

Teledermatology Helps Doctors and Hospitals to Serve Their Clients

Leonard Witkamp

KSYOS TeleMedical Centre, Amsterdamseweg 206 1182 HL Amstelveen, The Netherlands
{Leonard Witkamp, l.witkamp}@KSYOS.org

Abstract. Telemedicine contributes to efficiency increase and leads to the accelerated development and use of the internet based electronic patient record. The broad use of telemedicine is hampered by rigid decision structures, slow adaptation processes and concern for its consequences. Health Management Practice (HMP) addresses these issues by developing, investigating and implementing telemedicine tools in a modular way. KSYOS TeleMedical Centre, the first virtual healthcare institution in The Netherlands, has successfully applied HMP on teledermatology. Teledermatology has led to high satisfaction and learning effect, 65,1% referral reduction, 40% cost savings, and better quality of care. Teledermatology is an excellent tool for hospitals to dosage their waiting list, increase and strengthen their contacts with general practitioners, and provide them and the patients with better service. HMP has enabled KSYOS to perform over 16.000 teleconsultations, expand teledermatology to other EU countries, as well as to other areas such as teleophthalmology, telespirometry and telecardiology.

Keywords: Health Management Practice, teledermatology, KSYOS.

1 Need for Change in Healthcare Delivery

Increasing pressure on the healthcare sector makes it necessary to design a new model of how to provide care. Without radical changes in the way care is provided, healthcare costs will increase extensively in the coming decades. With a population pressure of 60% at this moment, in The Netherlands, 40% of the population is active to maintain the others, of which one third are older than sixty-five and two thirds are younger than twenty years. In the coming decades, the population pressure will grow to 85% of which half will be over sixty-five and of those a major part will be seventy-five plus. This group is bulk consumer in healthcare. This extensive increase in demand of care will not be followed up by an increase in care providers and care capacity. If the healthcare sector is not going to change, it will probably grind to a standstill. The improved awareness of the need for change in healthcare has as yet not fully led to a powerful introduction of tools that help to improve (the efficiency of) healthcare. Developments in the field of integrated care applications are characterised by fragmentation, and lack of proficiency and marketing insight. The lack of prospect to reimbursement turns investing for parties into a risk. Promising projects remain therefore often on a relatively small scale invisible or just disappear after subsidies are

terminated. Successful initiatives so far are scarce. However, some are successful. Because integrated services bear many aspects such as healthcare delivery by various care providers, development of software, hosting, research, marketing on the medical market, quality control and negotiations with care providers and health insurers, participants with expertise in the various fields need to cooperate. Successful initiatives are mainly combinations of public and private parties that have the courage to work together, share their knowledge and invest jointly. A requirement for a responsible introduction of integrated services in regular care has proved to be meeting demands for security, connectivity and user friendliness. The Health Management Practice (HMP) model addresses all these aspects.

2 Health Management Practice (HMP)

With the use of Health Management Practice, private and public parties and independent knowledge institutes jointly develop telemedicine tools, study their effect on efficiency increase of the primary healthcare process and empower their modular and subsequent up scaled introduction in regular care. It enables the step by step introduction of new telemedicine tools in day to day care not by weakening it but on the contrary by intensifying it. Health Management Practice consist of four phases: phase I is development and internal testing of a new application or service, phase II is usability research among future users, phase III is efficiency research regarding satisfaction, effectivity and quality parameters and phase IV are implementation studies.

2.1 Phase I: Telemedicine Development

Partners elaborate a telemedicine tool to an integrated service including security, software, hardware, infrastructure, hosting and management. Telemedicine tools developed meet requirements of safety, connectivity and user friendliness. They adhere to national ICT healthcare infrastructures and on the long term add to the development of the electronic patient record.

2.2 Phase II and III: Health Management Research

Health Management Research aims to prove that the use of telemedicine services increases efficiency: brings more satisfaction with users, increased production volume and better quality at equal or lower costs, thus re-routing the dramatic growth in costs in the healthcare sector. It entails usability and efficiency research aiming at professionalising new telemedicine tools in a phased way, obtain support, prove the effect on improvement of efficiency and after that study the user and reimbursement model. Independent scientific parties protocol the various stages of the research and monitor its' quality and independence.

