additional function.
- G. Dependent in all six functions.

Katz demonstrated that this index was a valid tool describing changes in a patient's status over time and comparing changes in the course of an illness among patients. Similar relationships in the probability of functional deterioration were found with co-morbid conditions such as congestive heart failure, and the amount of nursing time required to care for the individual. For the first time providers of care to the chronically ill had a tool which reliably measured functional loss.

Katz's original description of the index identified several potential practical applications.¹⁵ Chief among these are its inherent objectivity, its usefulness in determining prognosis, its utility in guiding treatment, and its value as a research tool in comparing populations of patients.¹⁴ Since that time ADLs have become ingrained in medicine. They are the common language by which physicians, nurses, physical and occupational therapists communicate about patients with significant functional loss. Furthermore, federal proposals use ADLs to determine funding levels for both home and institutional care.¹⁹ Following publication of the original research, increased understanding of the nature of ADLs has occurred. For those involved in long term care it is important to understand these implications.

Hierarchical Structure

Once a valid set of measurement parameters for quantifying functional loss was identified, it became important to understand fully the nature of these activities. Did they occur in a random fashion, were they condition specific, or was there something inherent in them that allowed them to be used irrespective of the underlying impairment? If a pattern could be identified, then the index's usefulness became greater, as it then became applicable to a wide variety of conditions.

Subsequent investigations have addressed some of these questions. For example, it has been found that each activity represents a separate and distinct function. Furthermore, in ninety-three percent of the cases studied, ADL loss and recovery occurs in a sequential and hierarchical order that is independent of individual medical conditions.^{15,20} Specifically, an individual first loses the ability to bathe independently, then to dress without assistance, then to toilet and so on until all six functions are lost. Likewise, when recovery is possible, impaired individuals tend to recover these functions in the reverse order.

Explanations put forth to explain the basis of the hierarchy were related to the biological and cultural behavior of these activities.^{15,18,21} Early on it was recognized that ADLs and their characteristic order of loss closely mirrored the patterns seen in child development. Childhood growth has been described in terms of both the locomotor and neurologic aspects of basic vegetative functions: transferring, continence, feeding and the culturally-learned functions: bathing, dressing and toileting.

The loss and recovery of activities of daily living closely parallel early childhood development. Activities most essential for survival such as feeding are acquired first and lost last, while those least essential to survival like bathing are learned last and lost first. The implications of these findings for long term care insurance are important and will be further examined in the following sections.

The Instrumental Activities of Daily Living (IADLs): Predictors of the Need for Assistance

The basis of private long term care insurance is the provision of financial protection against asset loss and the protection of the insured's ability to maintain independence in ongoing care decisions when he or she becomes functionally dependent. As in many insurance products, prudent risk selection is important to maintain the viability of the product and insure ongoing

protection for the insured. The identification of specific medical conditions which have an increased risk of causing loss of independence in ADLs is basic to the risk selection process. Other predictors of the future need for assistance, either in the institutional or home care setting, are advancing age, cognitive dysfunction, social isolation and the Instrumental Activities of Daily Living.

Following Katz's development of ADLs subsequent investigators recognized additional characteristics of human behavior which reflected various aspects of functional status. In the late 1960's, M. P. Lawton and others described the Instrumental Activities of Daily Living as another valid indicator of functional loss.²² While ADLs are the basic functions that humans do every day in order to maintain an independent quality of life, the Instrumental Activities of Daily Living are those activities performed to remain independent in the community. IADLs include shopping, driving, preparing meals, cleaning house, and managing personal finances. Interestingly, just as a hierarchical relationship exists among the six ADLs, a similar relationship has been shown between ADLs and two particular IADLs: shopping and transportation.¹¹

Multiple studies have shown that loss of the ability to perform an IADL is predictive of the need for home care assistance, hospitalization and institutionalization.^{17,23-27} In many cases individuals requiring this level of assistance will ultimately become more dysfunctional and lose ADLs. Knowledge of the pattern of functional loss - many times related to the natural history of the underlying medical condition - and the incidence/duration of functional loss, is important for those individuals involved in LTC risk selection and actuarial projections. A study based upon the 1984 National Long Term Care Survey, gives a good summary of age-segmented, functional loss, incidence and duration data for individuals who have lost IADLs, ADLs or combinations of both.¹⁷

Active Life Expectancy

Mortality is an important issue in a variety of insurance products. The mortality ratio is of prime importance in life insurance underwriting, and life expectancies also have implications in the risk selection of disability and health insurance.¹ In the case of Long Term Care insurance, an additional mortality concept based upon ADL loss has been developed.

