



Swiss TPH Winter Symposium 2017

Helminth Infection – from Transmission to Control

Helminths, Disability, Functioning, and Health-Related Quality of Life

Thomas Füst

November 8, 2017, Basel, Switzerland

A dose of the “Hydra”... and potential adverse effects



Amphora with Hercules and the Hydra of Lerna (560-540 BC)



«Chribel», Ueli Berger, Kunst(Zeug)Haus Rapperswil-Jona

Background

Global Burden of Disease 2005: call for collaborators

The Global Burden of Disease (GBD) Study was commissioned by the World Bank to provide a comprehensive assessment of the global burden of disease. Study. Second, new sources of primary data, such as vital statistics, Demographic and Health Surveys, and Multiple Cause of Death Surveys. For the Institute for Health Metrics and Evaluation see <http://www.healthmetricsandevaluation.org>

Murray et al. (2007) Lancet

Global burden of human food-borne trematodiasis: a systematic review and meta-analysis

Thomas Fürst, Jennifer Keiser, Jürg Utzinger

Fürst et al. (2012) Lancet Infect Dis

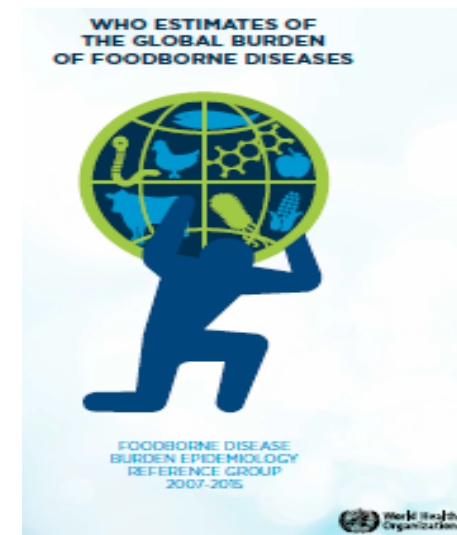
Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010

Christopher J L Murray†, Theo Vos, Louis Almirall, Jennifer Barber, Benjamin A Branson, Mohsen Naghavi, Abraham D Flaxman, Catherine Fitzmaurice, Stephanie A Hay, Ali H Mokdad, Majid Ezzati, Kenji Shibuya, Joshua A Salomon, David A Thomas, Amir Q Khan, Mirjam Kulkarni, and the GBD 2010 DALYs and HALE Collaborators

Murray et al. (2012) Lancet

Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition

GBD 2013 Collaborators (2015) Lancet



WHO FERG (2015)

Background

Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

GBD 2015 DALYs and HALE Collaborators

GBD Collaborators (2016) Lancet

Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016

GBD 2016 DALYs and HALE Collaborators

GBD Collaborators (2017) Lancet

RESEARCH

Open Access

Self-rated quality of life and school performance in relation to helminth infections: case study from Yunnan, People's Republic of China

Kathrin Ziegelbauer^{1,2}, Peter Steinmann^{1,2,3}, Hui Zhou³, Zun-Wei Du⁴, Jin-Yong Jia⁴, Thomas Fürst^{1,2}, Tie-Wu Jia³, Min-Nong Zhou³, Jürg

Ziegelbauer et al. (2011) Parasit Vectors

Effect of Schistosomiasis and Soil-Transmitted Helminth Infections on Physical Fitness of School Children in Côte d'Ivoire

Müller^{1,2,3}, Jean T^{1,3,4,5}, Thomas Fürst^{1,5}, Stefanie Kn^{1,5}, Mattendorf^{1,5}, Stefanie J

Müller et al. (2011) PLoS Negl Trop Dis

RESEARCH

Open Access

Questionnaire-based approach to assess schoolchildren's physical fitness and its potential role in exploring the putative impact of helminth and Plasmodium spp. infections in Côte d'Ivoire

Fürst et al. (2011) Parasit Vectors

Schistosomiasis, Soil-Transmitted Helminthiasis, and Sociodemographic Factors Influence Quality of Life of Adults in Côte d'Ivoire

Thomas Fürst^{1,2}, Kigbafari D. Silué^{3,4}, Mamadou Ouattara³, Dje N. N'Goran⁵, Lukas G. Adiossan⁶,

Fürst et al. (2012) PLoS Negl Trop Dis

Background

Video Article

Determining Soil-transmitted Helminth Infection Status and Physical Fitness of School-aged Children

Peiling Yap^{1,2}, Thomas Fürst^{1,2}, Ivan Müller^{1,2}, Susi Kriemler^{1,2}, Jürg Utzinger^{1,2}, Peter Steinmann^{1,2}

