



TALLINN UNIVERSITY  
Haapsalu College

# The potential of Estonian Curative Sea-Mud

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**February 2015**



European Union  
Regional Development Fund



Investing in your future

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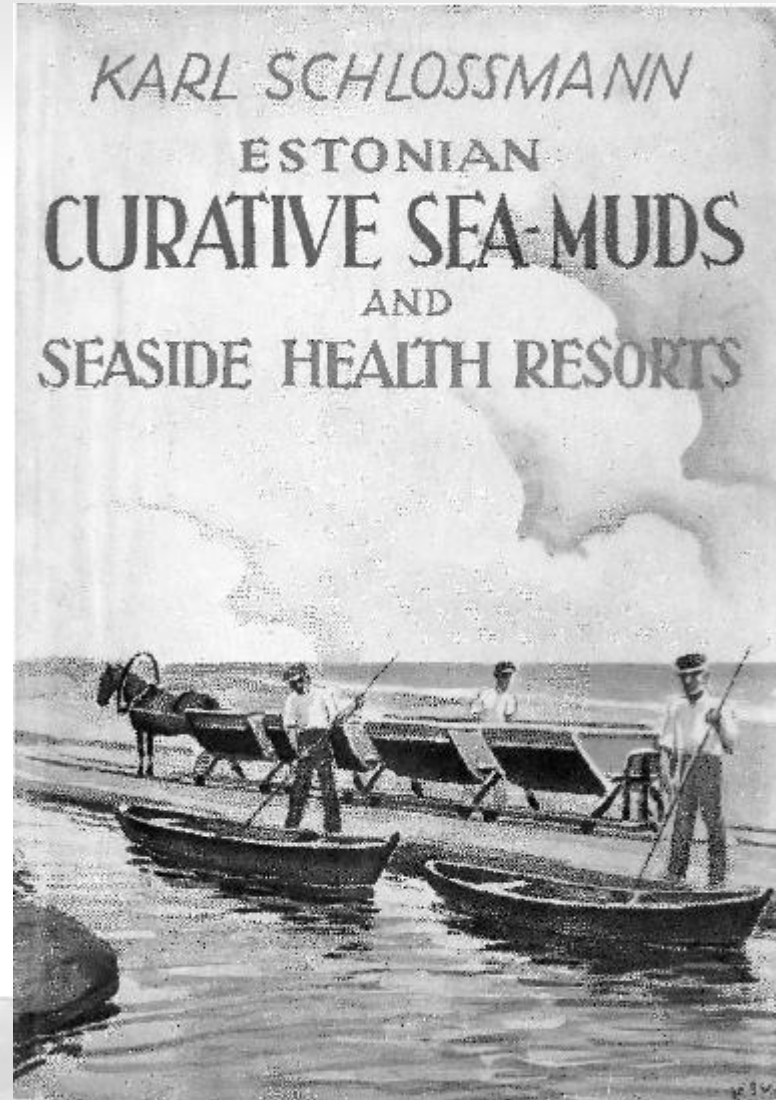
**Balneotherapy** comes from Latin  
*balneum* "bath"

Peloid packs and, specifically, peat, have been used in Europe for medicinal baths and wraps for the past 200 years.





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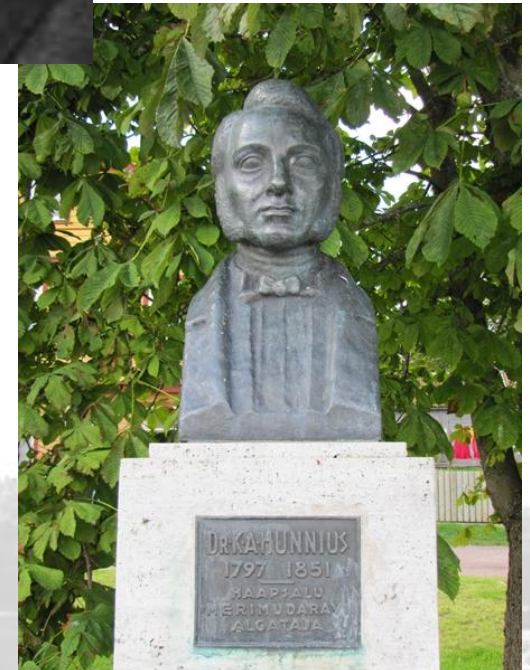


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Dr. Carl Abraham Hunnius (1797-1851) was the first to notice that the local residents used the sea mud to find relief for their ailments and was inspired to start investigating the properties of the mud.