The concept of "Active Life Expectancy" was introduced in 1983 using the already established index of Activities of Daily Living and life-table techniques.²⁸ Termed the

Active Life Expectancy, this measurement predicts, for a large population of individuals, the expected duration of functional well-being, and represents the average remaining years of independent life. Other authors have used this concept when examining the rehabilitation needs of the aging population.²⁹

To determine the active life expectancy, a population of non-institutionalized elderly Massachusetts residents were studied. Independence was considered to have been lost if any of three criteria were met: loss of function in one ADL, institutionalization, or death. By examining the five-year intervals from age 65 to over 85, the average active life expectancy was determined based on these criteria. The Table is modeled after the life-table so developed. As this table shows, the average active life expectancy declines with increasing age. Individuals in the 65 to 69 year interval have on average 10 years of independent function remaining, while those greater than age 85 have 2.9 years left.

Table
Active Life Expectancy

Interval, Years	Alive & Independent No./100,000	Loss of Independence No./100,000	Active Life Expectancy, Years
65-69	100,000	29,152	10.0
70-74	70,848	28,304	8.1
75-79	42,544	17,418	6.8
80-84	25,126	14,353	4.7
>85	10,773	10,773	2.9

After Katz.²⁶

The implications of average life expectancy data are important in order to fully understand the likelihood that a given group of cohorts will remain independent. For instance, for an insured population the mean life expectancy in the 65 to 69 age interval is 14 years.³⁰ Knowing that on average individuals in this interval have 10 years of "active" life expectancy remaining, one can estimate an average period of dependency of 4 years. This kind of analysis is useful when evaluating large groups of people. Individual risk assessment, however, must also consider the probability that a person with a specific medical condition will in the future lose ADL function as a result of that impairment.¹

The implication of this analysis for long term care risk selection will vary depending upon the characteristics of the product to which it is applied. For instance, differing elimination periods, benefit periods, benefit amounts, exclusions, and benefit triggers all must be

taken into account to fully understand the risk selection for a specific product. Integrating the concept of average life expectancy into the process adds to the complexity but is needed to fully comprehend the future risk. To incorporate average life expectancy as a risk predictor, not only must one understand the specific product but also, as outlined above, the assumptions inherent in the calculation of average life expectancy must be considered.

Cognitive Function

In addition to losing ADL function as a result of a specific impairment, individuals may lose the ability to perform an ADL because of cognitive dysfunction. That is, the person may not have the appropriate cognitive abilities to carry out the activity. For the purposes of this discussion, cognition is the process performed by the human brain to carry out mental activities such as: reasoning, thinking, remembering, orientation, or judgment. In many situations it is difficult to determine whether ADL loss is secondary to a specific medical condition, such as a carcinoma of the lung, or whether the loss results from cognitive dysfunction.

Cognitive impairments can arise from a number of conditions. Some of these are clearly related to medical conditions such as Alzheimer's dementia, Parkinson's disease, or multi-infarct dementia, while others are caused by psychiatric conditions such as pseudo-dementia of depression, the manic phase of bipolar illness, and schizophrenia. Regardless of the underlying cause, cognitive dysfunction can result in dependence through either the loss of ADL function, or the need for another person to be present and protect against the risk to the impaired individual's safety.

Interestingly, the initial studies on functional loss recognized the difficulty in attributing functional loss to a specific underlying condition.¹⁰ To avoid bias, the observer made no attempt to decide if the individual being tested had the capability to perform the function. Instead, the key issue was whether the ADL was performed. Thus, in the original studies if someone with a fractured hip could not dress, no attempt was made to determine whether this loss was secondary to a specific medical condition, which would render the individual incapable of carrying out the activity, or whether there existed cognitive, emotional or motivational factors underlying the loss. Likewise, if the person had a cognitive deficit, the underlying cause of the impairment, be it psychiatric or non-psychiatric, was not considered relevant.

Recognizing the inherent difficulty in differentiating the underlying cause of ADL loss, many long term care policies not only use the index of ADLs as the tool to measure functional loss, but also recognize that loss of independence in ADLs may result from cognitive deficits. Being aware that significant dysfunction may occur regardless of the underlying cause is consistent with the underlying scientific basis of ADLs.

