



i- Health®medical systems: scientific background

Abstract from the article by Prof. G. Falsone, Univ. of Trieste (IT): i-health systems, a scientific evaluation.

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Introduction

The i-Health medical system consists of three modules. The first one is a treatment-module that uses different wave bands of the electromagnetic spectrum and galvanic current. The second module is a module for diagnosis, with which the skin resistance can be measured and evaluated according to the model of traditional chinese medicine. These measurements tell you where to treat. The module has been validated in many German and Russian studies. A large animal study on the reliability (Bosma. Et.al) was published in the peer reviewed journal 'Int. Journal of Veterinary Medicine'. The third module uses rapid-response thermography that serves the selection of specific signals that are suited for the case at hand, out of the vast array of wave-lengths and -forms. The i-health system for energy-medicine stands apart from other systems in several ways:

- it is an open and transparent system because the effects of any type of treatment or manipulation can be evaluated by means of meridian-diagnosis. These measurements are exact, operator independent, easy to learn and wield a world of information. They can be linked for example to HRV data and are also suited to test medication and food.

- The system uses pulsating electromagnetic fields, colored light and galvanic current to improve the homeostatic capacities. This means we are using veritable, reproducible signals of constant quality and specific effects. These signals consist of complex wave patterns or sequences of colored light with specific effects.
- There is a vast knowledge base, cemented in many publications, in peer reviewed journals about the healing effects of pemf, light, galvanic current. But the i-health system has overcome one of the major practical problems in the application of energies because integrated in it is a system to select the most effective signals, thereby solving the problem 'what is good for the individual patient'.
- The type of signal and frequency that needs to be used for each individual case can be measured automatically and objectively by means of thermography.

The i-health system is being recommended by the German Society of Preventology, the German Society for Homeopathy and Homeotoxicology. In 2003 the I-Health has already been designated the most innovative and effective system by TNT expres Europe. Since then we have steadily developed. I-Health is also being used by the South-German Centre for Lyme's disease.

The i-Health energy-treatment module.

The i-health therapy module uses minute field-strengths of 2- 4 μ T and colored light of 5 mW. Because the signals have been developed to energize specific receptors (nerves, cell-membranes linked as organ-cells, receptors at the cell-metabolic level) mostly only low intensities are sufficient. There is an ongoing discussion on Bioelectromagnetics versus Biochemistry and this discussion ought to be an and-and discussion, not a polemic. The National Institute of Health states that "bioelectromagnetics essentially underlies biochemistry, in that chemical reactions of biological importance are mediated by the electromagnetic force." Bioenergetic Medicine offers the possibility of more

economical and more effective diagnosis and noninvasive therapies for medical problems, including those considered intractable or recalcitrant to conventional treatments. (See: Electromagnetic Applications in Medicine NIH-OAM Panel Report by Beverly Rubik, Ph.D. and Robert G. Flower; National Institutes of Health, Office of Alternative Medicine, January 14, 1993).

Therapeutic effects of light have been studied during a long period. The most commonly known effects are:

- effects of high intensity-light administered at large skin areas of patients with depressions. Especially in countries with periods of short daylight in the winter this is widely used.
- Treatment of fractures and wounds with LASER;
- Treatment of acne and wrinkles with sedating resp activating colours;
- Treatment with infra-red and red-light to stimulate the circulation;
- Treatment with blue light because of the sedating, inflammation inhibiting effects, for example with Psoriasis;
- Treatment of water and septic wounds with ultra-violet light in order disinfect.

Whelan reports that treatment of cell cultures with red light is activating certain genes that are important for the regeneration of tissue. This has been confirmed by Popp (1992). This has led to further research of the wound-healing capacity of diabetic mice as influenced by LED-radiation. The conclusion is that the use of led diodes increases the natural healing processes significantly. The LED's stimulate the basic energy turnover in the mitochondria (chromophores, cytochrome systems). Wavelengths that give optimal results are around 680, 730 and 880 nm. When these wavelengths are combined than the DNA-synthesis in fibroblasts en muscle cells is multiplied fourfold. LED-radiation of a very low intensity penetrates deep into tissues (2,5 – 3 cm). When Laser and LED-light are used in combination with Oxygen under higher than normal atmospheric pressures (hyperbaric) wound healing is increased. Russell et al and Sadick conclude that the application of red and near-infra red light from LED's are an effective and acceptable