At his initiative, the first therapeutic mud baths were established in Haapsalu in 1825.





## Haapsalu – the historical summer resort of the Czarist court

Reports about the curative effect of sea mud reached the upper class in St Petersburg and thence the resort town strewn with numerous inlets and small islands became the beloved summer residence of rich St Petersburg nobility and the Imperial family of Russia.

The Czars Peter I, Alexander I, Alexander II, Alexander III and Nocholas II all came to Haapsalu to improve their health and to enjoy some royal still life.





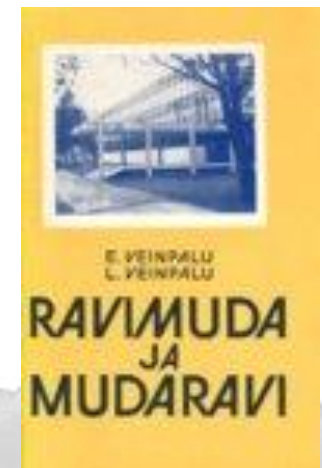
Prof Ernst Raudam

After the polio in 1958 due the initiative of prof Raudam from Tartu University a rehabilitation hospital was founded in Haapsalu what continued the tradition of mud treatment in the practice of neurorehabilitation.



# History of curative sea-mud studies in Estonia

- prof Voldemar Vadi. „Eesti Tervisemuda. Balneoloogiline uurimus“ Tartu 1947.
- 1957 Institute of Curortology was founded in Pärnu.
- 1976 Endel Veinpalu, Liidia Veinpalu. A book “Ravimuda ja mudaravi” was published
- from 2002 in Tartu Ülikooli Pärnu Kolledž M. Übner continue studies of the balneology





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# The study of Estonian mud deposits by Jaanus Terasmaa work-group

рл жррмтс Тетрзмтгг мотк-дтотб

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## Käina bay and Voosi 2014

Jaanus Terasmaa  
Agata Marzecova  
Sander Rautam  
Galina Kapanen  
Annika Mikomägi





