

Threads and Yarns: Weaving the Tapestry of Comorbidity

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As any weaver knows, the elegance of a fabric lies in the yarns, not the threads. The whole is lots more than the sum of its parts. In health services, the threads are the diagnoses on which interventions are based. How these threads are spun into yarn (the underlying biodynamic of the tapestry of health) is poorly understood, to the detriment of efforts to understand the genesis of health problems and the interventions associated with them. Part of the problem is the imperative to “sell” diagnoses in order to market the interventions associated with them. Those who make their living by focusing on diseases resist understanding that health is a pattern. Without grasping the pattern, management is at best an approximation of adequate care.

Tinetti and Fried¹ explained why the assumption that diseases capture the essence of illness is erroneous. Patients with symptoms or signs that cannot be attributed to a specific diagnosis are shortchanged, because there is no incentive to spend time and effort on them. Treating only known biological components of disease minimizes the ability of the practitioner to tailor therapeutic interventions to individual patients. Adherence to disease-oriented guidelines for medication therapy when patients have other conditions predisposes to polypharmacy, with an increase in the likelihood of adverse effects.

The well-described limitations of guidelines when other diseases are present² has not stopped the prolif-

eration of disease-oriented, processes-of-care-dominated quality agendas. In this issue of the *Annals*, Martin Fortin and colleagues³ document the extent to which comorbidity is likely to be present in populations taking part in randomized controlled clinical trials (RCTs) and the limited recognition of comorbidity by the trials’ investigators. Perhaps this explains why the variability in response to the interventions is so great and the number needed to treat on the basis of the RCT findings is generally rather large. That is, the populations taking part in clinical trials are almost certainly quite heterogeneous with regard to comorbidity, despite the use of exclusion criteria. Everyone is left in the dark as to which characteristics of the trial participants are associated with benefit, which are not, and which are associated with adverse effects. Yet disease-oriented guidelines based largely on RCTs are pervasive and increasingly used to judge quality of care or to calculate a payment for performance.

The result is that primary care practitioners, who by definition are patient- (not disease-) focused, are increasingly challenged to practice guideline-directed medicine—an inherent misconceptualization of the role of primary care.

As comorbidity is here to stay and will only increase in prevalence as the population ages, what can be done to understand it and to take it into consideration in the setting of standards for illness prevention and management? Several lines of action deserve consideration.

1. The likelihood that patients are characterized by comorbidity needs to be explicitly acknowledged. As shown by Fortin and colleagues⁴ in a previous study, the great majority of patients have more than one health problem at any given time period. The simultaneous presence of multiple health conditions (known as *comorbidity* when there is an index condition and other unrelated conditions, and as *multimorbidity* when no one condition is identified as an index condition) is

Conflict of interest: Dr Starfield is the codeveloper of the ACG system. The Johns Hopkins University holds the copyright for the software and received royalties from its sale for commercial purposes. The system is available for use by researchers.

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the norm in populations, particularly in populations of patients. Although the percentage of patients with multiple diagnoses increases with age, because of the higher prevalence of illness with increasing age, the extent of multimorbidity is actually greater than would be expected (according to the chance likelihood of more than 1 disease being present) in children,⁵ suggesting that risk factors for multiple diseases are not randomly distributed. This issue is worthy of research attention.

2. People should be characterized by their morbidity burden and, more importantly, by the patterns of morbidity that they experience with time. One particular tool, the Johns Hopkins ACG system,⁶ was specifically designed to facilitate such an effort. With its use, populations can be described according to the mix of types of all conditions (including signs and symptoms as well as all types of diagnoses) they experience in any given time period in a way that has implications for their persistence with time and a population's need for different types of health resources. It is the only tool specifically designed to describe, epidemiologically, the distribution of patterns of morbidity in patients and populations in a way that is independent of the resources consumed in the diagnosis designation and management of specific diseases. The likelihood of persistence of morbidity is the basis for combining individual diseases into degrees of morbidity burden to better reflect the reality of illness in populations.

3. "Rules" for clinical trials should mandate characterization of the participants according to their total morbidity burden (patterns of types of illnesses). Trial results should be analyzed by subgroups based on variability in the prespecified morbidity burden groups. Although the RCT is the reference standard for evidence on utility of interventions, it has increasingly well-recognized limitations in generalizability,^{7,8} particularly when considering the issue of disease-specific vs overall clinical endpoints.⁹ Given the principles of such trials, with their focus on efficacy (rather than effectiveness) and on internal validity, other mechanisms for testing interventions as a basis for assessing and assuring quality of care need to be developed. Whatever mechanism is chosen should consider the burden of morbidity.