2.3 Phase IV: Health Management Implementation

All stakeholders – manufacturers, users, policy makers and health insurers – are involved in the design of practice and reimbursement research. Starting point here are significant reductions in costs on a macro level and a healthy business case with

surplus reimbursement per use for manufacturers, users and policy makers. The interested parties together establish a price for the use of the telemedicine tool, and predefine performance indicators that are conditional for reimbursement. These performance indicators may entail outcomes on health as well as logistic outcomes. In order to guarantee successful up scaling in regular care, the benefits of the telemedicine instrument for and its synergy with regular care are actively marketed and communicated.

3 Success of Teledermatology in The Netherlands

Health Management Practice has been successfully applied to develop, investigate and up scale teledermatology in The Netherlands. Teledermatology has proven to enable the general practitioner to provide a dermatologist with digital images and short description through a secure internet connection. As both general practitioner and dermatologist experienced teledermatology as enrichment of their work, with emphasis on quality improvement and learning effect, teledermatology has been widely accepted now in regular healthcare. Teledermatology has led to higher volume growth of dermatological care at equal costs in The Netherlands.

3.1 Development: KSYOS Teledermatology Consultation System (TDCS®) as an Integrated Service

Health Management Practice has led to the introduction of the KSYOS Teledermatology Consultation System (TDCS®), through which general practitioners perform teledermatology consultations safely with the use of the unique health worker identification passport (UZI-pas), guaranteeing all patient data to remain confidential, integer and available. This digital pass is issued by the Dutch Ministry of Health. The TDCS® does not only include software, but also the provision of hardware (digital camera, docking station, UZI-pas and card reader), quality monitoring, helpdesk, on site monitoring, billing, administration, education, and malpractice insurance. The expansion of this teleconsultation system to other disciplines has added to the accelerated development of the electronic health record.

3.2 Research: Performance Indicators

In usability studies, the complete service including the infrastructure of the Teledermatology consultation System has been tested under intensive monitoring among a relatively small group of future users (10-20 medical specialists and family doctors) during a short period (4-8 weeks). In these studies software, hardware, logistics and experience of the user have been investigated. Health Insurance companies and policy makers have agreed upon the following performance indicators of Teledermatology that are conditional for it's reimbursement:

- The use of the Dutch national Unique Health worker Identification pass (UZI-pas),
- Monitoring of the number of prevented physical referrals to the dermatologist
- Monitoring of the response time of the dermatologist

3.3 Unique Health Worker Identification Pass Implementation

On the 1st of June 2007, in total 1732 health workers were working with the UZI-pas; 733 of them have provided by KSYOS for the use of the KSYOS Teledermatology System (43% of all UZI-passes in The Netherlands. This UZI-pas can be use for different other (transmural) services and by other institutions. Teledermatology thus ads significantly to the development of the national health infrastructure and the electronic patient record.

3.4 Number of Prevented Physical Referrals to the Dermatologist

KSYOS has monitored the general practitioner's decision points before and after the Teledermatology consultation. Before the teleconsultation the general practitioner answered the standard question: "Would you physically refer this patient to the dermatologist without the availability of teledermatology?" Afterward the TeleConsult he answered the following question: "Do you refer the patient physically to the dermatologist?" Of 8.863 TeleConsultations evaluated, 71,7% of the population would have been referred to the dermatologist without the availability of Teledermatology (Group A). In 28,3% , this would not have been the case (Group B). In this group, a TeleConsult is asked to for general advise in order to improve the quality of the treatment. After the Teledermatology Consultation, 75,0% are not referred. Of group A (would have been referred without the availability of Teledermatology), 20,9% are referred, a 73,4% reduction. Of group B, (would not have been referred without the availability of Teledermatology), 18% is physically referred to the dermatologist. In the whole population, the total number of physical referrals to the dermatologist decreases from 6.355 to 2.215, a reduction of 65,1%. This reduction includes extra referrals due to advice, quality improvement and potential lowering of the referral threshold. This reduction does not include the long term reduction of referral due to the learning effect of Teledermatology, nor to the advices that have been given in Group B.