Yap et al. (2012) J Vis Exp

Reassessment of the cost of chronic helminthic infection: a meta-analysis of disability-related outcomes in endemic schistosomiasis

Charles H King, Katherine Dickman, Daniel J Tisch

King et al. (2012) Lancet

PHYSIOLOGICAL PERFORMANCE AND WORK CAPACITY OF SUDANESE CANE CUTTERS WITH *SCHISTOSOMA MANSONI* INFECTION*

K. J. COLLINS, R. I. BROTHERHOOD, C. T. M. DAVIES, CAROLINE DORÉ,

Collins et al. (1976) Am J Trop Med Hyg

Deworming drugs for soil-transmitted intestinal worms in children: effects on nutritional indicators, haemoglobin and school performance

David C Taylor-Robinson¹, Karl-Heinz Waiser², Sarah Donegan¹

Taylor-Robinson et al. (2012) Cochrane Database Syst Rev

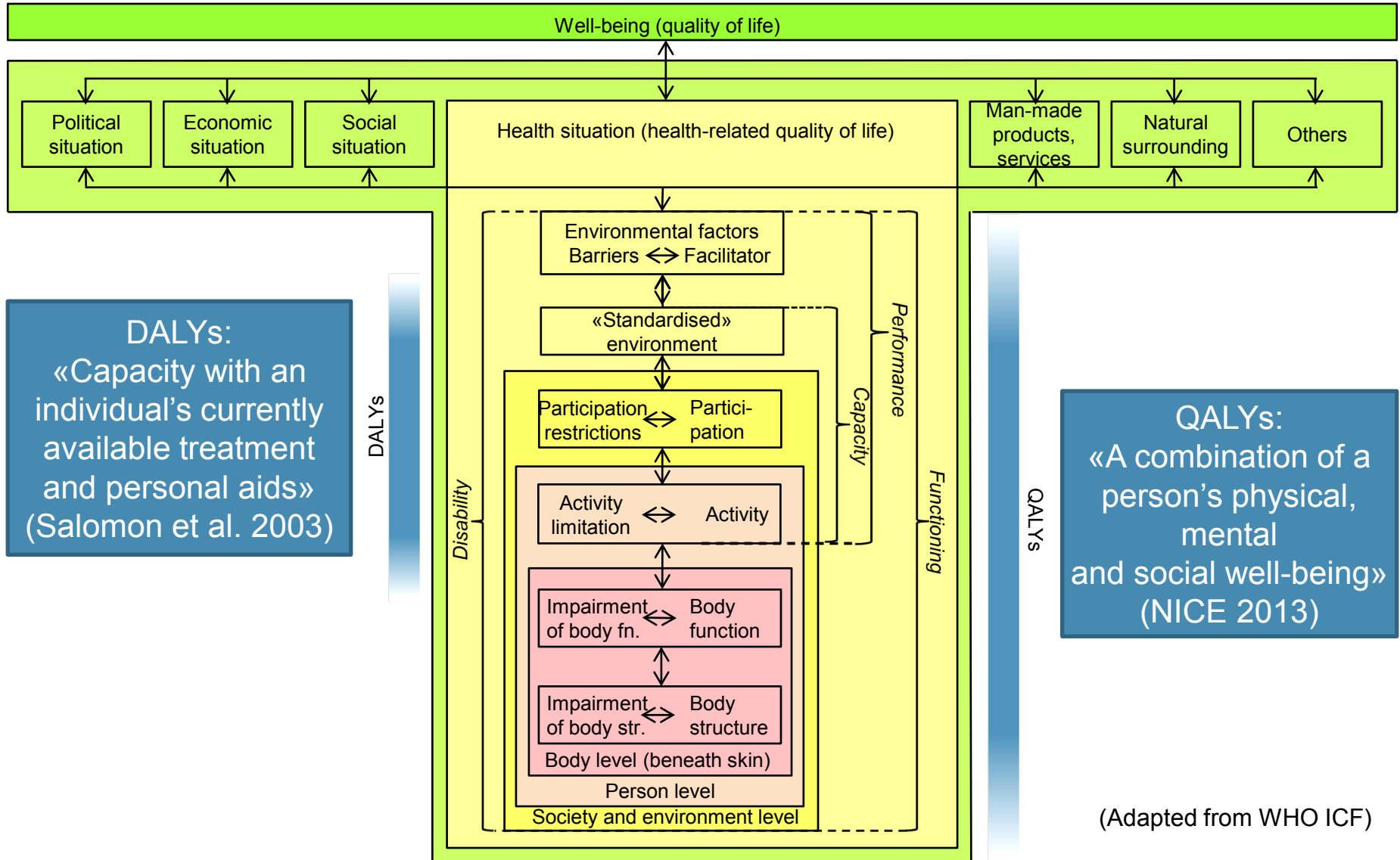
Important questions to prioritise conditions and interventions in public health:

- How many affected?
- How «good» or «bad» / «healthy» or «unhealthy» for affected?
- What can be done?

