might build a scale of diagnoses according to their "glamour." A few examples follow.

- Inappropriate secretion of antidiuretic hormone sounds more "glamorous" than benign prostatic hypertrophy.
- Left anterior hemiblock sounds more "glamorous" than decubitus ulcer.
- Idiopathic hypertrophic subaortic stenosis sounds more "glamorous" than gonarthrosis.
- Problems related to major histocompatibility complex sounds more "glamorous" than insomnia, but the main reason for the disability may be the inappropriate use of valium for sleep.

The clinical art of what to treat first, and what not to treat, becomes of tremendous importance. Often, I do not treat hallucinations in a mentally deteriorated patient if they have a "good" content, and if, by resurrecting a long-dead husband, they help a hallucinating widow to populate her lonely world. In a moderately Parkinsonian patient, with good chances of further improvement, I often refuse to add L-Dopa, if he is alone and threatened by orthostatic hypotension when he gets up at night. And sometimes I have to oppose my devoted physiotherapists in order *not* to correct a knee flexion contracture which could help a bilaterally below-knee amputee to maintain his sitting balance. Therefore, we have to look behind and beyond the first and most resonant complaint.

6. To use a life history fruitfully for clinical understanding.

What does it mean: "He married at 22, he graduated in 1938, he was a chemical engineer, he retired at . . . ?" Does it have any impact on his hypertension or his chronic obstructive lung disease? What is the relationship between his biography and his illness? Probably very little, if we see biography as a sequence of conventional life events. A man does not have a past, he *is* his past. Life history is not only an accumulation of events, but a history of coping. The individual is the summation of coping and failures, and all of them are conducive to the totality of "I am."

That "I am" is, in my opinion, of major clinical significance. The "I am" in a wheelchair is the "I am" that is undesirable, the "I am" who takes his medicines or not, the "I am" who wants to be respected. In geriatric medicine we deal with an "I am" that took a long time to be built emotionally, and often it takes only one night of incontinence to put it in jeopardy.

This challenge should be, therefore, met by teaching ourselves and our pupils to approach the elderly patient as an individual and not as a cross-section of an amorphous population that has diseases. As Kierkegaard said, "Truth is the individual."

I shall summarize by conveying all the previous challenges in a final one.

7. Approach the elderly in a clinically existential way in the totality of his or her being, not with the traditional medical model.

What would happen if the existential-medical diagnosis were as follows? "A retired accountant, with a right hemispheric damage and severe sensory-spatial deficit, fell a few weeks after relocation." or "A recently widowed housekeeper, with severe degenerative joint disease and borderline cognitive functioning, living in her son's remodeled house, became incontinent."

To the possible opponents of such a long formulation, I can answer that a diagnosis should not necessarily be brief. Brevity and truth do not always get along well.

In conclusion, to meet the challenges that I was asked to deal with, I offer these principles:

1. Geriatric medicine should strive to create a somewhat different type of clinician, rehabilitation-oriented, with knowledge of several disciplines concentrated in the one-person care giver.
2. Clinical geriatric medicine, as it grows at the bedside, should focus on the person who has a face, a name, a uniqueness, and it should encourage him or her to resist classification.
3. Geriatric medicine, while remaining medicine, should come as close as possible to applied human anthropology.

Functional Assessment as a Model for Clinical Evaluation of Geriatric Patients

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FUNCTIONAL ASSESSMENT may be defined as the systematic, multi-dimensional, detailed evaluation

of a person's abilities to perform various tasks associated with independent daily living. Functional assessment typically measures disabilities in physical, mental, social, psychological, and economic domains, and usually it is coupled with appropriate medical evaluation. Functional assessment is most useful when standard instruments are used to measure and record impairment. It is especially valuable and important in evaluating older persons, for whom independent capabilities are easily perturbed by the broad array of illnesses and problems common in old age.

Although interdisciplinary teams are properly regarded as the "gold standard" to perform functional assessment, individual physicians, nurses, social workers, and other health professionals certainly *can* satisfactorily do assessment. Who performs the assessment in a given clinical setting is less important than getting it done objectively and routinely, and using the results appropriately. Functional assessment can and should be used clinically as a clue to the presence and severity of illness, to determine service needs and eligibility, and to follow change over time.

Understanding and using instruments to assess functional capabilities of impaired older persons are intimately associated with the successful planning and delivering of health and social care required by dependent elders. This paper focuses on the usefulness of Geriatric Functional Assessment (GFA), both in the education of health professionals responsible for care of older persons and in the delivery of the care (*1*). Uses of GFA are discussed, and the intrinsic worth and necessity of GFA are considered, particularly in relation to special features of geriatric medicine and of educational programs for geriatric health care providers.