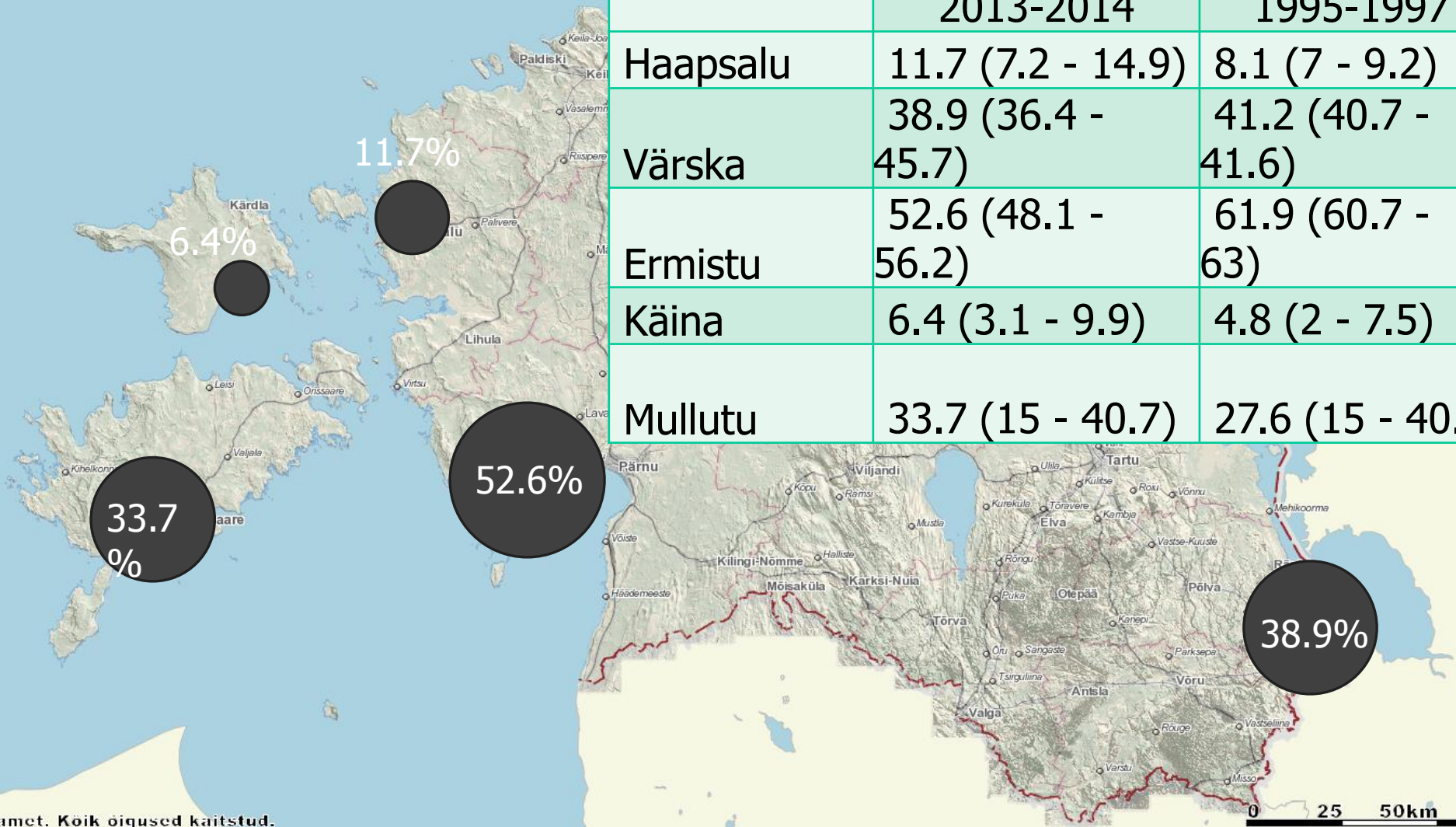
# Käina bay

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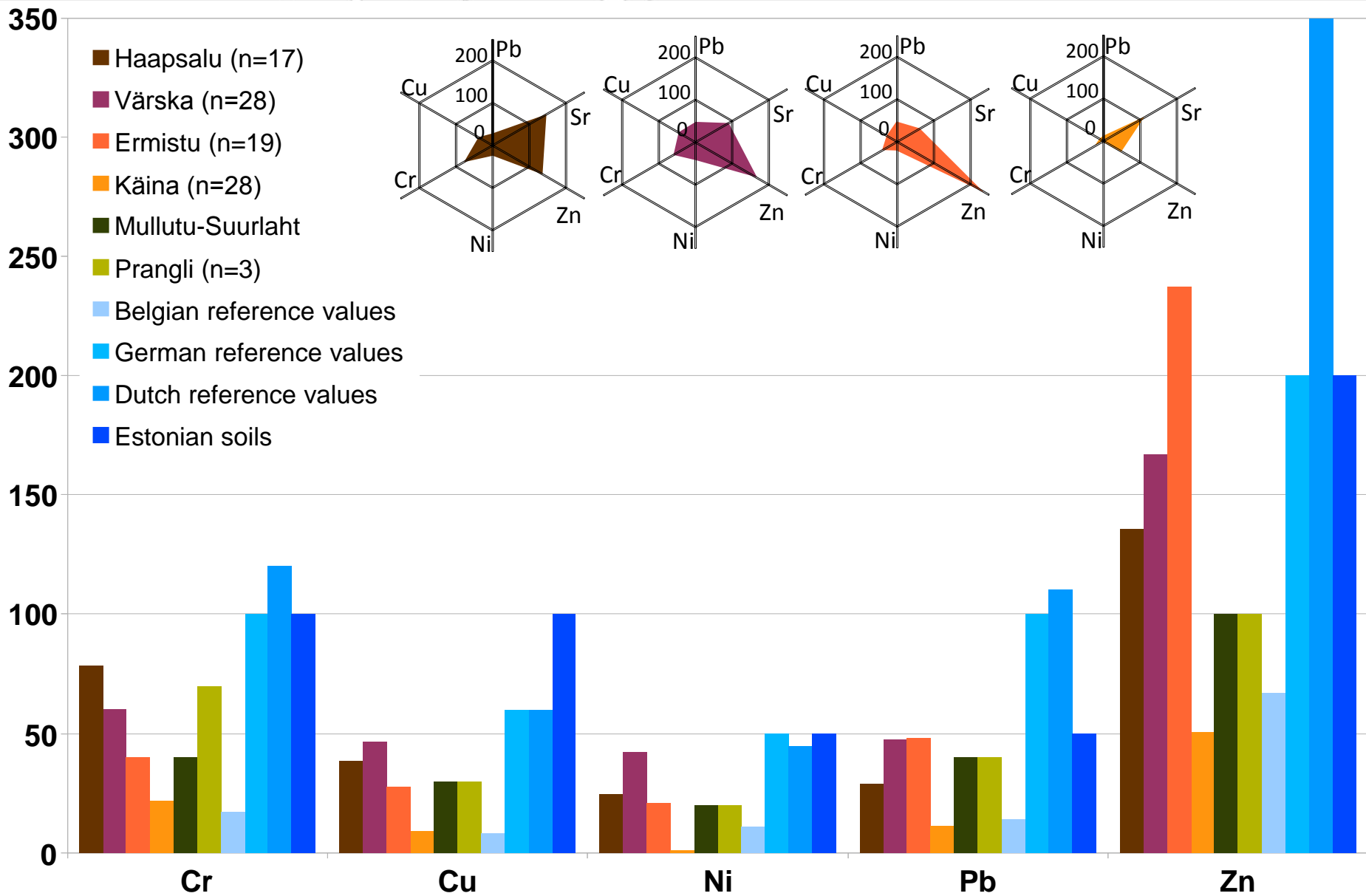




Site	Average organic matter, % (min - max)	
	2013-2014	1995-1997
Haapsalu	11.7 (7.2 - 14.9)	8.1 (7 - 9.2)
Värska	38.9 (36.4 - 45.7)	41.2 (40.7 - 41.6)
Ermistu	52.6 (48.1 - 56.2)	61.9 (60.7 - 63)
Käina	6.4 (3.1 - 9.9)	4.8 (2 - 7.5)
Mullutu	33.7 (15 - 40.7)	27.6 (15 - 40.2)



X-GIS. Maa-amet. Koik õigused kaitstud.





## Why mud treats?

Therapeutic mud affects the organism as a thermal, mechanic and chemical irritant and has an effect of **biomodulation for the whole organism:**

the nervous and cardiovascular systems, the skin, blood composition and metabolic processes

*Schlossmann, K. Estonian sea-muds and seaside health resorts. London.1939).*

Mud bathes in Värskä SPA



- Mud therapy cures chronic inflammatory diseases and relieves pain, this treatment also has a biostimulating action (accelerates metabolism and cell renewal) and drains excess liquid and residue from the body.
- Chronic disease processes may become slightly more acute in the beginning of treatment, as metabolism is activated.



- Therapeutic mud affects the organism as a **thermal, mechanic and chemical irritant.**
- Changes take place in the nervous and cardiovascular systems, in skin, blood composition and metabolic processes.