method for photo-rejuvenation. The depths of wrinkles decrease, according to this study, within a couple of weeks with 25 to 50% by more than half of the test-persons. Wrinkles around the eyes decreased significantly with more than 80% of the test persons. It is very likely that the efficacy increases when low frequency pulsating magnetic fields are used in combination with light (Sadick, 2005). Blue light is effective for the treatment of light to intermediate acne-conditions (Morton, 2005). Blue light is especially effective when acne-lesions are treated. It is well known that a biological system exposed to a physical stimulus is able to detect its presence and to modify its own biological activity depending on the characteristics of the applied stimulus such as mechanic, electric or magnetic. The cell structure, able to receive the applied energy, has been identified to be cell membrane (Cadossi et al., 1992). In the past, it has been verified that electric or magnetic fields can affect membrane functions not only by a local effect on ion fluxes or ligand binding, but also by altering the distribution and/or the aggregation of the intramembrane protein (Bersani et al., 1997). It is known that such proteins include a variety of different specialised molecules, such as receptors, enzymes, ion channels, integrins that are essential for many fundamental functions mainly related to signal transduction and cell adhesion. In particular, the influence of radio-frequency electromagnetic exposure on ligand binding to hydrophobic receptor proteins is a plausible early event of the interaction mechanism (Chiabrera et al., 2000). Collateral studies of magnetic or electric fields reveal a modulation in skin resistance.

There is extensive scientific literature about PEMF and its therapeutic effects, the mechanisms that apply, their risks etc.

The i-health®system uses sinus frequencies in the range of 80 Hz to 9500 Hz and block waves from 115 to 145 Hz (autogene frequency therapy). A substantial part of the research on PEMF has been carried out while applying this frequency range but much higher signal strengths. Research of the effects of EM fields concentrates on the influence of the exploding number of cell phones and their networks. The relevant frequencies reach

into the GHz-range and are of a very different nature.

The signals that are used by the i-health®system are between 0,1 tot 4,24 µT. These signals are 20x less strong than those used in magnetic-cushions such as the Bemer that uses signals ranging from 100 µT to 3000 µT(from Spodaryk, 2002), even thousands of times weaker than what is used for orthopaedic stimulation and even millions of times weaker than what is used for transcranial stimulation.

By means of magnetic induction weak electrical pulses are generated in the tissue or nerve fibres (Musaev, 2004, Warnke, 1997, Adey, 1976: Brain interactions with weak electric and magnetic fields. Neurosciences Res.Prog.Bull 15, 1,pp 1-129, 1976.). These impulses are influencing the production of neurotransmitters through the potential differences that are induced in the nerve fibres. An other effect is the stimulating direct influence on receptors at the cell membranes See: Smith (2004), Sandyk(div. publ.), Richards en Pessina .

Most references report on the favourable or even very favourable effects of PEMF on the healing of bone fractures. Accelerated healing of fractures as influenced by weak em-fields (Fredericks, 2003; Diniz 2002; Varani, 2003, Ottani 2001, Cane 1991). An exception is Basset(1991) who does not cite effects of pemf on fracture healing. Trock, 1994, Jorgensen, 1994, Jacobsen 2000, Pipitone en Scott, 2001, Sherman, 1999 reported on successful treatment of pain and tissue trauma wit pemf. Spodarek carried out a placebo-controlled double blind study of the effects of extremely weak magnetic fields on muscle ache (86 µT). Treated patients showed remarkable improvements when compared with untreated patients. Sanseverino, 1997 and Rubin, 1997 reported on improvement of bone density indices due to pemf. Smith(2004) found a significant increase of the arteriole vasodilatation in relation to the localized application of weak pemf. This dilatation of an average of 9% directly after the application of the pulse is still present an hour later (8,5% on average). The effects on the transported blood volume have not been measured by Smith. These results coincide with the results that have been achieved with the autogene frequency therapy. Gluck(2001) and Ito (1997) report on significant improvements in the micro-circulation resulting from the application of

extremely weak em-signals. Kafka (1991) summarizes the effects of extremely weak pemf with: expressed in a simple way, a broad range of the bodies functions are stimulated..

