



Dr Marc
Realise worldwide wellness

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Hot Springs Sanitation: Towards Global Best Practice

CONFERENCE
Bologna, Italy
November 2022



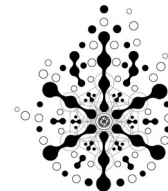
**GLOBAL WELLNESS
INSTITUTE™**
EMPOWERING WELLNESS WORLDWIDE



MARUIA
HOT SPRINGS

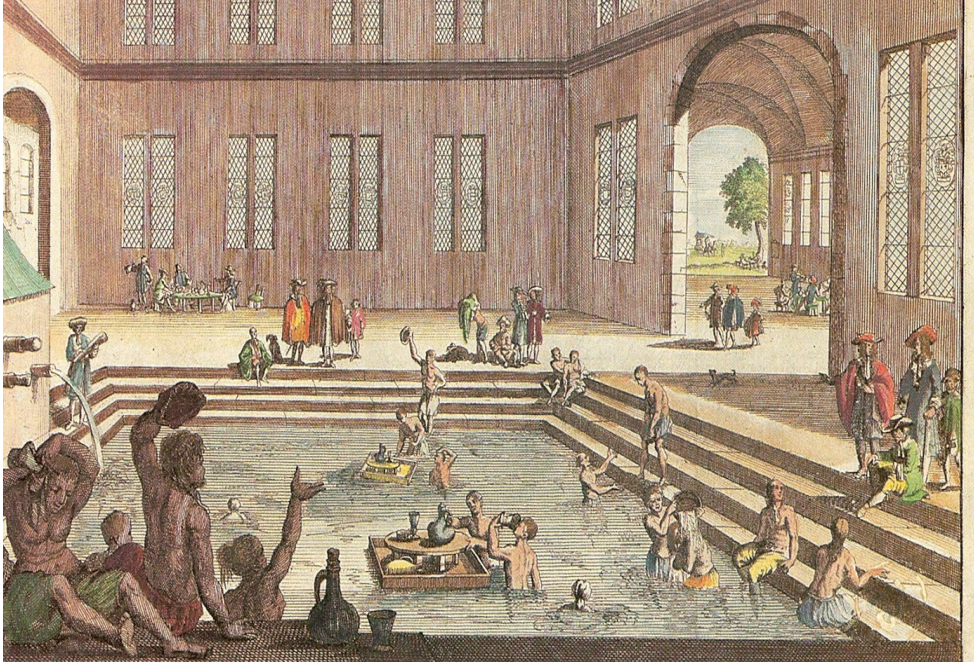


PENINSULA
HOT SPRINGS



Beautiful Water®
Filtered structured balanced blessed free

Salus Per Aquam – Health through water



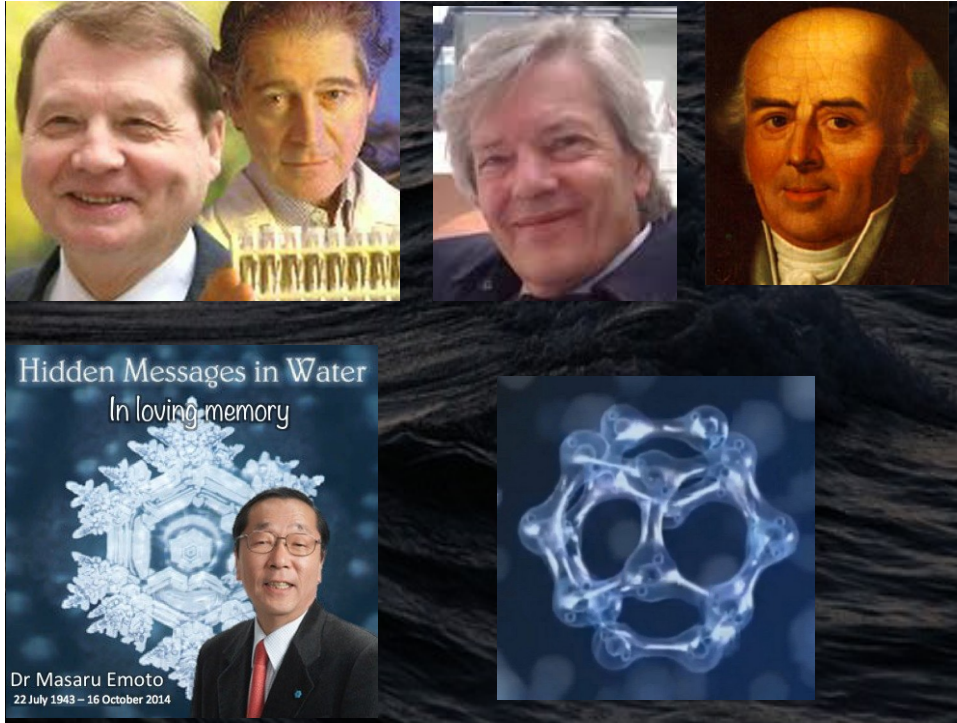
- Prevention and hygiene
- Physical and mental health
- Rehabilitation and recovery
- Nature connection
- Social connection

