community. This is also essential if these diverse health care providers and facilities are to work effectively together. It substitutes for the face to face visits of the visiting nurse while at the same time creating a record of the contact which is available to all team members. Similarly, it enables patients to interact with their occupational, speech or physical therapists without either patient or therapist having to travel. It enables patients to "see" their doctor when the need arises without having to wait for an appointment or, more typically, forego the visit because it is inconvenient or impossible and thus waiting until the condition gets so aggravated that more costly emergency care or hospitalization is required. The availability of telemedicine can forestall the patient's premature and more costly institutionalization in a nursing home simply because care is not available in the home or in an assisted living facility.

Because of the more comprehensive patient record which is created upon each telemedicine contact, the use of telemedicine enables the team members to coordinate their treatment of the patient and to communicate their observations of the patient in a variety of settings and circumstances to all of the other team members in a timely and cost effective way. Case management decisions can be made - and revised as the patient's condition improves or worsens- with the participation of the patient, family member or care giver on the one hand and the relevant members of the patient's health care team on the other. Care is coordinated and wasteful fragmentation and duplication of services by

facilities and health care providers can be eliminated through the widespread use of telemedecine.

(b) Health Care Service Needs of Rural Communities

In addition to the more familiar health care services, other advanced services include, such as teleradiology and remote specialist consults with local physicians. There is a broad range of health care services which can also be provided by advanced telecommunications that are of great concern to a significantly broader segment of the population.

These services fall into several categories as follows:

- Patient self care, wellness promotion, access to health care information and health care provider continuing education;

To ensure effective and timely access to these services, it is essential that rural patients and providers have access on demand to interactive, multi media communications in their homes since consumers are unlikely to seek health care information except in the privacy of their homes:

On demand because patients will most likely seek and use information when they perceive a need for it and that need can be conveniently and effectively satisfied;

Interactive because information prepared for that mythical average consumer and provided to a user without knowledge of the user's health status and needs will not likely be read or used; and

Multimedia because video communications are more effective teaching and learning tools than texts for many consumers and provide the essential ingredient of motivation to use the information which has been so lacking in the past efforts to get patients to engage in self care.

-Assessment, Diagnostic and Treatment Services

Chronic or convalescing patients in their homes who cannot easily travel to health care facilities have increasing needs for health care services. The telemedicine technology is capable of remote delivery of a broad variety of electronic monitoring and treatment modalities between the home, clinic or hospital. Using digital compression to carry sound and visual images, using stethoscopes, endoscopes, electrocardiography, radio and sonographic equipment that can carry high quality diagnostic information electronically from patient to remote health care provider.

-Supervision and Instruction of Patient, Caregiver and Home Care Worker

As more and more patients can or must look to receiving health care in their homes, the instruction and supervision of their care givers and home care workers is

pivotal to their care. Printed instructions can be helpful as can oral instruction at the time of the patient's discharge from the health care facility. However, care givers can be forgetful or can panic in an emergency, resulting too often in unnecessary calls for an ambulance. Some patients who can make a visit to their clinic or rehabilitation therapist often skip it because of its inconvenience.

On line face to face electronic instruction on demand at the time of need can be much more effective and less costly than printed or one time oral instructions. By the same token, on line supervision of home care workers and timely handling of misunderstandings between patient and home care workers on line, in place of an actual home visit or substitution of a home health aide, can be more effective and save a substantial portion of home care costs.

-Support Groups For Patients and Family Members

The medical profession has recognized that access to support groups can have significant therapeutic impact on patients, shortening convalescence and relieving caregiver burnout and stress. By definition, home bound patients and their care givers cannot easily arrange schedules to participate in support groups. Voice communications or asynchronous "chat" on computer links are feasible but not as effective as video conferencing.

The urgency of the need to deliver cost effective quality health care to rural communities and the potential benefits of electronically delivered health care to patients in their homes are so great that the FCC must include these services in its definition of services which are entitled to universal service support.

Almost 2.5 million persons, approximately 2.5% of the US population, received home care in 1987. The number is even given the increased number of people who are discharged from hospitals but require intensive care for convalescence from acute interventions, suffer from strokes, heart disease, arthritis or Aids, have disabilities, are young mothers with high risk pregnancies, low birth weight babies or who are frail elderly people with motor, cognitive, visual or hearing impairments. Children under the age of 17, accounting for 70 million of our population, and the functionally impaired elderly, accounting for 14.5 million persons, together, constitute a sizable portion of the real cost of health care. Telecommunications can reduce the cost of treating these patients and enable them to avoid institutional care on a long term or acute care basis. It can reduce the costs of home care workers, visiting nurses and therapists and facilitate the effectiveness of the work of their health care provider team.

