

INTRODUCTION

The Visualization of Primary Care The White-Williams-Greenberg Diagram

Gordon H. DeFrieze, PhD

ON THE COVER OF THIS ISSUE we display a rendition of what is arguably the most famous figure in healthcare research. This is the diagram contained in a 1961 article by Kerr L. White, T. Franklin Williams, and Bernard G. Greenberg (all three, at that time, at the University of North Carolina at Chapel Hill) entitled “The Ecology of Medical Care.” This ingenious diagram conveniently displays a summary of then available statistical data on the relationships among a number of key variables affecting patterns of healthcare utilization in the US population. In this diagram, one can clearly see “the place of primary care,” hence its significance as the graphic motif for this special issue of the *Journal*.

If one takes the literal position that “primary care” begins only when a patient first consults a formal healthcare provider, then our discussion of the relevance of primary care to population health should focus on only 250 of the 750 persons out of a population of 1,000 adults who experience any kind of illness symptom each month. On the other hand, if one considers as part of “primary care” those steps that people take on their own behalf when symptoms appear (i.e., what some call “self-care”), prior to consulting a formal care provider, then of course the scope of primary care is much broader. Moreover, if one visualizes some proportion of the hospital care received under the supervision of a generalist or “hospitalist” in primary care practice, then our notion of “primary care” must also be enlarged.

On the facing page is the original diagram as displayed in the 1961 paper in the *New England Journal of Medicine* by White, Williams and Greenberg.¹

We are fortunate that Kerr White provided a detailed history of how this diagram came about in an essay published in connection with the founding of The Kerr

White Institute in Atlanta, Georgia, in May of 1995.² White spent much of the decade of the 1950s in Chapel Hill as part of the faculty of the University of North Carolina School of Medicine after it expanded from a two-year to a four-year school. He was one of several general internists recruited to Chapel Hill to teach undergraduate medical students, to organize a program of research, and to begin what was then called a “General Medical Clinic.” The goal of this clinical care and teaching unit was to “expose all faculty, medical students, and residents in the Department of Medicine to the problems faced by ‘generalists.’”

When White returned to Chapel Hill in the fall of 1960 after a sabbatical leave in London, a new department chairman was in place who had a much more limited view of the role of the “generalist” in internal medicine, and he saw the General Medical Clinic as outmoded and non-essential. A protracted series of discussions between White and the new chairman failed to convince the new department leader of the need for this type of clinical teaching and research program in a department that aspired to be on the leading edge. Frustrated in making a case for generalist care and teaching in an emerging academic health center that emphasized subspecialty training, White joined with his colleagues T. Franklin Williams, also in the Department of Medicine, and Bernard G. Greenberg, then chairman of the new Department of Biostatistics in the UNC School of Public Health, to gather the data to support the inclusion of generalist patient care and education in the modern medical school clinical program.

White credits a 1954 article by two general practitioner friends from London, John and Elizabeth Horder,³ as the stimulus for his own work with Williams and Greenberg. Using data generated from their own practice over a three-

Dr. DeFrieze is Professor of Social Medicine at the UNC-Chapel Hill School of Medicine, President of the North Carolina Institute of Medicine, and Editor-in-Chief and Publisher of the North Carolina Medical Journal. He can be reached by email at gordon_defrieze@unc.edu.

month period, the Horders were able to depict with three squares of decreasing size the proportion of patients from their practice who would experience an illness event of sufficient severity to warrant seeking care (about one-third), and the proportion of these who would be referred to a hospital-based specialist (about one-quarter, or about 8% of the total number). White wondered whether these same relationships would hold for general practice in a North American medical school setting. Thus began the search for data by which to examine this set of questions.

It is important to recall, as White did in his 1997 paper recounting this history, that data on anything but mortality and cause of death were in short supply in the late 1950s. Quantitative information on “the health problems of the living” were rare. These researchers had themselves conducted extensive surveys in North Carolina through which they had attempted to document the volume and characteristics of the practices of community-based generalist physicians as well as their referral patterns. But generalizing these findings to the nation as a whole presented difficulties. Gathering statistics from a wide variety of sources (population-based surveys, practice-based record studies, interview surveys), White, Williams, and Greenberg set out to compile a composite picture of the healthcare utilization experience of the American adult population (all persons age 16 and older) over a one-month period. In their model, wherever possible, each assumption was supported by at least two sources of data. Bernard Greenberg, the biostatistician (who later became Dean of the UNC-CH School of Public Health), took great care to assure that the model’s boxes were drawn at the correct size (area) to precisely depict the proportions they represented.