Geothermal Waters are Unique



- Location / Source / Flow rate
- Temperature
- Mineral & physicochemical properties
- Microbiota
- Subtle properties

Water Has Esoteric Properties



- Water is mysterious with 72 unexplained scientific anomalies
- Water is the basic operating system for life and consciousness
- Water has memory and structure
- Water is not naturally sterile and houses microbial ecosystems

Microbial Risks



Faecal-derived pathogens

- bacteria (*Shigella* spp., *Escherichia coli* 0157),
- viruses (adenoviruses, hepatitis A, noroviruses, enteroviruses)
- protozoa (*Giardia* and *Cryptosporidium*),

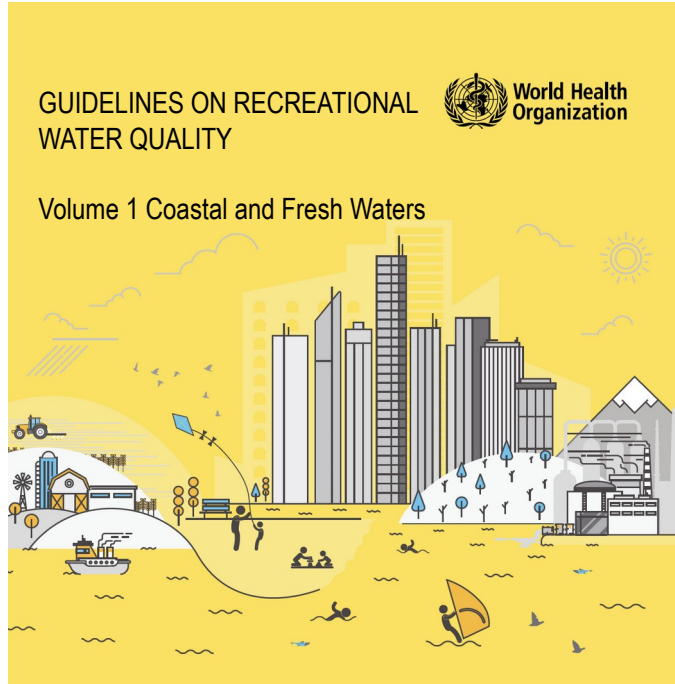
Non-faecal pathogens

- bacteria (*Pseudomonas* spp., *Mycobacterium* spp., *Staphylococcus aureus*)
- viruses (molluscipoxvirus, papillomavirus, adenoviruses)
- fungi (*Trichophyton* spp., *Epidermophyton floccosum*).

Free living pathogens

- bacteria (*Legionella* Spp, *Pseudomonas* spp)
- amoebae (*Naegleria fowleri*)

Microbiological Parameters – not hot spring specific



Conventional Aquatics

<1cfu/100ml (E. Coli, P. Aerginosa, L. pneumophila)

Natural Recreational Waters

40-200 cfu/100 ml (Enterococci - indicator)

Fragmented and Inconsistent Regulations



- Not evidence-based
- Some require residual disinfection
- Some consider water untouchable
- Must consider recirculation & flow
- Turn over ranges from 8hrs - 30 mins

Factors to Consider



- **Water** - quality, use and contamination risk
- **Flow** - dilution of contaminants
- **Bathers** - load, health, age, showering, submersion
- **Cleaning** - filtration, sanitation, drain, clean and dry
- **Monitoring** – water, health outcomes

Microbes Aren't All Bad



- Ge Hong - the father of First Aid in TCM prescribed 'yellow soup' for diarrhoea
- FMTs are now used with great success
- Can social bathing and sharing of biomes infect people with good health?
- Can environmental microbes have beneficial effects?