3.5 Cost Reducing Effect of Teledermatology

The reimbursement for a Teledermatology Consult is € 69,00. This includes reimbursement for the general practitioner (€ 22,50), dermatologist (€ 20,-) and KSYOS TeleMedical Centre (€ 26,50). The reimbursement for KSYOS includes the complete integrate service. The reimbursement of the general practitioner includes the extra work for Teledermatology Consultation (10 minutes) and all to the TeleConsultation related visits to general practitioner. The general practitioner is not allowed to declare these visits in his regular system. The mean costs of a physically referred patient including treatment are € 275,-. The size of Group A is 71,7% of the total population; the referral reduction is 75,0% in this group). The size of Group B is 28,3% of the total population; in this group is 18% is referred after teledermatology. The cost reducing effect in group A is somewhat reduced by the quality increase in group B, still leading to a cost reduction of 40,0%. The breakeven point for Teledermatology is € 179,02 per TeleConsult. However, due to a long term reduction of physical referral, the cost saving effect of Teledermatology will further increase.

3.6 Service for the Patient: Response Time of the Dermatologist

The trimmed mean response time of the dermatologist was 5.59 hours, the median 3.31 hours. Of all patients 95% received a response within two working days. Most TeleConsultations were sent at the end of the morning or afternoon. This applied also for the response by the dermatologist.

3.7 Perceived Benefits of TeleDermatologie

In interview sessions among patients, general practitioners, dermatologists, hospital management, policy makers and account managers of health insurance companies, Teledermatology was considered to lead to increased service, more working satisfaction, cost saving and higher production volume at equal costs and better quality of care (table 1).

More structured independent qualitative research among 205 general practitioners that work with KSYOS Teledermatology concluded that general practitioners see Teledermatology as enrichment of their work. General practitioners considered Teledermatology to have a learning effect, to be important for their work, to add to the efficiency of the care process, to increase work satisfaction and to fit into their regular work activities (table 2).

Table 1. Perceived benefits of Teledermatology

	Higher satisfaction	Higher production volume at equal or lower costs	Better quality of care
Patient	Answer within 2 days, no waiting list	Accessibility of care in the coming decades, no costs for travelling and absence of work	Quicker and better care, advice in case of non referral, emergencies
General practitioner	Working satisfaction, service to the patient, learning effect, innovation	Extra budgetary income	Learning effect, advices, emergencies
Dermatologist	Working satisfaction, service to general practitioners, increased adherence	Extra budgetary income	Learning effect, more time for more dermatology suited patients
Hospital	Service to general practitioners, increased adherence	Increased adherence to general practitioners, dosage of waiting lists, marketing instrument, free service (no investment for the hospital)	
Policy maker	Innovation	Accessibility or care in the view of the aging population	Quicker better care
Health Insurance Company	Service to clients	Accessibility or care in the view of the aging population	Quicker better care, better service for clients

Table 2. Perceived benefits of Teledermatology by general practitioners

	Fairly positive, positive and very positive
Teledermatology has a learning effect	
I can treat more dermatological conditions by myself	78%
I learn from Teledermatology	83%
Teledermatology is important for general practitioners	
Teledermatology is important in my work	79%
Teledermatology is useful	84%
Teledermatology is efficient	
Teledermatology makes healthcare provision in general more effective	94%
Teledermatology prevent live referrals to the dermatologists	79%
Teledermatology enables me to service my patients quicker	87%
Teledermatology simplifies the treatment process of patients	86
Teledermatology increases satisfaction	
I like to work with Teledermatology	88%
Teledermatology fits into my routine practice	
Teledermatology adheres to my daily activities	81%

3.8 Implementation of Teledermatology

At this moment, 8.200 general practitioners and 350 dermatologist on a population of 15 million are registered and actively practising in The Netherlands. Eight percent of all general practitioners' consultations concern dermatology. Hereof, 93% are treated by the general practitioner, 7% are referred to the dermatologist, leading to 45 referrals per year. Within the last 1,5 year, KSYOS TeleMedical Centre has connected 1.500 general practitioners and 142 dermatologists. However, 40% of the general practitioners are active in Teledermatology, performing 4.0 Teledermatology.

