

# Chapter 53

## Telemedicine as a Modality of Health Care Delivery and its Implications

**Rashid L Bashshur**

*Telemedicine Resource Center, University of Michigan Health System, USA*

**Gary W Shannon**

*University of Kentucky, USA*

### ABSTRACT

*This chapter provides both formal and operational definitions of telemedicine as well as the related concepts of telehealth, e-health, and m-health, and reviews the origin and historical evolution of the nomenclature and content of telemedicine over the last century. The rationale for telemedicine is discussed in terms of potential effects on improving access to care, especially for underserved, remote and isolated populations, redressing inequities in quality and cost containment in terms of greater efficiency and risk avoidance, not only singly but also symbiotically. The current status of telemedicine and the reasons for its limited diffusion to date are discussed. Finally, the empirical evidence is briefly reviewed, selecting one application as an example. The chapter concludes with an optimistic expectation of continued proliferation of the field to serve the common good.*

### INTRODUCTION

*Telemedicine*, the initial term applied to the field, refers to the remote delivery of medical care via information and communication technology (ICT). The word “tele” itself is a combining form meaning “distant,” especially “transmission over

a distance,” used in the formation of compound words. It derives from the Greek “teleos” or “telos” meaning “far off, afar, at or to a distance.” Identifying the original source for the term, *telemedicine*, however, has proven to be elusive. Based on the available evidence, Kenneth Bird (1917-1991) used the term ‘telediagnosis’ in 1967,

and together with Raymond Murphy introduced the term ‘telemedicine’ into the literature in 1969 (For a detailed account of the early origin of telemedicine and its evolution, see Bashshur and Shannon, 2009). Bird has been acknowledged for popularizing the concept, as well as the field in general, through numerous publications together with his colleagues at Massachusetts General Hospital during the 1970s.

This paper is aimed at providing a general overview and scope of the concept of telemedicine and its evolution in content and nomenclature; briefly reviewing its long history and its current status; presenting the rationale supporting its development; and using cardiology briefly as one example of the available evidence in clinical applications of telemedicine.

## **THE EVOLUTION OF THE NOMENCLATURE**

The essential attributes of telemedicine systems of care, rather than single clinical applications, include (1) the geographic separation between the users, be they patient and provider, provider and provider, or patient/provider and sources of information; (2) reliance on ICT to substitute for personal presence or face to face contact and for information exchange; (3) the development of appropriate organizational structures and staffing to perform the necessary functions in this modality of care; and (4) the development of explicit protocols and operational procedures for management (including credentialing, licensure, and reimbursement), quality control, and interpersonal interactions. Each of these attributes has both direct and indirect implications for the expected benefits of telemedicine in terms of improved access, enhanced quality and cost containment, as will be discussed in subsequent sections.

As telemedicine expanded, and applications of ICT in various clinical specialties and disease entities and in various specific aspects of the

medical and health care processes multiplied, so too has the nomenclature. Neologisms were introduced to refer to the specific clinical and diagnostic specialties as well as to the site of care, diseases and treatment modalities that rely on ICT. In all instances, this is designated by adding the prefix ‘tele’ to the application. Applied to clinical specialties, for example, there is telepsychiatry, teler dermatology, and telesurgery; among diagnostic specialties, there is teleradiology and telepathology; site of care includes tele-home care; disease entities such as teler diabetes and teler stroke; and, teler rehabilitation for rehabilitative services.

The proliferation of the nomenclature in telemedicine reflects three notable trends in medicine, health and society in general, namely: (1) a continuing trend toward greater specialization and sub-specialization in medicine largely as a result of scientific and technological advances; (2) a growing interest in the use of information and communication technology in various medical specialties, public health, medical institutions, informal social networks, as well as clinical contexts and other health applications; and, (3) an expanding trend of humanistic liberalism in labeling health care institutions and providers, such as re-naming hospitals as medical centers to health centers and health systems, and physicians as providers.

As the scope of telemedicine expanded to incorporate various areas of public health such as epidemiology, health care management, health behavior and health education, as well as environmental health, the term ‘telehealth’ was introduced in 1978 (See Bashshur 2000). The term was intended to convey the expansion of the scope of telemedicine to incorporate a broader spectrum of health related activities under its purview. In essence, the difference between *telehealth* and *telemedicine* is similar to the difference between *health care* and *medical care*. Obviously, in both instances the former is more inclusive than the latter.

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