Multiple clinical assessment tools have been developed to aid the examiner in determining the level of cognitive function. These tools vary in their complexity, time needed to perform them, level of training, skill of the examiner, and the aspects of cognition being assessed. Several of them are applicable as screening tools for risk assessment and benefits adjudication purposes due to their ease of administration, proven reliability and validity.

The short portable mental status questionnaire, the Folstein mini-mental status examination, and the Knopman delayed word recall all screen for the presence of cognitive dysfunction, are easily administered, and have well-documented validity.³¹⁻³⁵ In many cases the status of an individual's cognitive function can be ascertained from information supplied by the attending physician. At other times this data needs to be supplemented by having an individual trained in the administration of these tests assess the applicant/claimant to determine the level of cognitive function. As with the application of any clinical assessment tool to the process of risk selection, it is prudent to fully understand the benefits and limitations of that tool. An article recently published in the *New England Journal of Medicine* describes in great detail the attributes of many of these tests.³⁰

Implications for Long Term Care Insurance

The index of Activities of Daily Living was developed over thirty years ago. It has undergone rigorous and repeated evaluations to assess its validity, reliability and utility. Our knowledge of this index brings with it critical implications for long term care insurance that influence product design, risk selection, and benefits administration.

As was discussed in a previous section of this report, the index is characterized by its hierarchical nature. This attribute has been independently verified by several observers. For those involved in long term care this property of the index has several important implications. First, it points out that each of these six activities is a separate, discrete function. Losing the ability to bathe independently is an entirely distinct loss from

being dependent in dressing. Therefore, when assessing the risk of losing ADL function, it is prudent to consider each activity individually, knowing that dependence in one does not automatically imply dependence in another. Likewise, an evaluation of ADL status at the time of benefits determination requires the evaluator to consider each activity as a separate function.

Some legislative and regulatory bodies are attempting to standardize the list of ADLs.³⁶ This attempt has some validity as it helps clarify for the insurance consumer some of the complex issues of long term care insurance buying. In many situations, this has resulted in the creation of new lists of ADLs, for example, combining bathing and dressing into one ADL to create five,^{37,38} or adding mobility to create a list of seven.^{39,40,41} While laudable in their attempts to simplify the process for the consumer, the creation of these new indices makes it difficult to judge the impact they will have on risk selection, benefits adjudication and product viability, as these new lists have not been subjected to the same scientific scrutiny as Katz's original six.

It is prudent that those individuals assisting decision-makers provide well-founded, scientifically valid advice on these issues. This is true whether it involves working with product designers, marketers, underwriters and benefits examiners within one's own organization, or legislators, regulators and consumer groups. Given the thirty-year experience clinical medicine has had with Katz's index of ADLs and the extensive research that has elaborated its validity, reproducibility and utility, we can with great confidence endorse its standard use in long term care.

Second, the hierarchical nature of these functions is important as it relates to prognosis. Individuals who lose the ability to perform several ADLs will lose them in the order predicted by the hierarchy 93 times out of 100. Also, if function recovers, it is restored in the reverse order. Another important aspect of this is that it is more likely that an individual who has become dependent in only one or two ADLs will regain independence, than an individual who has lost the function of four or five ADLs. Thus, the higher the number of ADLs in which the individual is dependent, the higher the probability the loss will be permanent. Knowledge of this phenomenon is important to those individuals involved in benefits management because it assists them in more fully understanding the potential for recovery of any given individual. The feasibility of becoming involved in possible rehabilitative or case management efforts is more easily assessed when the likely outcome of that effort can be forecast.⁴²

Finally, Activities of Daily Living represent a measurement tool with broad applications. In any disability product, whether it be Worker's Compensation, Social Security, private insurance or long term care, the decision that an individual meets the contractual definition pertinent to that system is by its very nature subjective. Tools which help quantify that decision such as the Guides to the Evaluation of Permanent Impairment,⁴³ used in Worker's Compensation, and Disability Evaluation Under Social Security,⁴⁴ utilized by the Social Security Administration, make the outcome less subject to decision-maker variation. Because the six Activities of Daily Living are valid, reproducible, easily performed with minimal training, and good indicators of functional loss, they are well designed to provide objectivity in the long term care arena.

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