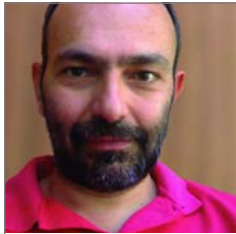


Italy's Telbios: Enriching Patients' Lives and Well-being Through Home Medical Care

By Dr. A. Mason



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Challenges in the Healthcare Market

Aging population, longer life expectancies

The aging of the population has been – as in all industrialized and many developing countries – a characteristic of the demographic dynamic of Italy and will remain so in the coming decades. In Italy, the fertility rate has declined. Currently, the total fertility rate stands at 1.25 births per woman of child-bearing age, while life expectancy in 2001 reached 76.7 years for men and 82.9 for women and continues to grow. According to the latest UN estimates, life expectancy could reach 81 and 86 years respectively by 2050. Because of the demographic shift, Italy has the highest population percentage aged 65 and over in the world (18.1) and the lowest aged 15 and below (14.1).

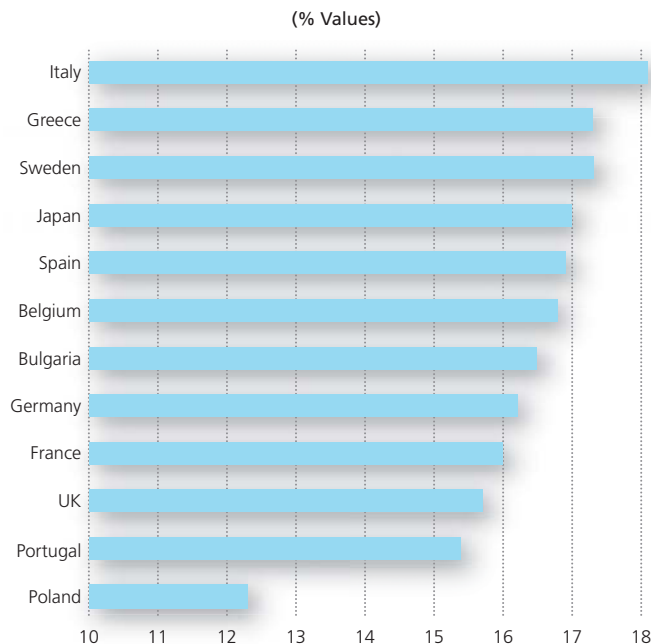
Change in family/patient lifestyles

The recent evolution in traditional family structure shows an increasing number of one-parent families, increased career opportunities for women and an increase in dual-income households. These contributing factors have created a shortage of citizens able to dedicate the time needed to care for older or chronically ill family members.

Concurrent to the aging population, people are staying healthier longer. In turn, elderly people are increasingly choosing to remain at home longer, while care is still required.

Figure 1: Countries with the oldest population (65+ years old)

Source: United Nations World Population Prospects



1 © 2003, *Adherence to Long-term Therapies*, World Health Organization

Supply/demand imbalance

Healthcare organizations face a growing imbalance of supply and demand. Recent healthcare/medical advances mean that many more patients are able to stay independent and mobile longer. This includes the elderly and those with chronic health conditions, which provokes an ever-increasing demand for more services and pharmaceuticals. The supply side, however, is hindered by a shrinking pool of investment capital; a shortage of willing care-givers; and an existing infrastructure straining under the growing number of patients. Consequently, hospitals and healthcare centers are experiencing major challenges in terms of capacity, including lack of available beds, exceedingly long waiting periods for inpatients, and shortages of medical staff, leading to poor quality of service and patient dissatisfaction.