Functional Loss in the Elderly

Restriction of independent functional ability is the final common pathway for many disorders in the elderly. Functional impairment means decreased ability to meet one's own needs, and it is measured by assessing activities of daily living (ADL), including mobility, eating, toileting, dressing, and grooming, and by assessing instrumental activities of daily living (IADL), including housekeeping, cooking, shopping, banking, and driving or using public transportation. In addition, objective assessments of cognition and behavior, and of social, economic, and emotional states, are required to document health-related function of older persons. Unlike young persons, when the elderly get sick, the first sign of new illness or activated chronic disease is rarely a single, specific complaint which helps to localize the organ system or tissue in which the disease occurs. Instead, elderly persons when ill usually evidence one or more nonspecific problems, such as the following, which themselves are manifestations of impaired function (*2*):

Functional Presentations of Illness
Stopping eating or drinking
Falling
Urinary incontinence
Dizziness
Acute confusion
New onset, or worsening of previously mild dementia
Weight loss
Failure to thrive

These problems quickly impair the independence of the previously self-sufficient elder without necessarily producing obvious, typical signs of illness by most lay and even general professional standards.

Why disease presents first with functional loss in old patients, usually in organ systems unrelated to the locus of illness, is not well understood. It appears that disruption of homeostasis by any disease is likely to be expressed in the most vulnerable, most delicately balanced systems in previously independent, functional elderly persons. And these most vulnerable systems, or weakest links, are likely to fail and produce problems of ADL or IADL function rather than the usual classic signs and symptoms of disease. Thus, difficulties in mobility, cognition, continence, and nutrition are frequently the first manifestations of disease in an old person, regardless of the organ system or tissue in which the disease resides. Progressive restriction of the ability to maintain homeostasis is a physiological principle, capsulizing much phenomenology of biological aging (*3*).

The lesson for health care providers, family members, and elders themselves is that deterioration of functional independence in active, previously unimpaired elders is an early and subtle sign of untreated illness, and life quality can only be maintained by rapid and thorough clinical evaluation when such functional impairments develop. These disease-generated functional impairments in old people are usually treatable and improvable, but detection and evaluation are essential steps necessary before treatment can be applied (*4*).

Since disease is likely to present with abrupt impairment of function in elderly persons, GFA is critically important to allow early detection and thus intervention during the beginning phases of active illness. Early therapeutic intervention has

been repeatedly emphasized as essential for successful health care of elderly persons. Often called "prevention" or "preventive geriatrics" (*5,6*), early response to functional loss and treatment of disease is tertiary prevention at best, but it is still crucial to restoring independence.

Success of these health maintenance or early intervention strategies in geriatrics requires a sensitive and accurate ability to assess functional status initially and over time in vulnerable elders in all settings. Accordingly, GFA emerges as a vital capability for front-line health care providers dealing with the elderly. GFA is valuable as an objective and rapid surveillance instrument to be used by all health providers for elderly persons. Periodic formal assessment, coupled with rapid response to any detected declines in independence, is a central requirement for satisfactory geriatric care; acquisition of assessment skills must be incorporated in the basic, post-graduate, and continuing education of health care professionals working with the elderly.

Disability in the Elderly

Chronic functional impairment increases with increasing age, and thus persons over 65 years carry a disproportionate burden of disability compared with younger persons. Fifty percent of community-dwelling elders have ADL limitations, and more than three-quarters have at least one chronic illness. More than a third cannot perform their major activity independently, and 5 percent are confined to home (*7,8*). Beyond age 75, 15 percent are confined to their homes, and over the age of 80 nearly one-quarter cannot go outdoors independently (*9*).

The disability figure should also have added into it the 5 percent of the over 65 population dwelling in nursing homes at any one time. In view of this impressive level of functional disability in the geriatric population, it seems only sensible that objective, reproducible, quantifiable assessment of functional impairment should be used in designing and distributing supportive services for disabled elders. Those chronic functional losses that are not a result of treatable or reversible pathology still should be evaluated by GFA so that the type and intensity of compensatory care needed to buttress function in those elders can be estimated accurately. Although functional disability may often be caused by stable but disabling chronic illness, insufficient supportive services and unappreciated, unmet, functional dependency needs themselves are likely to produce cascading further functional loss and deteriorating independence. Accordingly, another important value of GFA is in determining and then providing supportive care to prevent further accumulation of disability.