- Due to the influence of mud treatments the patients' pulse will quicken, sweating also occurs in the beginning of treatment, **circulation of blood is improved.**
- Irritation of numerous skin receptors with warm mud strengthens inhibitory processes in cerebral cortex that explains patients' drowsiness during the treatment and especially after the treatment.





- Therapeutic mud is used for therapy either for the whole body (general mud therapy) or only on the wanted area (local mud therapy).
- The duration of mud therapy is approximately 15-20 minutes
- Mud packages the treatments are performed either every second day or daily, depending on the patient's health status.



- General mud therapy – a customer lies in a liquid mud with the temperature 38 - 42 ? C.
- The customer is covered with plastic and blankets, so that the temperature of mud bath would not lower and the efficiency of therapy would be preserved. After the treatment follows a light shower.



- Local mud therapy – in case of customers for whom general mud therapy is not suitable for some reason (age, accompanying diseases) “mud gloves” and “mud socks” can be used where a customer keeps his/her corresponding limb (either the palms and/or feet) in a vessel filled with mud.



# Diagnoses and health conditions for mud treatment

Haapsalu mud is used for treating the following diseases:

Chronic inflammations of musculoskeletal system

Diseases of the vertebral column

Muscle atrophies

Post-traumatic and post-operation adhesions and scarring

Chronic skin diseases (psoriasis, eczema)

Some chronic gynaecological diseases

Some chronic internal diseases

Chronic prostatitis

New indications for local mud treatments in health prevention and in the occupational medicine ( overuse syndroms etc)





## New trends

- During the last decades, length of spa therapy time in Estonia has decreased mainly due to changes in the economic situation and is now commonly 6-7 days

*(Vaht, M., Birkenfeldt, R., Übner, M. (2008) An evaluation of the effect of differing lengths of spa therapy upon patients with osteoarthritis (OA). Complementary Therapies in Clinical Practice, 14, 60-64.3).*

- There is a need for new mud products what are easy to use and can be used also at homes as health promotion



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## **Health Promotion and Rehabilitation Competence Centre (CC)**

- was established by Tallinn University Haapsalu College in 2012
- The idea of this center is to represent an innovation-based cooperation between the representatives of PRM clinics, research and development institutions, local authorities and businesses in the field of balneology, especially mud therapy.