Poor adherence to treatment of chronic diseases

People with chronic diseases find it difficult to make the necessary lifestyle changes to adhere to the therapy and the doctor's indications. Adherence to long-term therapy for chronic illnesses in developed countries averages 50%. In developing countries, the rates are even lower.¹

Inadequate adherence results in poor health outcomes and increased healthcare costs. Telemedicine can help patients make these lifestyle changes. It also improves the supply side by minimizing unnecessary hospitalizations and reducing waiting lists for medical treatment, saving significant resources. A main priority in many EU countries today is the monitoring of chronically ill patients. For instance, in Italy, there are over 2.5 million diabetic patients, over 4 million patients suffering from respiratory dysfunction, 1 million patients suffering from chronic heart failure and over 1 million patients undergoing anticoagulation treatment. Patients with two or more chronic diseases represent 19.4% of the population. Telemedicine is the best solution to improve treatment and increase patient satisfaction.

For example, diabetic patients spend more time in self-management activities than with their doctor for check-ups. There is a need to propose not just new tools to patients, but also a new environment that motivates patients to make lifestyle changes.

Reduce costs for national healthcare

Health expenditures as a share of gross domestic product (GDP) is a good indicator of how important a society considers health to be; it may also reflect the efficiency of the health system and price levels in the health sector. On average, EU health expenditure is over 8.3% of GDP, but this varies widely between European countries. Taking both public and private expenditure together, in 2003 the share was highest in Switzerland (6.7% public/4.8% private), Germany (8.6%/2.5%) and Iceland (8.8% / 1.7%); and lowest in the Slovak Republic (5.2%/0.7%), Poland (4.5%/2.0%) and Luxembourg (6.2%/0.7%).

Cost reduction in national healthcare brings about a decrease in hospital expenditures and an increase in primary/home care services (Italy has the highest level of hospital expenditures in relation to total health expenditures). By reducing the number of patient check-ups, avoiding unnecessary or difficult patient transfers and hospitalizations, and focusing on long-term residential or home care, a country's health system can optimize healthcare resources and dramatically save money.

Hence, the last 20 years have seen a strong decrease in acute care hospital beds in almost all European countries. From 1980 to 2002, the number of acute care hospital beds per 1,000 population decreased in Italy from 7.9% to 3.9%; Switzerland from 7.2% to 3.9%; Sweden from 5.1% to 2.4%; and Finland from 4.9% to 2.3% (Source: OECD 2005).

¹ © 2003, Adherence to Long-term Therapies, World Health Organization

Meeting the Challenge

These challenges are driving the need for a new care model based on homecare and tele-care. Today's successful health-care organizations respond with flexible and effective processes for delivering superior customer service. They offer innovative solutions for delivering tele-medicine services by bringing medical assistance directly to the patient's home using familiar technologies such as the phone, Internet and TV.

Benefits of this new care model

- “Tele-assistance” and “Tele-emergency”: Improve the patient experience, providing social assistance and comfort and delivering remote medical assistance via telemedicine services, to facilitate everyday life and avoid patient isolation. Moreover, according to the level of emergency, the operator can simply call a list of available telephone numbers or contact the emergency services (911).
- “Tele-monitoring”: Enable continuity of care and provide better care through continuous, remote monitoring of patients with chronic conditions and rapid medical intervention when required.
- “Tele-diagnosis” (or real-time consultation): Enable remote professional consultancy, with specialists available 24/7 to analyze critical patient conditions.

As a result, Telbios launched an innovative homecare program named *General E-care Access for homecare via SATellite* (IGEA SAT) to gain patients' confidence through reliable and easy-to-use solutions.

About Telbios

Telbios is Italy's leading provider of telemedicine services and networks for civil and military healthcare organizations, providing home-care assistance with customer-oriented solutions.

It specializes in integrated telemedicine networks and benefits from the expertise of its shareholders, including Scientific Institute H. San Raffaele, Telespazio and Telecom Italia. Telbios' mission is to provide an ecosystem of clinically and technically validated solutions that integrate and share personal data on health, lifestyle and well-being in a medical setting.