This will require, as the FCC has recognized in its call for comments, the need to accelerate the universal deployment of advanced networks as defined in Section 706

through universal service support for these networks. While, some of the services listed above can be delivered over the existing copper network, many of them require higher resolution that the network can provide. Network capabilities of 1.5 mbps should in fact be sufficient to meet the bulk of the health care needs of rural communities enumerated above.

The alternative of leaving network deployment solely to market forces will only exacerbate the division between the information rich and information poor. These terms are in a broad sense merely surrogate terms for the populations segments which reside in affluent urban areas on the one hand, and in less affluent less highly populated rural and inner city areas, as well as in small towns throughout the nation on the other. The issue of the cost considerations of these networks is discussed below.

2. Network Cost Considerations

It is clear that the use of the existing public switched network upgraded to provide advanced services as defined in Section 706 of the Telecom Act constitutes a much more cost effective network to ensure the implementation of the 1996 Telecommunications Act by supporting the use by public institutions of leased T-1 or other dedicated lines.

Although APT cannot provide cost estimates for this upgrading, since the costs will be different for every community and state, there are certain considerations which the FCC must take into account in estimating these costs.

- The typical telemedicine hub and spoke leased line configuration for the delivery of health care from medical center or remote specialist to rural primary care physicians is more expensive than using a switched network and is not as responsive to the needs of rural health care providers. The need of local rural health care providers to be linked with remote specialists and labs, while important, is much less frequent than their daily interactions with each other. Yet they have the same advanced network needs as these remote specialist/local provider contacts in order to interact visually with each other and their patients and to exchange their patients' health care data, test results, lab reports, ex rays and the like.

Given the wide range of these local providers of health care in rural communities- physicians, physicians assistants, nurses, nurse practitioners, therapists, home health aides, nutritionists and patients- their needs are for a switched telecommunications network which can connect them to each other in their homes, offices, local health center or health care facility.

Clearly an upgraded switched public network has an enormous contribution to make to enable rural health care providers to meet their advanced telecommunications needs.

- Every local exchange carrier has modernization plans in place today to upgrade their public network to carry these advanced services. In addition, many states have built high speed networks to provide health care and other telecommunication services with varying degrees of penetration in rural parts of the state. Other high speed networks are beginning to be deployed by electric utilities, highway departments to provide traffic control along major free ways and by other private and public entities to link specific facilities. None of these networks reach all communities in a rural area, for example, nor do they reach to individual offices, clinics or homes of patients and health care providers. Yet they are significant in considering a community's costs of providing telecommunications services. A community could find that it was only a short distance from a smart highway fiber link or from a fiber installation belonging to an electric utility or other entity with which it might be able to negotiate some type of linkup thereby reducing its costs of providing switched communications within the community.

- Everything the FCC can do to accelerate public network upgrades or the deployment of other network technologies such as wireless, which may in the future offer other paths to providing universal access to advanced telecommunications, makes it unnecessary for schools, libraries and health care facilities to lease dedicated T-1 lines. It also reduces the

amount of universal service support which they will need to cover the costs of the accessing the advanced telecommunications services they need and are ensured by the Telecommunications Act.

- Advanced network deployment and technology costs are changing and declining in cost so rapidly that any estimates provided for these costs must be regarded as valid at best for the following one or two years. As carriers design new network configurations that bring essential hardware closer to the home and usage volumes thereby increase, costs will drastically decline.

- FCC universal support mechanisms should lay down the principle that eligibility for such support requires that the most cost effective way of providing advanced telecommunications links in its service area is being proposed or utilized, eg. public switched network instead of a leased line or deploying a spur to link to the nearest available advanced network.

In summary:

1. Advanced services for rural health care providers to be supported by universal service funds must encompass:

-advanced communications <u>between</u> health care providers located <u>within</u> rural areas;

-a broad range of health care providers within rural areas are located in out-patient facilities, nursing homes, hospitals, community health care clinics, assisted living facilities and senior centers;

-high speed data, image and video conference communications to facilitate transfer of health care data such as X rays, patient consults, and patient, caregiver and health care provider instruction and education;

2. Principles To Be Considered In Public Network Upgrades should include attention to:

- the type of network configurations being used to ensure their reach to the broadest segment of health care providers;

- the accessibility to communities of high speed advanced networks developed by public utilities, state highway, health and education departments and other entities which may cost very little to connect to technologies, deployment and equipment;

-the short life of network deployment cost estimates due to the rapidly changing and declining costs of networks as a result of evolving carrier network configurations and rising usage;

-the lower cost of using public network facilities over private leased or dedicated lines which can reduce the amount of universal service support required by a health care provider; and

-development of eligibility requirements for universal service support which relate to use of the least expensive and most cost effective way of providing access to telecommunications services.

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