Except for the use of the term “ecology” in the title of the article, the paper was accepted for publication largely without editorial modification. White insisted that the title remain as it was submitted. The paper received immediate and vociferous response from colleagues in academic medicine, particularly subspecialists, who were offended by the assertion that academic medicine focused inappropriately on the health problems of only a minute segment of the population needing professional healthcare. The provocative diagram pointed out that most clinical education of medical students focused on the one person out of 1,000 who happened to have been hospitalized in a tertiary care teaching hospital, not on the majority of persons who experienced symptoms they felt were significant enough to bring to the attention of healthcare professionals. Despite these challenges, the basic analysis

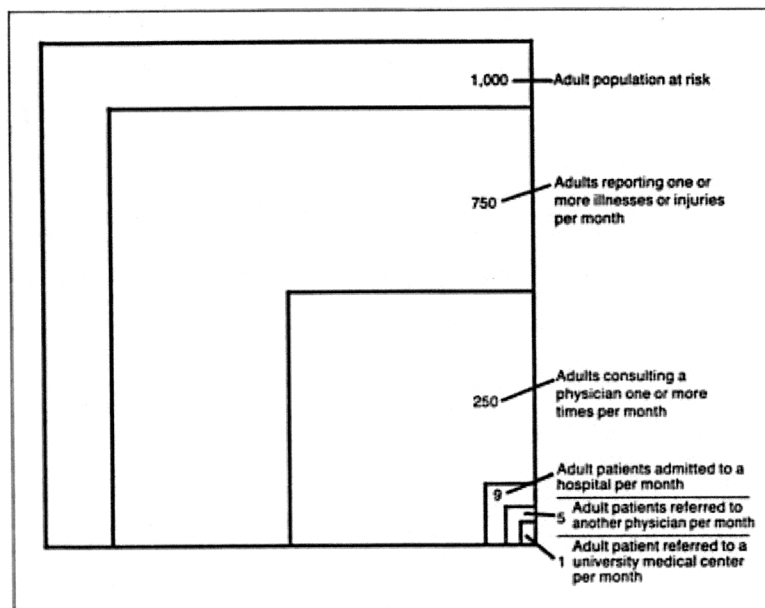


Figure. Monthly prevalence estimates of illness in the community and the roles of physicians, hospitals, and university medical centers in the provision of medical care (adults 16 years of age and over).

performed by White, Williams and Greenberg has stood the test of time, and has been replicated by others.

White himself used data from the National Center for Health Statistics in a 1973 update published in *Scientific American*⁴ which depicted these same relationships. Even with better and more nationally representative data (as of 1970, when access to care was more easily realizable for all Americans), it was clear that, over a one-year period, “out of a population at risk of 1,000, an average of 720 people visited a physician in an ambulatory setting at least once, 100 people were admitted to a hospital at least once, and only 10 were admitted to a university hospital at least once.”²

In a return to this paradigm by White, published in 2001, he reported more recent data on the monthly prevalence of illness in the community and the types of healthcare sought. Of 1,000 persons in a typical US population (of all ages), 800 would report symptoms; 327 would consider seeking medical care; 217 would visit a physician's office (of these, 113 would visit a primary care physicians office); 65 would visit a complementary or alternative medical care provider; 21 would visit a hospital outpatient clinic; 14 would receive home health care; 13 would visit an emergency department; 8 would be hospitalized; and less than 1 would be hospitalized in an academic medical center.⁵

The editors of *The North Carolina Medical Journal* are pleased to connect once again with this famous graphic depiction of “The Place of Primary Care” in our special issue on this topic. E. Harvey Estes, Jr., MD, one of the foremost contributors to the research and educational programs in

primary health care in our state, who has made significant contributions to the national public policy debate on the role and future of primary care, has prepared the issue brief outlining the major issues of concern related to the role of primary care at this juncture in the history of our nation's health care system. Dr. Estes has raised a number of problems of considerable importance to the public policy debate on this topic and set out the framework for a number of commentaries that follow in this special issue of the *Journal*.

Contributing Editor Donald L. Madison, MD, has provided not one but two special additions to this issue. First, he offers an informal history of the concept of primary care and how this term came to have the specific meaning we associate with it in discussions of health and medical care. Second, he provides a summary of two extensive interviews with North Carolina physicians who exemplify the essence of primary care practice, Jane McCaleb, MD, and Frank Leak, MD. Few who have devoted their careers to primary care practice in our state are as well-known for their efforts as these two physicians. Their stories are interesting and compelling as we contemplate the future for this level of medical practice.

In this issue we have included the perspectives of an outstanding nurse practitioner (Sharon Cullinan, RN, MSN, FNP) and a well-known primary care physician assistant (Justine Strand, PA-C). Given the large and growing dependence of so many North Carolinians on primary care from these professional groups, it is important to illustrate the nature of their training, clinical practice, and career orientations.

Finally, we include the perspectives of two individuals who have leadership responsibilities for the education of NC primary care physicians in family medicine. Warren P. Newton, MD, is Aycock Professor and Chairman of Family Medicine at the University of North Carolina at Chapel Hill.

He brings to this issue a provocative discussion of the economic outlook of the young primary care physician now considering a practice location in a small rural North Carolina community. Allen Dobson, MD, is Director of the Cabarrus County Family Practice Residency Program in Concord. He examines the extent to which the infrastructures supporting contemporary family medicine and primary care practice are sufficient to enable such practitioners to adequately manage the "population health" of those under their care.

As always, we invite the comments and reactions of our readers to these several commentaries on the current situation and future prospects for primary care practice in the evolving North Carolina healthcare arena. We hope that this set of ideas advanced by our authors in this issue will provoke discussion and debate among stakeholders (decision makers, health care administrators, practitioners, and the general public) as we move toward some as yet unclear system(s) of care for the future. The Editors of the *North Carolina Medical Journal* look forward to your reactions to these issues in the weeks ahead.

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