Active Life Expectancy

GFA also has substantial applicability in the prediction of functional decline. By use of a modification of the Katz ADL index (*10*) and life table techniques, calculations were made of remaining years of independent or active life expectancy (ALE) for noninstitutionalized older persons in Massachusetts (*11*). The onset of dependency was defined by the accumulation of ADL assistance need. Years of ALE remaining declined with increasing age, shrinking from 10 years for persons 65 to 70 years, to less than 3 years for those 85 and older. ALE was less at all ages for the poor elderly. Although ALE was similar for men and women at most ages, because of the greater longevity of women, the percent of life spent without dependency was greater for men at each 5-year interval. Besides its obvious value in predicting the need for supportive services and in further research on the condition of older persons, the concept of ALE has a major impact on our thinking about the future of older persons. For the first time, we have predictive data to frame the discussion of the burden of disability and its onset associated with the increasing life expectancy of Americans. The opportunity to quantify objectively the duration of dependency which comes with longer life should be seized by supporting further study in this arena.

Relationship of Function and Disease

A major task in the education of health professionals, especially physicians, is the systematic and detailed identification of the clinical signs and symptoms associated with specific pathological conditions. I have already discussed the frequent functional presentations of disease in old age, characterized by the absence of classic or typical clinical findings of illness. GFA illustrates and clarifies another phenomenon common in geriatric medicine, in which there is poor correlation between type and severity of functional disability and the list of disease problems. Since the burden of illness and the functional loss both increase with increasing age, it is often assumed that the number of diseases or conditions enumerated on the problem list of an old person correlates with and

identifies the kind and intensity of functional disability. But a long list of problems or illnesses accumulated by an old person does not necessarily result in serious loss of function. Instead, it is common to find independent and vigorous elderly persons with shockingly long lists of serious problems (*12*). Another common but erroneous assumption is that the specific functional impairment in an old person is determined by the organ or tissue with disease, so that mobility problems are attributed to musculoskeletal or neurologic disorders, confusion arises from brain disease, incontinence from the bladder, and so on. This causality principle, usually valid for disease in the young and middle-aged, does not hold in geriatric medicine. Instead, certain particularly vulnerable tissues and organ systems, responsible for functional integrity in the elderly, are especially likely to decompensate as a result of the systemic influence of disease anywhere in the body.

Further, the severity of illness, as measured by objective data, does not necessarily determine the presence or severity of dependency. For example, cardiac arrhythmias may be discovered on routine electrocardiogram or use of a Holter monitor, or chronic elevation of alkaline phosphatase may be found on multi-phasic screening, in an independently functional old person. If laboratory tests show impressive abnormalities, but the person has minimal or no obvious functional disability, objective GFA can support a decision to withhold treatment for the symptomless problem; particularly if the treatment carries with it considerable cost, discomfort, or health risk.

Accordingly, use of GFA will allow health professionals the maximum capacity to enhance independence among elders and to detect declines driven by potentially treatable illness. Special features of history-taking, physical examination, and interpretation of laboratory data for older persons, and their linkage to GFA, have been well described (*13*).

The lessons taught by these noncorrelations between function and diagnoses are crucial for good geriatric care. First, functional impairment must be assessed and quantified independent of the medical problem list. Second, although functional deterioration is specific and can involve capacities served by a single organ system, the loss of function in a single organ system does not in any way mean that the primary pathology exists in that particular organ system, nor does it allow us to attribute causality for functional loss to disease found in that organ system. Only the restoration of normal organ function by successful treatment of the disease in that organ system allows us to identify a causal relationship with certainty.

'Although health care providers may focus on objective measurements of disease, such as physical findings and abnormal laboratory values, for the elderly person these parameters are unimportant compared with the impact of lost function on their daily lives. Therapeutic interventions for the patient must be measured by restoration of lost function . . .'

The crucial importance of lost function to the elderly person emphasizes the value and need for GFA. Although health care providers may focus on objective measurements of disease, such as physical findings and abnormal laboratory values, for the elderly person these parameters are unimportant compared with the impact of lost function on their daily lives. Therapeutic interventions for the patient must be measured by restoration of lost function and the resulting improvement of life quality.

The educational objective for health professionals caring for vulnerable elders is to acquire the skill and awareness to use GFA in parallel with classic disease-oriented evaluation techniques (*14*). Enumerating functional impairments side by side with the problem list can facilitate matching diagnosis with lost function. A list of functional impairments and their severity will allow identification of those medical problems that are the likely cause of most troublesome functional losses for the elderly individual. Using a functionally oriented priority system is most likely to satisfy the patient and the clinician by producing important gains in independence. Finally, if interventions are not beneficial, they can be confidently abandoned and replaced by functionally relevant new treatment.