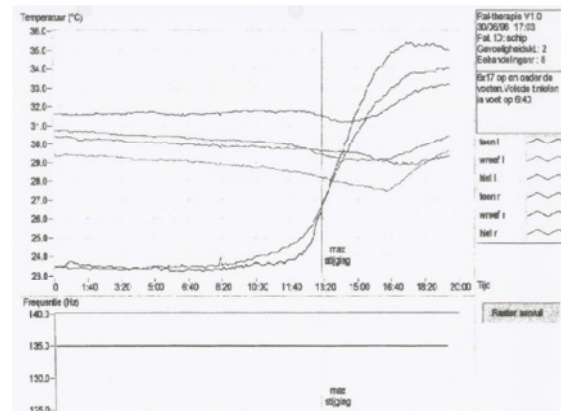


Fig 1. Begin of vasodilatation of arterioles in the feet after approx. 6 minutes resulting in an increase of the surface temp of 13 °C through pemf of 135 Hz, 4 µT low frequency signals. Ceteris paribus, control points of measurement at the feet and arms.

increase of painfree walking distance of 120 65 year old Claudicatio patients

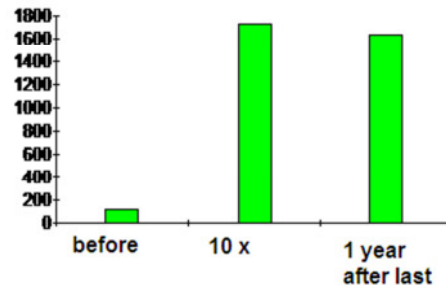


Fig.2.Average painfree walking distance before (left bar), directly after(middle) and 1 year after treatment (right bar) with 120 Claudicatio patients. * in the beginning of the developments we called this therapy the radio-induction therapy or 'RAI'. (now integrated as AFT-module in i-Health) Raitec bv, internal report 1998.

increase of foottemperature in degree Celsius with # of AFT-treatments

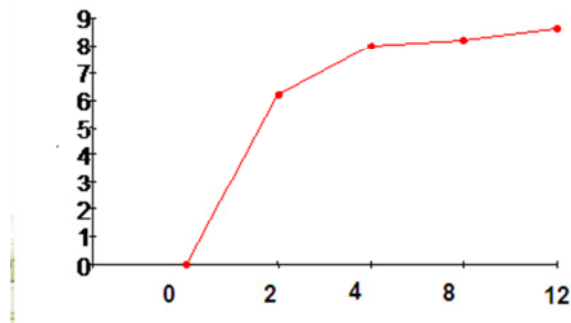


Fig.3. Increase of average foot-temp in °C of 120 Claudicatio patients in relation to the number of treatments with aft-signal, ULW PEMF 115 - 145 Hz; Raitec bv, internal report 1998.

i-Health used a automated volumetric plethysmograph for the verification of the effects of AFT on the micro-circulation. The increase of the micro perfusion ranged from 30 to 60 % while the heart-minute volume remained constant.

A long term study showed that the stimulation of the micro-perfusion with AFT at 120 Claudicatio-patients, average age 67 years, resulted in an increased pain free walking distance from 110 m to more than 2000 m. After a year this improvement was still at the same improved length. This coincided with the improvement of the Doppler-signal.

Sandyk reports on the neurological effects of many cases. EMF results in a better transduction of impulses through nerve fibres of which the myeline-sheath is damaged as the result from Multiple sclerosis and Guillain-Barre. (Sandyk, div.publ.1991/2000, Richards, Univ. Of Washington en Thomas, 2001).

The i-health® system differs from other systems in several respects.

Signal-strength:

- the field intensities that are generated by the i-health®system are lower than those that are generated by other systems. The fields that we use range from 0,1 to 4,24 µT. This is 0,3 to 14% of the max. allowed strength for non-ionizing radiation as set by ICNIRP for occupational exposure for the frequency range up to 9000 Hz.

- The applicator has a diameter of 3,5 cm because we wish to influence locally at acupuncture points or organs. Much larger applicators are the norm that are designed for whole body treatment.

Choice of the treatment-location :

- The choice of the frequencies depends on the eda-measurements.

Zones in the sense of dermatomes or acupuncture points with the highest relative resistances are being treated with preference.

- The required result is the normalisation of the skin-resistance through checking and comparing the new curves with previous ones. Normalisation of curves during treatment very often is an indication of a future reduction of complaints.