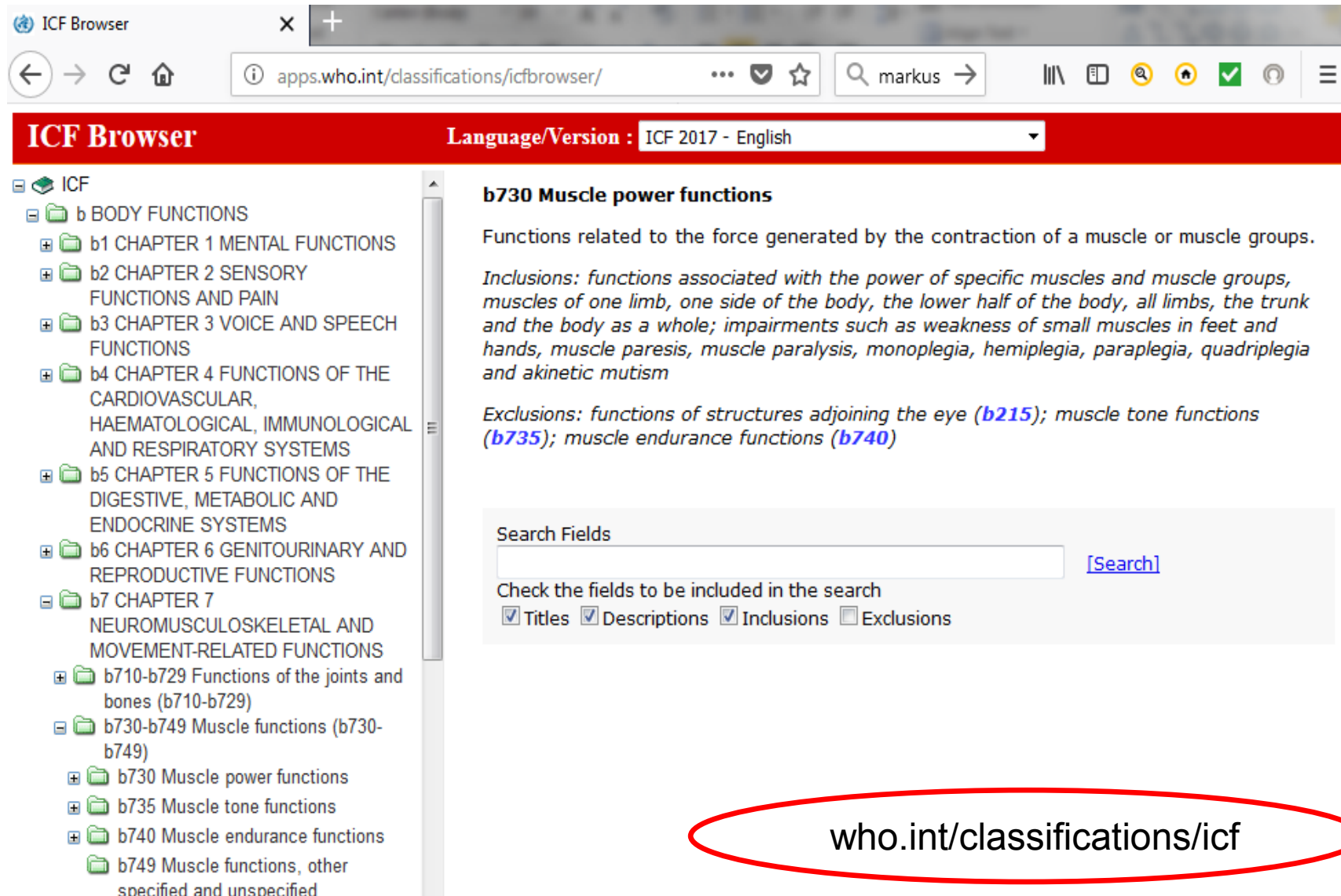
→ What to measure?

→ How to measure?

What to measure?



What to measure?



The screenshot shows the ICF Browser interface. The left sidebar lists the hierarchy of body functions, with 'b730 Muscle power functions' selected. The main content area displays the definition and inclusions/exclusions for b730. A search field is visible at the bottom of the main content area.