Interdisciplinary Teams and GFA

Successful geriatric health care requires a wide array of collaborating professionals and poses both an opportunity and a challenge (*15,16*). When clinicians from multiple disciplines sequentially evaluate the elderly patient, leave their recommendations, and depart after failing to communicate with any of the other professionals involved, the

'For maximum effectiveness, GFA and health care should be administered by professionals who use a common language of functional assessment.'

likely outcome is uncoordinated and possibly conflicting therapeutic initiatives. In contrast, the hallmark of good geriatric health care is an interdisciplinary, coordinated team in which primary care providers, (usually but not limited to, physician, nurse, and social workers) evaluate, plan treatment for, and follow elderly patients using each profession's perspective on functional assessment. Communication and coordination are crucial to success. Additional professionals can be consulted or recruited for the team, but always within the context of interdisciplinary team functioning. Help in doing evaluations or recommending therapy can come from medical subspecialties such as psychiatry, physiatry, and neurology as well as from the professions of podiatry, dentistry, restorative therapies, nutrition, pharmacy, law, and other potentially useful disciplines (*17*).

For maximum effectiveness, GFA and health care should be administered by professionals who use a common language of functional assessment (*18*). Discipline-specific jargon interferes with communication and coordination of care. Functional assessment provides the common language to facilitate interdisciplinary evaluation and management of disease across disciplines. Agreement on nomenclature and instruments is long overdue. When members of each discipline use their own unintegrated methodologies, communication is impeded and frustration grows. GFA provides interdisciplinary teams with functional data, enabling each discipline to see and discuss problems of the old person as they affect life and independence. If one uses the language and methods of GFA, teaching several disciplines simultaneously becomes possible. GFA makes evaluation, treatment planning, therapeutic interventions, and followup easier and measurable. Teaching geriatric care in any discipline and at any level of training is simplified and enhanced by GFA.

Geriatric Assessment Units

In light of the substantial flurry of exhortation and reasoning about functional assessment as a useful component of geriatric care, it is not surprising that there has been a proliferation of care units whose staff report integration of functional assessment into the routine evaluation and management of elderly patients. The best of these clinical programs have recruited teams of health professionals who cooperate in an integrated and interdisciplinary structure of care aimed at the especially vulnerable, functionally impaired, and medically complex older patient. These units have developed in acute care hospitals, chronic care hospitals, nursing homes, and HMOs; they are particularly prevalent in Veterans Administration medical centers. Geriatric Assessment or Evaluation Units (GA-EUs) ideally address social, medical, rehabilitative, and emotional problems of older persons, using the "technology of geriatrics" (*19*). This technology consists of a coordinated, interdisciplinary, functional, and clinical assessment coupled with a team approach to plan care.

Advantages of GA-EUs for older patients have been reported in many domains of patient care. Most units have documented larger numbers of important diagnoses made, with increased accuracy, and identification of treatable, improvable problems compared with patients who receive routine care (*20,21*). Accurate and long-lasting placement is another benefit claimed by such units (*22,23*). In one study a major reduction in drug use was demonstrated, and the number of diagnoses made was also augmented (*21*). Improved overall social, cognitive, and ADL functions are commonly recorded (*21,23-25*). In one prospective study, researchers examined the impact of a home health care team on service use, functional status, and patient and informal care giver satisfaction (*26*). Patients in the experimental group showed reductions in hospitalization, nursing home admissions, and visits for ambulatory care, as well as in overall cost of care, compared with controls. Care giver satisfaction was especially high. Although most information points to benefits of GA-EUs, a majority of data comes from uncontrolled studies (*20-25*) which document clinical care outcomes for the patients within a particular unit. Additionally, some studies have shown little or no advantage to assembling the numerous personnel and developing the structure of a GA-EU (*27-29*), although these studies are also cited to emphasize the need for targeting of services by GA-EUs for special high-need, high-risk elderly subpopulations. The strongest evidence in support of GA-EU care comes from a prospective randomized study of inpatient care in a VA hospital with continued outpatient

followup (*30*), which showed, in addition to most of the aforementioned advantages, a decrease in nursing home admissions, in cost of care, and in mortality.