Chlorine and the Skin Microbiome

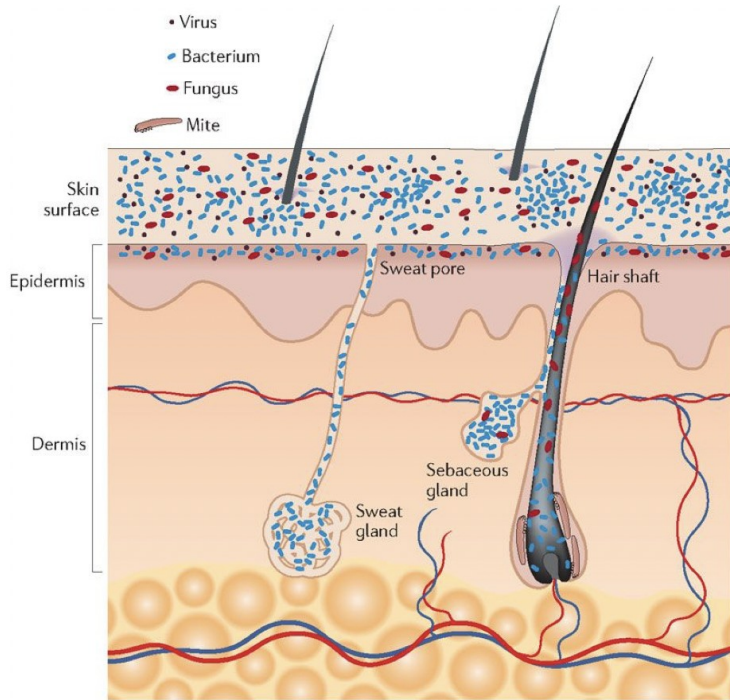


Image adapted from <https://www.nature.com/articles/nrmicro2537>

*www.sciencedirect.com/science/article/pii/S0022202X17311648

- Skin is the largest epithelial surface for microbes
- $>30M^2$ due to hair follicles and sweat glands *
- Skin microbes are the first line of defence against pathogens and educate the immune system
- Chlorine oxidises natural oils, dries skin & alters the skin and gut microbiome
- Resident microbes share biological information with the global microbial ecosystem

Problems with Chlorine



"The total internal dose of [chloroform and trichloroethene] from a 10-min shower or a 30-min bath is greater than that from ingesting 2 litres of water."

- Dangerous to store and handle
- Toxic to staff and guests
- Alters water properties
- No use for viruses, spores – crypto, giardia
- Oxidises natural oils, dries skin
- Alters the skin and gut biome
- Release volatile DBPs when heated
- Inhalation & dermal absorption > ingestion

Sanitation Methods



- **Chemical** – chlorine, bromine, ozone, ionization
- **Filtration** – physical, membrane
- **UV** - sunlight, applied
- **Vortex, magnetic**
- **Nano** - photo catalytic

Bathers - Critical risk factors



- Bather load
- Demographics
- Health status
- Hygiene practices
- Behaviour

Best Practice by Design



- Enhance flow
- Limit contaminants
- Reduce toxic chemicals
- Enable thorough cleaning
- Enhance user experience

Principles to Consider



Minimize – risk, toxicity, cost, intervention

Measure – physico-chem, minerals, microbes

Manage – water, bathers, cleaning, environment

Monitor – water quality, health, social impact

Monetize – economic and social benefits

Global Best Practice Consensus



Driven by your expertise.



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FEMTEC

WORLD FEDERATION OF HYDROTHERAPY AND CLIMATOTHERAPY
NGO IN OFFICIAL RELATION WITH WHO (WORLD HEALTH ORGANIZATION)

Consistent - definitions, measures

Principles - measuring, managing, monitoring

Evidence-based - empirical data supported by science

Recommendations - for regulation, operators, researchers

Assurance – investors, insurers, regulators, clinicians, public

Creating a Culture of Wellness

“The best response to a global pandemic is to create a wellness epidemic. Just as hysteria can damage a community, it is possible for wellness posts to go viral and infect the world with good health. Our responses to the pandemic can mitigate climate change, reduce the burden of chronic disease, and build a healthy global community where the wellness industry becomes the dominant industry on earth.”



DR. MARC COHEN,
Medical Doctor and Founder, Extreme
Wellness Institute, Australia

Spas and hot springs promote wellness

- Integrate traditional and modern practices
- Healthcare and recreational settings
- Can go viral & spread good health
- Build community immunity
- Reduce impact of future pandemics

Balneotherapy can lead a global
wellness pandemic!