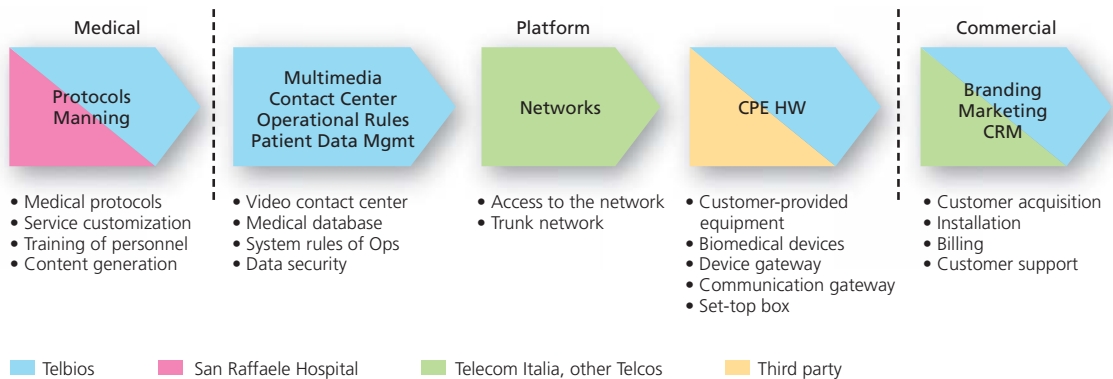
Service Design: the need for a new approach

Healthcare services are innately complex, dealing with personal needs, feelings and lives. Despite this, healthcare innovation is more concerned with products (new diagnostic tools, surgical procedures, drugs).

The healthcare service has a design flaw: it cannot identify or understand patients' interactions with healthcare providers. A new approach is needed, involving patients in the design process, using new methods and tools and covering different skills and profiles (designer, cognitive psychologist, human interface designer, doctor, marketing and communication manager).

For a service company like Telbios, research and innovation are known as *Service Design*. The company started this process more than a year ago with a project dedicated to patients with chronic diseases and their lifestyles. Telbios' ecosystem covers and integrates different disciplines and systems where the client's behavior (patient, doctor, healthcare professional, specialized operator) depends on the quality of the information given and their experience at each touch-point (Figure 2).

Figure 2: Telbios' ecosystem – integration is key to the quality of the service



The patient's needs must be reconsidered based on specific conditions within their day-to-day environment. These needs can be shared in real time with doctors via wireless biomedical devices and interactive TV, and patients are offered new ways of interacting with doctors, using video communication via their TV using a set-top box.

Telbios' IGEA SAT program overview

The *Health and Lifestyle Program* offered by IGEA SAT is already being used for patients affected by irregular cardiac rhythms; heart problems caused by hardening of the arteries; diabetes; and Chronic Obstructive Pulmonary Disease (COPD).

The treatment programs have been approved by hospital ethical committees, which agree on the criteria for patient inclusion in the health program.

In terms of infrastructure, IGEA SAT is a modular system, tailored to specific needs. The mapping of user behavior and experiences defines the architecture and system needed to create an environment where the patient is engaged and motivated to:

- Use their TV set to view their medical data, interpreted by a doctor. The terminology and navigation on the menus accessed by the TV remote control are easy to read and understand. The patient is motivated to make lifestyle changes with rewards for meeting targets (e.g. weight, physical activity).
- Interact with medical center specialists through scheduled video calls.
- Share information with a medical team regarding their condition and daily needs via periodical questions answered by the interactive TV application using the remote control.
- View information clips addressing their specific clinical conditions, helping to fill the gap between education and action. The clips answer frequent questions that a patient faces every day, for example practical suggestions on the diabetic diet.

The IGEA SAT platform has already been adopted by the Regione Lombardia and the Regione Toscana (ASL 6 Livorno).