The atypical nature of the population and the site, as well as continued control of care matched only against routine followup, make additional studies mandatory. Further questions about GA-EU care include (*a*) What is the optimal site for such a unit? (*b*) Who are the personnel essential for successful outcomes? (*c*) Is continuing input from the team required, or is one consultative evaluation sufficient for benefit? (*d*) What are the real costs of developing and operating GA-EUs?

In a comprehensive review of studies of GA-EU impact, Rubenstein discussed in detail the findings of all published studies in English (*31*). A survey of existing GA-EUs at medical schools and VA medical centers documented many aspects of their structure and function (*19*). More than 90 percent of the 114 such units identified responded to a questionnaire, and 80 percent were hospital-based, although 60 percent served ambulatory as well as inpatients. Half had not existed before 1983, and of those which had, two-thirds have grown substantially since. Half of the physicians involved lacked training in geriatric medicine. The evaluation of new referrals in outpatient sites exceeded 2 1/2 hours on average, although the time varied greatly. Conclusions drawn from this study argue powerfully for additional and improved policy-informing studies of the design and operation of GA-EUs; the data are increasingly persuasive that it is advisable to add some form of these units to the collage of clinical care in geriatrics.

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Workshop: Resources for Research in Aging: Special Populations, Longitudinal Studies, Tissue Banks, Research Personnel

David Danon, MD, and Barry Lebowitz, PhD, co-chairmen; DeWitt Hazzard, PhD, rapporteur; William H. Adler, MD, David Barzilai, MD, Boaz Kahana, PhD, Richard Sprott, PhD, and Michael Traugott, PhD, participants

THE CONDUCT OF RESEARCH on aging requires resources that will provide a suitable model system. To maintain an animal to old age or to follow a human population to old age is expensive. Therefore, it is very important in pursuing research on aging that cooperative efforts be taken to share these valuable resources of old animals to as great a degree as possible. Funds for research are not easy to come by in either Israel of the United States. Differing cultural traditions, environmental conditions, and past histories provide unique opportunities in each country to conduct research on aging. Each of the invited participants discussed a particular type of resource for research on aging and areas of possible collaboration where applicable.

NIA-Supported Biological Resources

Early in the 1970s it became obvious to many investigators engaged in research on aging that the availability of appropriate animal models was the major factor limiting the development of much needed research. In response to this clear need, and in recognition of the fact that many, perhaps most, investigators had neither the facilities nor the fiscal resources needed to develop and maintain colonies of aged animals, the National Institute on Aging (NIA) made the provision of such resources one of its highest priorities. Mammalian resources currently available from the NIA include specific pathogen-free mice and rats that range in age from 3 to 36 months and are raised in barrier facilities, and small numbers of nonhuman primates ranging in age from 20 to 35 years.

Nine mouse and four rat genotypes can currently be obtained from NIA. All rodents in NIA colonies are regularly monitored for genetic purity and disease status. Facilities and care are provided by contract organizations. Animals are housed behind specific pathogen barriers maintained at temperatures of 70 ± 2°F, fed NIH 31 diet (ad libitum), and given unlimited access to acidified, chlorinated drinking water. Cages are rotated on cage racks to prevent retinal degeneration from fluorescent lighting. When investigators receive animals from the NIA, they are given a health monitoring statement for the room where the animals were raised.

NIA, through grants, also maintains approximately 400 nonhuman primates of several species in four locations in the United States. Access to these animals for noninvasive research or shipment of certain body fluids and tissues can be arranged through the NIA staff. The NIA has also established a colony of approximately 200 rhesus monkeys for invasive research. These animals are approximately 17-20 years of age, experimentally naive, and living outdoors in relatively normal social groups.

Another valuable resource is the Aging Cell Repository, supported by NIA through contracts. The familiar IMR-90, IMR-91, and WI-38 cell lines are at various population-doubling levels. The repository has a large collection of skin fibroblasts derived from participants in the Baltimore Longitudinal Study of Aging at the Gerontology Research Center at Baltimore, MD. The ages of the donors range from 17 to 96 years, and cultures are available from the same donor at multiple decades of life. In a separate collection are matched skin (fibroblast) and peripheral blood (lymphoblast) cultures from extensive Canadian and Italian kindreds with familial Alzheimer's disease. The repository also has available cultures from donors exhibiting Werner, Hutchinson-Guilford, Cockayne, and Rothmund-Thomson syndromes. In addition, the repository is banking fibroblast, endothelial, and smooth muscle cultures of nonhuman origin from animals exhibiting a broad range of lifespans.

For those using lower organisms in research, the NIA supports through contracts a *Caenorhabditis elegans* (a nematode species) stock center.

The NIA also maintains a bank of frozen em-