ICF Browser Language/Version : ICF 2017 - English

- ICF
 - b BODY FUNCTIONS
 - b1 CHAPTER 1 MENTAL FUNCTIONS
 - b2 CHAPTER 2 SENSORY FUNCTIONS AND PAIN
 - b3 CHAPTER 3 VOICE AND SPEECH FUNCTIONS
 - b4 CHAPTER 4 FUNCTIONS OF THE CARDIOVASCULAR, HAEMATOLOGICAL, IMMUNOLOGICAL AND RESPIRATORY SYSTEMS
 - b5 CHAPTER 5 FUNCTIONS OF THE DIGESTIVE, METABOLIC AND ENDOCRINE SYSTEMS
 - b6 CHAPTER 6 GENITOURINARY AND REPRODUCTIVE FUNCTIONS
 - b7 CHAPTER 7 NEUROMUSCULOSKELETAL AND MOVEMENT-RELATED FUNCTIONS
 - b710-b729 Functions of the joints and bones (b710-b729)
 - b730-b749 Muscle functions (b730-b749)
 - b730 Muscle power functions
 - b735 Muscle tone functions
 - b740 Muscle endurance functions
 - b749 Muscle functions, other specified and unspecified

b730 Muscle power functions

Functions related to the force generated by the contraction of a muscle or muscle groups.

Inclusions: functions associated with the power of specific muscles and muscle groups, muscles of one limb, one side of the body, the lower half of the body, all limbs, the trunk and the body as a whole; impairments such as weakness of small muscles in feet and hands, muscle paresis, muscle paralysis, monoplegia, hemiplegia, paraplegia, quadriplegia and akinetic mutism

Exclusions: functions of structures adjoining the eye (b215); muscle tone functions (b735); muscle endurance functions (b740)

Search Fields

Check the fields to be included in the search

☒ Titles ☒ Descriptions ☒ Inclusions ☐ Exclusions

[\[Search\]](#)

who.int/classifications/icf

What to measure?

- ICF (who.int/classifications/icf) x ICD (who.int/classifications/icd) matrix for health state profiles

[illegible]

How to measure?

- ICF (who.int/classifications/icf) x ICD (who.int/classifications/icd) matrix for health state profiles

		ICD										
		B68	B69	B70	B71	B72	B73	B74
ICF	...											
	...											
	b730											
	b731											
	b732											
	b733											
	b734											
	b735											
	b736											
	...											
	...											

- Direct vs. indirect measurement?
- Objective vs. subjective measurement?
- «Descriptivist» vs. «normativist» interpretation?
- Possible study designs?
- Ethics?



Put meat on the bones: an “old” example

Effect of Schistosomiasis and Soil-Transmitted Helminth Infections on Physical Fitness of School Children in Côte d'Ivoire

Müller^{1,2,3}, Jean^{1,3,4,5}, Thomas Fürst^{1,5}, Stefanie Kattendorf^{1,5}, Stefanie Kattendorf^{1,5}

Müller et al. (2011) *PLoS Negl Trop Dis*

RESEARCH

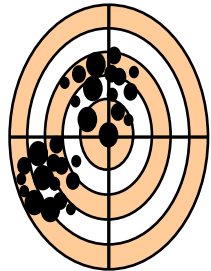
Open Access

Questionnaire-based approach to assess schoolchildren's physical fitness and its potential role in exploring the putative impact of helminth and Plasmodium spp. infections in Côte d'Ivoire

Fürst et al. (2011) *Parasit Vectors*

- 20m shuttle run test to assess max. oxygen uptake as proxy for physical fitness
- Questionnaire on physical fitness
- Parasitological examination
- Confounders (temperature, humidity, clinical examination, heart rate monitoring)
- Both approaches (shuttle run test and questionnaire): no significant effect of helminth infections and infection intensities on children's physical fitness
- Issues: cross-sectional study design, comparatively small sample size
- OF NOTE: Significant correlation, i.e. good agreement, between shuttle run test and questionnaire results in the assessment of physical fitness
- OF NOTE: Questionnaire allowed inclusion of children who were excluded from shuttle run test due to medical concerns

Conclusion



- Clearly define the «morbidity» target
- Consider validity and reliability
- Combine various measurement methods and perspectives in the absence of a «gold standard»
- More holistic understanding of disability to better understand the «pain and gain» of conditions and interventions

Conclusion



“Without data
you’re just
another person
with an opinion.”

- W. Edwards Deming,
Data Scientist