The risks of PEMF with intensities of 4,24 µT max.:

- improved Calcium transport through cell membranes while using a transcranial applicator (Pessina, 1991);
- Influence on the transport of myosis-reducing medication and their biological availability could not be established by Laque at al. Influence of fields 400x and much longer application times did not result in a diminished efficacy of Methotrexate (Laque-Ruperez, 2003).
- Decrease of the vitality of cancer-cells under the influence of PEMF in combination with cytostatics with photodynamic characteristics (Traitcheva, 2003).
- Influence of the speed of duplication of osteoclast cells at extremely low field intensities of several milli Tesla (factor 1000 stronger than used by i-health) was reported by Chang (2003).
- Leman could not establish a relevant influence on the proliferation and invasion of Mamma tumorcells while a positive influence on weak connective tissue was noted. Field strengths were 100 – 1000x stronger in this study than what i-health applies.

Thermography.

Thermography is widely used for:

- the establishment of zones with vascular constriction;
- diagnosis of arterial deficiencies in the legs;
- the identification of inflammations;
- the prescription and evaluation of treatments;
- the measurement of temporal changes in the micro-circulation (Makarov I.V.,2002; Winsor,1985)

Changes in the output of energy in the form of heat are caused by:

- vascular dilatation (resulting in relaxation);
- changes in the energy-consumption after exercise, movement, intoxication, stress, exhaustion, rest, relaxation, external stimulation, a.o.
- autonomous regulation, meaning simpatico- or parasympaticotone regulation of the micro-circulation.

Comparable thermo-regulatory changes may be induced for example for plethysmographic measurements or to diagnose the degree of atherosclerosis and changes over time (Winsor, 1985: the non-invasive laboratory; Fushimi, H et al, 1998: Peripheral vascular reactions to smoking).

The i-health@system uses thermography to:

- establish the effects of electro-magnetic and/or light signals on the micro-circulation and autonomous regulation.
- To find the signal or frequency (- pattern) where the best possible coupling between the EM-field and receptors in the body occur. Because of this coupling i-health is capable of achieving results with extremely low field-strength's and short exposure times.

Through the emission of electro-magnetic frequency-sweeps those EM-frequencies are identified that exert the strongest influence

on the output of heat, micro-circulation and autonomous regulation.

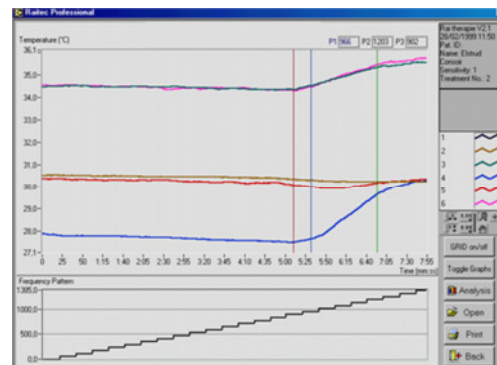


Fig 4. increase of the skin temp of 2 °C within 90 secs during a frequency sweep. The frequency where this reaction begins is the efficient frequency for em-stimulation of the microcirculation.

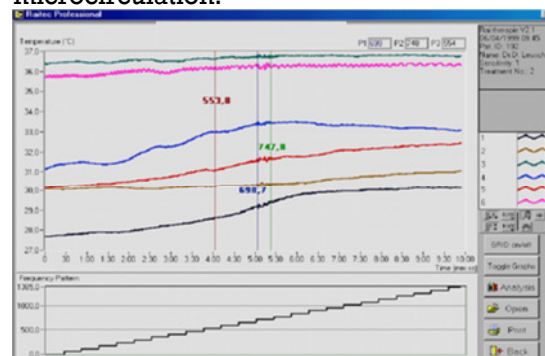


Fig. 5 An example of a short-lived reaction to EM-stimulation with various wavelengths (at 689 Hz). Stimulation with a frequency from this window where this reaction occurred is effective for the stimulation of the microcirculation or vasodilatation.

Validation of the method.

i-Health®systems Itronic EDA module.

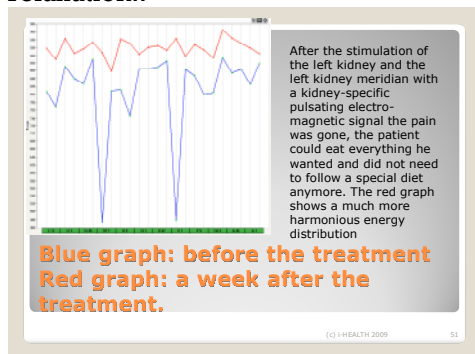
The device measures skin-resistances (in $K\Omega$) typically at acupuncture-points and temporal differences of the skin-temperature ($\Delta^{\circ}C/T$). The software establishes the degree in which the organism is capable of homeostasis, i.e. the capacity to regulate (stress of) the vegetative nervous system. Vegetative stress is defined as a lasting unbalance between Simpatico- en

Parasympathetic system of the autonomous nervous system.