4. Primary care practitioners and researchers should participate in the design of studies to test interventions and should assume the predominant role in committees that set guidelines for primary care practice. Disease-oriented specialists are in no position to take a commanding stance in what is an appropriate procedure for patients in primary care. Their training, generally limited to inpatients and referral clinics, does not provide them with the basis for interpreting illness as it occurs in community settings. For such illnesses, they should play a role only in an advisory capacity, based on their

expertise with particular conditions in their more severe state, while maintaining their main role of assuming care of uncommon conditions or uncommon complications of conditions.

5. Payment for performance (based on adherence to guidelines) in primary care should be undertaken only when scientific evidence is known to be relevant to primary care practice. In the most highly developed program for paying for performance (United Kingdom), performance indicators provide the basis for paying a substantial percentage of the earnings of general practitioners. It is a credit to the developers of this system that they recognized the application of disease-specific guidelines is inappropriate for everyone with the disease. As a result, practitioners are allowed to eliminate selected individuals from the numerator and denominator of calculations of percentage of patients for whom the performance guideline is intended. The National Health Service has not yet collected information on the reasons for these exceptions; when it does, the analysis of such data could contribute to understanding the reasons for nonapplicability of guidelines to performance. In the United States, where performance measurement is a thriving enterprise, there has been little attention to developing a basis for judging the appropriateness of performance measures in patients with comorbidity.

6. Academic departments and specialty organizations should be developing guidelines for specialty care. (At present, the great majority of guidelines have been developed to assess the quality of primary care.) In contrast to the situation in primary care, where characteristics of good primary care practice are known and measurable, there is no consensus on what specialty care is or how the achievement of good specialty practice can be characterized. Recent efforts to understand performance measurement recognize that the science of quality measurement in specialty care is greatly lagging.¹⁰ Studies of referrals from primary care to specialty care indicate that there is no clear consensus on which problem should be referred to which specialist. Primary care physicians vary considerably in what they think is the appropriate specialty to refer a patient with a given condition.¹¹ The extent to which comorbidity influences or is influenced by referrals to different types of specialists remains to be understood.

7. Specialty organizations should be encouraged to define the specific functions of specialty care, just as primary care has done. Almost nothing is known about the extent to which specialty care recognizes or deals with comorbidity. Population-based studies indicate that when patients who are not elderly are characterized by whether they have a particular clinical condition, more of their physician visits are made for problems other than the one by which they

are characterized, and that the number of visits they make to primary care physicians is greater than the number of visits made to specialists, regardless of their morbidity burden (extent of comorbidity).¹² The only exception is when they have a rare condition, in which case the number of visits to specialists for that condition exceeds the number of visits to the primary care physician for that condition. As is the case for younger patients, more comorbidity in the elderly is associated with more visits to both primary care physicians and specialists, but in contrast to the findings in the population aged less than 65 years, the number of visits to specialists is greater than to primary care physicians in all morbidity burden groups for more than one half of individual diagnoses, regardless of whether they are for a specific diagnosis or for a comorbid diagnosis.¹³ Specialty care for morbidity that is not in the area of the physician's special competence compromises quality of care.¹⁴ Preliminary evidence suggests that two thirds to three quarters of what is seen by some medical specialists in outpatient care is routine follow-up of patients previously seen. If this proves to be generally the case across specialty practices, there is strong reason to suspect that greater efficiency in care could be achieved by having the primary care practitioner do the follow-up care (in the course of more general care) and consulting with the specialist on the findings and their importance for continued management. Given the much greater use of specialists in the United States, higher rates of adverse effects,¹⁵ and likely decline in health in the presence of an oversupply of specialists,¹⁴ the quality of specialty services in the United States demands attention at least equal to that of primary care services.¹⁶

Understanding the tapestry of morbidity and the contributions of health services depends on the yarns woven from the threads that constitute diagnoses. The high prevalence of comorbid and multimorbid conditions and their impact on both responsiveness to interventions and the occurrence of adverse effects demand that views of health be changed from its current narrow focus on diseases to a much broader view of various aspects of health and their interactions in patients and populations.

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