Table 1: IGEA SAT Services

Macro Market	Services	Stakeholders
Case Management Continuity of care Early discharge	Specialized tele-monitoring Video assistance On-call immediate video assistance Specific information/educational program Tele-monitoring	Hospitals Local administration Insurance companies Patient associations
Care Management Chronic Patients	Video assistance (scheduled) On-call assistance Personalized information/educational programs	Local public administration Specialized centers GPs Insurance companies Patient associations
Management Population Elderly Health-conscious people	On-request "light" tele-monitoring On-call medical video assistance Choice of customizable information/educational programs Personal lifestyle programs (nutrition, physical activity, metabolism)	Local public administration Insurance companies Public social services and welfare departments
Boutique care	Mix of different services, at the discretion of the boutique sponsor	Hospitals Specialized centers

Why did Telbios partner with Alcatel-Lucent?

Telbios chose Alcatel-Lucent’s innovative solution for delivering residential telemedicine services, which enables patients, healthcare practitioners and hospitals to share clinical information. Alcatel-Lucent was selected because of its integrated video assistance solution and its proven success with similar projects in Italy. Telbios chose Telecom Italia as its network provider.

Information and Communication Technology (ICT) is transforming the traditional healthcare system into a new, virtual healthcare model. In this context, Alcatel-Lucent is fostering the development of ICT networks and applications for the healthcare industry through:

- Contact center applications.
- Specialized communication tools for doctors, nurses, hospital staff and patients (video, audio and data conferencing, location-based services, IPTV patient terminals, automated appointments, etc.).
- Carrier-grade and secure network infrastructure (LAN, WLAN).
- Unified in-building wireless coverage to ensure always-on reachability.

In particular, the contact center acts as a bridge between the main stakeholders: patients, doctors, hospitals, pharmacists, family and friends.

The Telbios solution

Alcatel-Lucent provided an integrated video assistance solution based on its Genesys contact center applications for Telbios’ IGEA SAT program.

The solution introduced a real-time tele-assistance service, a new care model similar to the traditional “store and forward” tele-assistance service (mailbox, medical report transmission, etc.). Operated on a mixed terrestrial/satellite path, it combines contact center functionalities with the ability to manage video calls, including those from mobile terminals, enabling a wider number of institutions and hospitals to access these services and assist their patients with an array of residential telemedicine services.

Telbios added video assistance to the portfolio of telemedicine services already offered by its telemedicine center, with TV as the preferred interaction tool between operators and patients. The new telemedicine service is available on every broadband communication network (terrestrial, mobile and satellite) to allow every citizen to benefit, even in areas not covered by terrestrial broadband.

Besides video calls and conferences on mobile terminals, it is possible to securely transmit and receive electronic medical data via the network and the TV set at home. The solution requires the installation of a webcam to enable video calls and a set-top box (STB) connected to the patient's TV.

The video call application is triggered by Genesys applications that connect to a window on the patient's television, establishing visual and voice communication between patient and practitioner. A Telbios operator calls patients daily to ensure adherence to the course of therapy and to resolve any problems. Patients can also initiate calls themselves to obtain advice or in case of emergencies.

The benefits

- Constant monitoring of long-term care patients through increased interaction with the doctor (i.e. daily or weekly interaction instead of quarterly or half-yearly check-ups for a diabetic). Chronically ill patients often managing their condition alone during these periods.
- Rapid medical intervention if abnormal vital parameters are detected. When set parameters are deviated from, the care team is automatically alerted for an immediate response.
- Reduced patient transfers to healthcare centers. The frequent interactions with medical staff and availability of up-to-date clinical data allow doctors to better assess the need for an emergency room visit.
- Improved preventive care and quality of life. With IGEA SAT, the focus is not just on managing a single task (e.g. measuring blood pressure at a certain time) but on creating an interactive communication channel between patients with the same conditions, medical staff, family and friends. It also helps to prevent isolation and exclusion by maintaining a social network, contributing to a better quality of life.