# Curative mud

**A Centre of Excellence  
in Health Promotion  
and Rehabilitation  
by Tallinn University  
Haapsalu College**

**The mission: to  
promote the research  
based rehabilitative  
methods of the  
working-age  
population.**

Mud laboratory

Database on  
curative mud

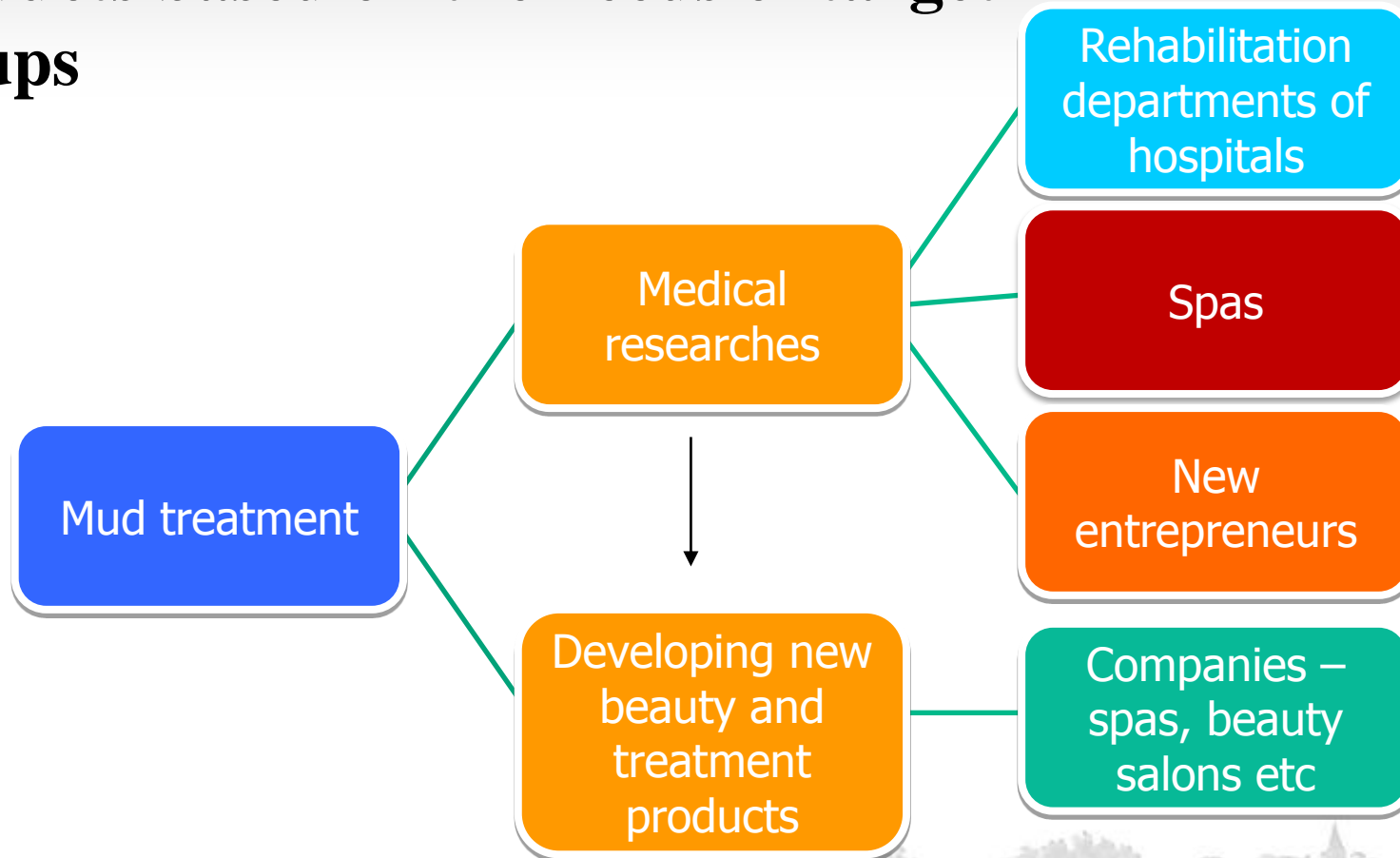
Clinical studies

New mud  
products





# CE goal: to develop services and products based on the needs of target groups







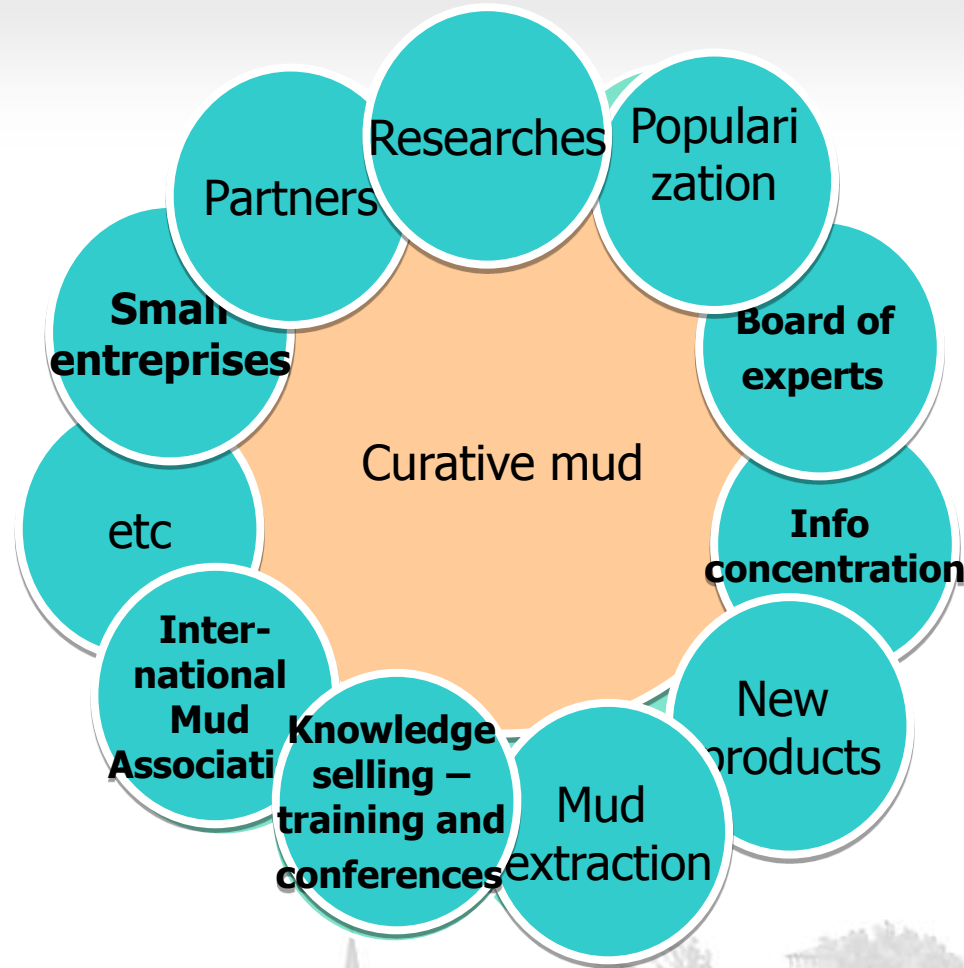
## CE project partners

- **There are 13 partners involved in the project activities :**

Tallinn University, University of Tartu, SA Haapsalu Neurological Rehabilitation Centre, Tartu University Hospital, Municipality of Haapsalu, Heal AS, Haapsalu Kuurort AS, Sanatoorium Tervis AS, Värskä Sanatoorium AS, IKT Demokeskus NGO, Eesti Abikeskused NGO, EQUA OÜ and Estonian Spaa Association NGO.



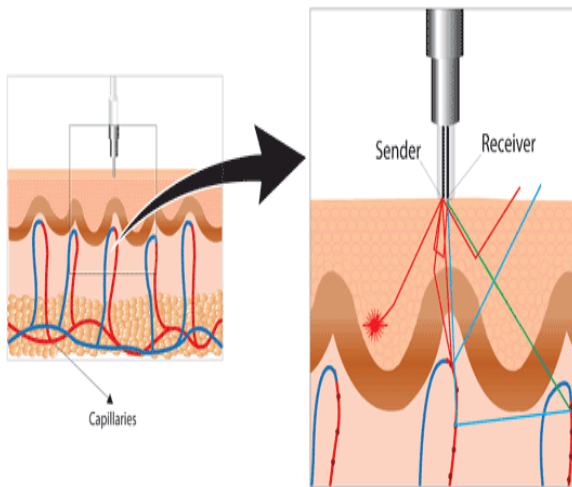
# CE mudel of co-work





## Clinical trials in CE

- Balneotherapy (mud , local heat and mineral water bath therapy ) in **occupational overuse syndroms.** The effect of the therapy was measured by laser doppler imaging, Myoton, EMG and functional and descriptive tests (Work Ability Index, Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms, Visual Analogue Scale)
- Osteoarthritis and neck pain patients



- There are the positive findings reported in most balnotherapy trials but from the other side there is an absence of an objective measurements
- Perimed laser makes show us the effect of balnotherapy on the blood circulation in the treated regions (hands, legs)



# Laser Doppler

- An information about the the circulatory system is very valuable because **perfusion abnormalities are often an early stage in different malfunctions** (eg overuse syndroms)
- As a consequence of the large normal variations observed in the microcirculatory blood flow, **provocations tests like post occlusive reactive hyperemia** (PORH) is often used to facilitate data interpretation.
- The test involves blood perfusion measurements before, during and after occlusion.