On the basis of skin capacitance measurements it is calculated which acupuncture points, combination of acupuncture points or skin areas must be stimulated to bring about better vegetative stress regulation. These suggestions for treatment of certain points are given according to the rules of acupuncture and can be carried out with the itronic light pen or beamer but also with needles, moxa or acupressure.

The impact of the stimulation is evaluated by means of consecutive measurements and these show if improvements have appeared with respect to the standard values.

The result of the treatment should be a normalisation of the skin capacitance as a result of improved microcirculation and relaxation..



The Itronic EDA-module of i-Health has been built according to example of the measurement system for skin capacitances on acupuncture points that has been developed for the Russian space travel-programme. This system has been used during a range of years, from 1984 until the launch of the ISS, in the Bhuran space travel programme.

I-health applies the technical specifications for signal strength, specific pressure of the feathered tip of the sampling-probe, the sampling procedure, choice of material, standards and algorithms of this system (Sagrjadski a.o., 1996. Several publications. Treugut, 1999). In two independent studies the validity of measurements have been verified (Colbert, 2004; Sponring, 2003; Bosma, 2006, J. of Veterinary Medicine). The choice has fallen on using these technical specifications because the exactitude and reproducibility of these measurements are much better than those of the well-known other systems (for example. Yamamoto, Voll).

Sagrjadski et al (1996) discuss the exhaustive research (22.500 test persons) that formed the basis for the development of the measuring method. The validation of the method has been done by comparing syndromes, as established by orthodox diagnosis, with the results of EDA-measurements. Depending on the type of disorder the agreement between the methods varies, from 75% up to 95% (See table at the end of the article).

Determinative for the reliability and the reproducibility of the EDA-method of measurement is the complete exclusion of irreversible influences of facies, connective tissue and nerves by the impulse and pressure exerted at the point of measurement. According to Sagrjadski et al. important characteristics are :

- the specific and constant presses on the acupuncture point,
- sending the pulse while constant permanent specific presses on the performance indicator,
- Amperage no higher than a few microamperes (in the case of itronic: 1 μ Amp),
- Restricted to a max. duration of the pulse of 200 millisecc.

These values have been used as design criteria for developing the itronic EDA-module since it has been proven measurements with these specifications of the hardware exert only a minute and quickly reversible influence on the facies, the underlying and connected structures and the vegetative nervous system.

Not only these criteria have been used, but also other literature on the presence or absence of vegetative stresses. The American Association of Osteopathic surgeons for example has published the anatomy of the dermatomes and this resembles the pathways of the meridians (A dermatome is the area that is connected with the nerves that originate in the spine and is nourishing a specific are called dermatome).

The variations between measurements can be evaluated as well. We have applied the Kolmogorov-Smirnov algorithm. The variation in the EDA-values gives insight in the regulation-types and these types are indicators for the absence or prevalence of certain dysfunctions (Klimek, W, 2004; Popp, et.al, 2004).

Several independent studies show that devices that have been constructed according to the criteria of Sagrjadski et al (1996) measurement series can be carried out with only a slight variation (Colbert, 2004, Bosma, 2006, Treugut, 1999). Measurements with the i-Health EDA of standard resistances vary far less than 5 % in the range 100 – 18.000 kΩ. Colbert et al (2004) have found that the variability decreases when the acupuncture point is hit in exactly the same way. This can be achieved by marking the point with a felt-tip.

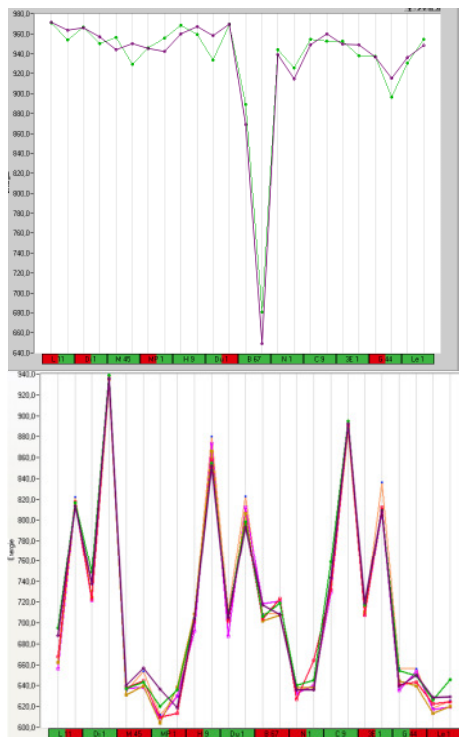


Fig.6. examples of reproduced measurements (chronic patients with blocked regulation).

