errors. This has been reported by researchers from several countries, in different treatment settings, i.e., clinical trials and medical practice, and with different medications. In addition, and of particular relevance to the present context, these studies covered patients with a wide age range, from childhood to very old age.[5,10,12–19] Surprising similarities in patterns of medication nonadherence were observed, irrespective of the patients' ages. For example, real overcompliance, which means taking higher doses than prescribed for longer periods, is no real problem. However, extra doses occur infrequently in both young and old patients, as has been documented in studies using compliance monitoring over periods of several months. Distributions of compliance frequencies show that partial compliance is the main problem. Thus, there seems to be good evidence that patterns of actual medication-taking behavior in older people do not differ substantially from those observed in younger patients. Why should they? Potential reasons have been studied extensively, and some answers were outlined and discussed by the authors.

The study of Park et al. had a comprehensive approach with regard to understanding nonadherence behavior. However, no comment on the relationship between adherence and treatment outcome, for example with special regard to arthritis medication, was mentioned.

The study had the unique opportunity to analyze compliance for different medications taken simultaneously by patients. The preliminary analyses did not show substantial differences in adherence rates across all of these drugs at least 8 to 10 different groups. This extraordinarily interesting result was mentioned but not discussed. It is clear that the implications of nonadherence depend on the drugs studied and, therefore, necessitate differential analysis.[2]

Considering the methodological implications mentioned above, it is possible that medication compliance behavior is affected little by drug, disease, prognosis, or even symptoms. The discussion is somewhat disappointing when recurring to often repeated assumptions despite of the results recorded. Finally, one question remains: The structural equation model of adherence behavior explained 39% of the variance in nonadherence; what about the other 60%? Other researchers' regression models were able to predict 89% of older patients with good compliance but only one-third of those with poor compliance.[20]

One may conclude that some of the pieces of the compliance puzzle are still missing. With regard to medication adherence, older may perhaps be wiser, but why is this so?

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Editors note: The above letter was referred to the authors of the original paper, and their reply follows.

In reply: The main findings from our recent *JAGS* article (J Am Geriatr Soc 1999; 47:172–183) were that older adult rheumatoid arthritis patients were considerably more therapy-adherent than younger patients, that there was no difference in the adherence rates for arthritis and nonarthritis medications, and that the older adults were highly adherent despite showing substantial amounts of normal age-related cognitive decline. The strongest predictor of nonadherence was self-report of being busy and having many unpredictable events in one's life, qualities typical of engaged, middle-aged adults.

Dr. Kruse wonders whether the findings in the present study suggest that drug type, disease, or symptoms have no effect on medication adherence because we found no evidence that any type of medical variable (including dosage frequency) makes much difference in adherence rates. I think it is unlikely that these findings generalize to all diseases, drug types, and symptoms. The sample we tested was composed of long-term rheumatoid arthritis patients who were taking multiple medications for the disease. Because of the potential for disability with rheumatoid arthritis as a result of nonadherence, and the fact that most of the drugs prescribed for other diseases had a once or twice a day dosing schedule, it

would not be difficult to integrate taking medications for these other diseases into the existing medication schedule. Patients were probed in detail in our study about side effects, and they perceived side effects to be almost nonexistent with these drugs. This suggests we tested a group of rheumatoid arthritis patients who tolerated the drugs they were taking well, which would also lead to adherence.

Regarding the issue of unexplained variance, this is not a surprising finding because the total rate of nonadherence for the last 2 weeks of monitoring was only 7.5%. This is such a low rate of nonadherence that, from a statistical point of view, it is quite remarkable that we were able to explain 39% of the variance in the data set using our predictors. This low amount of nonadherence also resulted in our finding no relationship between adherence and treatment outcomes (physical mobility, subjective well-being) because adherence was so high that there was little possibility of determining if nonadherence related to mobility and well-being.

In later work using this sample, we did find variables other than adherence to be important in understanding outcomes such as pain and coping. We reported, for example, that individuals of lower cognitive function reported more pain and poorer mental health than individuals of higher ability.[1] We also found that patients used adaptive coping strategies in this sample when pain was mild but tended to catastrophize when pain was severe.[2] Thus, we had good predictor and outcome measures, but there was simply not enough nonadherence to determine effectively the role nonadherence might play in important outcomes. Thus, if sufficient nonadherence were observed in a sample, powerful connections might be observed between medical variables (e.g., disease severity, number of doses, drug side effects) and adherence and between adherence and quality of life measures (such as mobility, well-being, and health status). As drug regimens are increasingly simplified, however, and patients recognize the ability of their drugs to modify disease, observing sufficient nonadherence to model such relationships will be difficult.

In summary, the good news is that rheumatoid arthritis patients take their medications responsibly and that older adults are particularly likely to do so. The problems of nonadherence in older adults with rheumatoid arthritis seem to be vastly overstated in the popular literature. Moreover, other studies we have conducted regarding hypertension[3] reinforce this point. However, I should caution that we did not study very old adults (the group aged 80 and older), and there is some evidence that these individuals are at greater risk of nonadherence and that they profit from medication organizers and other cognitive supports.[4] In my view, future research should focus on adherence in the very old and on adherence in recently diagnosed inception samples.

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A GEM RISK SCORING PROTOCOL

To the Editor: Williams and colleagues[1] have made an important contribution toward development of an instrument for identify the appropriate target population for admission to GEM units as well as toward describing the associations of increased mortality in hospitalized geriatric patients. There are several distinct patient populations for whom an instrument of this type would be useful, such as community-dwelling geriatric patients admitted through the emergency department, and, as we have at Montefiore, nursing home residents cared for by a hospitalist team of geriatricians.

Although the GEM risk scoring protocol presented in Figure 1 in their paper is a preliminary attempt to create an instrument, it would be helpful if the authors could provide the operational definitions that were used in the scoring protocol, which appears to have been derived from standard nursing assessment documents. Some of the associated factors are diseases, and others are syndromes or markers for a functional impairment. It would be helpful if the authors could elaborate on the following: How was depression measured? Were all patients who had a Foley catheter on admission scored for this regardless of whether the catheter was used for provider convenience, measurement of urine output, or for an obstructive uropathy? What was the operational definition of "malnutrition?" How was dysphagia diagnosed?

I look forward to additional development of an instrument such as this which could be validated in subgroups of hospitalized geriatric patients.

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Editors note: The above letter was referred to the authors of the original paper, and their reply follows.

In reply: Zeleznik asks how several items (depression, malnutrition, dysphagia) in our risk scoring protocol were operationally defined. As stated in our Methods, the three most clinically active diagnoses were determined (by MCS, who coordinated care on the GEM unit) for each patient. There were no set criteria for each diagnosis; rather, they were the medical problems judged by the patient's clinicians to have the most import in the patient's current rehabilitative care. As a consequence, when interpreting our risk scoring protocol, one must keep in mind that those diagnoses that appear on the protocol were primary concerns for these patients and not of an incidental nature.

We did not record the reason for Foley catheter use for patients transferred to the GEM unit.

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