Consultations per quarter. Overall, all general practitioners perform 0,5 TeleConsultations per month. Despite regular extra budgetary reimbursement for general practitioners and dermatologists, the rapid growth of general practitioners connected is not followed by an equal increase in number of Teledermatology Consultations. In total, over ten thousand TeleConsultations have been performed through KSYOS.

4 KSYOS TeleMedical Centre: The First Virtual Hospital in The Netherlands

Safe, prosperous and socio-economic balanced introduction of teledermatology demands its' provision by certified centers that meet minimal quality requirements and that guarantee reasonable reimbursement of general practitioner and dermatologist, additional to regular reimbursement. KSYOS TeleMedical Centre has been officially recognized as a healthcare organization in December 2005 performing teledermatology consultations. KSYOS contracts health insurance companies that pay for each teleconsultation that is performed. KSYOS in return pays the general practitioners and dermatologists, manages security, software and hardware (digital camera, docking station, UZI-pas and card reader), all logistics and infrastructure with ongoing instruction,

quality monitoring and helpdesk function, takes care of invoicing and account management, price negotiating, quality monitoring and liability insurance. It is the information point for (future) parties that certify healthcare service, the logistic process with regards to security and privacy rules and the information process with regards to data storage, continuity and accessibility of information. In this construction, KSYOS is a new business partner for integrated services for health insurers.



Fig. 1. KSYOS TeleDermatology Consultation System

5 TeleDermatology as a Service Tool for General Hospitals

With the ageing and more demanding population, healthcare provision is bound to undergo drastic changes. On regional, national and international level, health workers, policy makers and health insurance organisations are addressing issues of how to keep healthcare accessible for the population in the coming decades despite dramatic changes in demand. Efficiency increase of healthcare delivery and the role of ICT in this process is a recurrent issue in policy documents and grant descriptions. Basic of this efficiency increase is the replacing of the bulk of the work from higher to lower in the health knowledge hierarchy – from medical specialist to general practitioner, from general practitioner to nurse practitioners or from nurse practitioner to the patient – under supervision of the person higher in the hierarchy. Telemedicine is perceived as an excellent tool to achieve this goal, combining innovating techniques, changed working conditions, prevention and education. With the use of telemedicine, conventional general hospitals are able to elaborate on their role as centre of excellence on the top of the knowledge hierarchy in healthcare. On one hand, it enables these hospitals to further focus on highly specialised care as with the help of telemedicine less routine care will come into their boundaries. On the other hand,

telemedicine enables these hospitals to maintain their supervising role in “bulk routine care”. In the Dutch setting, KSYOS has taken care of all safety, quality and administrative issues of both general practitioners and has contracted all health insurance organisations for reimbursement. It has therefore enabled hospital to offer this innovative service to their general practitioners and dermatologists without investments, thereby reducing any risk for the hospital.

Apart from the fact that telemedicine in general prepares hospitals for future changes in healthcare delivery, teledermatology has proven to have various immediate positive effects. TeleDermatology enables hospitals and dermatologist to influence their waiting lists. This has been mainly the positioning of teledermatology in The Netherlands: in the growth segment. By doing so, the hospital delivers quicker and better care to general practitioners and patients without cannibalising on their own production. And here is where the second immediate effect has appeared. Teledermatology strengthens the health chain and the contacts between general practitioners and dermatologists. If teledermatology is delivered on a regional basis by a professional institution that stands for safe and user friendly communication, general practitioners and dermatologist are high enthusiastic about teledermatology. By offering teledermatology, the hospital firmly strengthens and enlarges its’ contact area of general practitioners that drain on it. In The Netherlands, teledermatology has proven to be an excellent service tool for hospitals to their regional general practitioners, an issue which has come more and more prominent in the Dutch healthcare system that is planned to be increasingly market driven.