Next steps

- Enable videoconferences with three or more participants, for direct communication between the patient, operator and a third party, such as a family member or doctor.
- Implement new interfaces for new sensors, alarm management and an emergency call button. Issues like wearability and non-invasive and less-invasive biomedical sensors to collect new physiological data are part of the continuous improvement of the user experience as well as the extension of the 'safety net' to other population groups.
- Extend the service outside the home by providing mobile connectivity via UMTS to allow user location tracking, enabling out-of-home assistance.

Conclusion

This project provides an improved medical care system accessible from the home (and in the future on the move) that allows patients to stay at home longer and reduces the number of patient transfers to healthcare centers. It also provides continuity of care at home (post operation or chronic disease) and enables the elderly and disabled to be independent while benefiting from the best treatment.

The new ICT technologies were well received by the target audience, who adapted to them without much difficulty following training by Telbios employees, with repeated tests carried out to ensure that patients understood the system. The transition was simple due to the use of familiar household technologies such as the TV and telephone. As a result, overall patient well-being has improved as their health issues have now become more manageable.

Telbios and Alcatel-Lucent have successfully worked together to strengthen the European social and medical model. Thanks to a seamless integration of health-grade IT devices with carrier-grade telecommunication products, Telbios and Alcatel-Lucent are fostering the use of reliable, secure and easy-to-use telemedicine services. This advanced care model not only facilitates the development of traditional telemedicine, but also acts as a platform to launch new services (health learning, drug prescription, etc.). Furthermore, it enables increased revenue for healthcare facilities by allowing hospitals to leverage the expertise of individuals across the country. Patients receive the care they need regardless of their location and often faster and at reduced cost. ☒

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Alcatel-Lucent Solutions Enabling Better Healthcare Outcomes

Better patient experience, improved care provider efficiency,
sustainable healthcare systems

By N. Hill

The healthcare industry faces a number of tough challenges. Matching citizens' demand for a better quality of life and patients' expectations for better and safer care becomes ever more difficult in the face of increasing health professional scarcity, cost constraints and an aging society.

Governments and key healthcare stakeholders (patients, payers and care-delivery organizations) acknowledge that information and communications technology applications in healthcare (eHealth) will play a key role in enabling much-needed healthcare systems transformation. Key expected outcomes include:

- Improved patient safety, reducing avoidable accidents and medical errors.
- Efficient coordination between healthcare institutions, shifting from acute care to chronic conditions management and homecare (post-hospital and independent living for the elderly).
- Fast recovery with limited impact on quality of life, i.e. limit unnecessary transport costs and related inconveniences.
- Increased emphasis on prevention.
- Increased citizen/patient empowerment and self-management (citizen-centered health care systems).
- Appropriate security and privacy provisions, protecting personal medical data from unauthorized access.
- Access for medical personnel to up-to-date personal medical records, enabling the best possible treatment anytime, anywhere.
- Access for all to best-in-class treatment, both in urban areas as well as in remote or underserved areas.

Alcatel-Lucent acknowledges these challenges and will leverage its complete portfolio of technologies and end-to-end solutions to support the successful transformation of healthcare systems. By continually improving the timely and cost-efficient delivery of quality care, Alcatel-Lucent can help put the patient at the center of a better patient experience and help caregivers, hospitals and care delivery organizations improve the efficiency that is so pivotal to sustainable healthcare systems.

Alcatel-Lucent's solutions portfolio enables a secure and easily managed network infrastructure to facilitate consolidation and cost reduction. It enables knowledge sharing and improved patient care and safety. By integrating IP voice into healthcare workflow and applications, Alcatel-Lucent's solutions make people and knowledge more accessible and provide a migration path from traditional to IP-based voice to protect existing investments.

Alcatel-Lucent is also engaged in breakthrough programs in the area of cross-institutional elderly care projects, as well as innovative and promising tele-care platforms in Europe and North America. Such solutions enable real-time knowledge sharing and rapid access to critical information – any time, anywhere.

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