## Background of the clinical study

- Repetitive tasks with hands often cause the loss of work capacity in long term practice.
- In 2009 the work capacity of 59 % of workers at the age of 15 - 64 was limited due to long-term problems with hands, legs, back or neck in Estonia.
- **We need good tools to prevent and rehabilitate these conditions before the permanent loss of work capacity appears.**



## Purpose of the study

to understand the effects and efficacy  
of the balneology treatment  
**in the prevention and treatment of  
the overuse syndromes**  
of working age persons  
on the professional overuse of the  
upper extremities.



## **The impairment in circulation- one of the explanations for musculoskeletal disorders**

- In static muscles work, when muscle contracts, the intramuscular pressure increases and the blood flow worsens.
- Insufficient flow can lead to oxygen deficiency in the muscle and in this way to a number of biochemical processes, that can produce a pain

*/Allan Toomingas et al, Occupational Physiology, Published:December 20, 2011 by CRC Press/*





## Materials and Methods

- The study included 110 factory workers with upper extremities professional overuse
- balneology treatment in outpatient clinic 10 times.
- The work-place risk analyses, pain Visual Analogue Scale (VAS) and Laser-Doppler Flowmetry were used.
- The microcirculatory signals of the hands were monitored before and after balneological therapies and during post-occlusive reactive hyperaemia test.



## Medium pain group (35 persons)

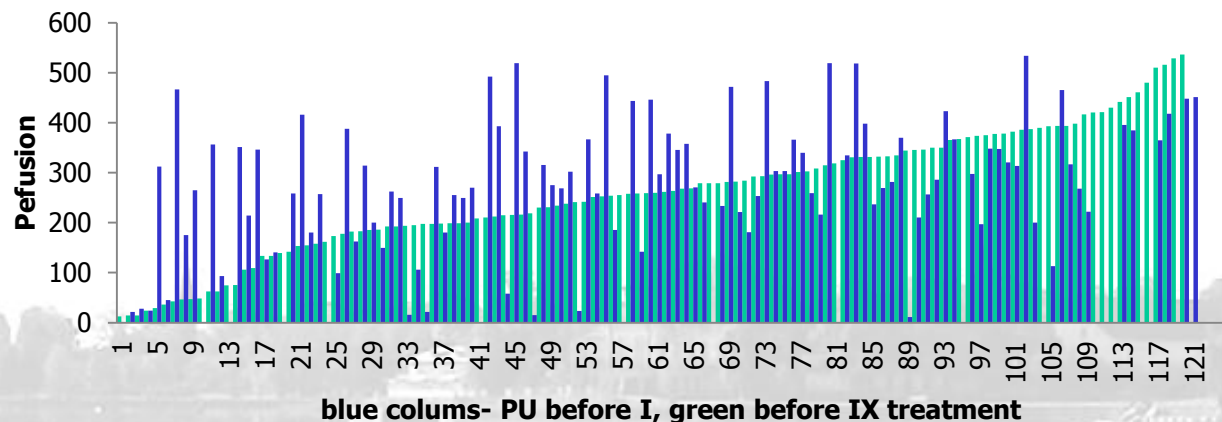
- There is a good correlation between tissue perfusion measurements by laser-doppler and pain intensity by VAS in the medium pain group : the changes of the perfusion after balneology treatment course were statistically significant



# The individual reactions of the microcirculation due balneology treatment

- ... are rather wide.
- The relatively lower rest flow at the beginning showed the best positive reaction after the balneology treatment and the high perfusion in the beginning did not .
- Biomodulation

**Perfusion before and after balneology treatment**





## Conclusions

- In this study we got the best results with the balneology treatment in the subgroup of the persons with upper extremity overuse syndrom, who had medium pain and the relatively lower perfusion before the treatment.



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Thank You for the attention!



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