Changes in the resistance of acupuncture-points (Lung and large-intestine meridian points) that were done as a part of a research project into lung-pathologies showed a correlation of 87% between the resistance-values of the lung points and the X-ray-pictures, but not between the X-rays and random-chosen Large-intestine meridian-points. Interestingly, no false-negative values occurred. The false-positive results (n=4) were derived from a patient with an inconsistent shadow on the X-ray, but not an evident tumour according to the tomogram or CT-scan (Sullivan et al, in print).

Szopinski (2004) showed that the pathology of an organ is linked to raised skin resistances of the corresponding

acupuncture-points and zones of Head (= dermatomes). EDA-values are considered to be a reliable, non-invasive bio-electronic method with a high degree of sensitivity and forecasting value considering the development of a pathology (Szopinski, 2004). The values that are mentioned by Szopinski match those of Sagrjadski(1996).

Krop(1997) found that with 41 polysymptomatic allergy patients 96% of the allergens (house-mites, histadine) were discerned from the non-allergens (salt-solution, water) based on their eda-readings. Becker(1976 and 1979) found strong correlations between physiological functions and electro-physiological measurements of meridians, skin-zones and acupuncture-points.

The faculty for Animal Sciences of the University of Wageningen and the faculty for sports-sciences of the Univ.of Innsbruck studied the validity of the i-health eda-system. Sponring (2003) concluded that the eda-measurements correlated strongly with lactate-tests of athletes after training. Bosma et al(2006) found that the measurement of skin-resistances correlated strongly with various parameters for animal health. The eda-measurements were done at points that are related with the immune-system (1999, Kothbauer: veterinary acupuncture on cattle. ETH Zurich). These values were compared with parameters for milk (somatic Milk-cell count), with the Body-condition score and the IA rate (number of inseminations per gestation). High correlation-coefficients were found.

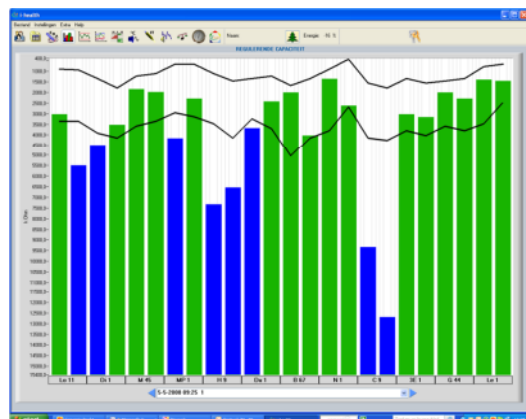


Fig.7. Graphical representation of skin resistance values as compared to norms: Hypo energetic points in blue. Normal energy in green.

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Literature can be found at www.i-health.com

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Reliability of the energy diagnosis and assessment

Pathological conditions	# of patients	reliability of the diagnosis and prognosis of the therapeutical efficiency
healthy sportsmen with varying degrees of exhaustion	9270	0,95
Neurology:		
Lumbosacral radiculitis	900	0,90
Arachnoiditis	1500	0,92
Syndromes caused by Exposure to chemical toxins	3100	0,90
Cardiology:		
Stenocardy, Myocard.infarct, Hypertony, Combination of syndromes	3820	0,96
Pathology of the lungs:		
Bronchial asthma	670	0,90
Pneumosklerosis	380	0,90
Pregnancy related pathology:		
Toxicosis during first 4 months	380	0,94
Toxicosis during 5- 9 months	220	0,92
Surgical pathology:		
Inflammation of the gallbladder With stones, and without stones, Pancreatitis, Peritonitis with exudate Appendicitis	890	0,94
General pathology:		
Ulcerous growth of the Intestines, cirrhotic-liver Diabetes	980	0,98

Traumatological pathology:		
Crash-syndrom Frost Traumatic amputation	69	0,98
(Patients that could not be followed until the end of the studies 718)		
Total # of patients included in the Studies	22.297	