

## **A clinical model II. Disorder, etiology, pathogenesis.**

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### **Abstract**

#### **Background**

The fragmentation of medicine into numerous specialties is an obstacle to the understanding of clinical problems. The clinical model (CM) developed here aims at unification and explains the transitions between health and disorder.

#### **Results**

The general organ partitions into the parenchyma, tube systems, slits/cavities and connective tissue. Morphologic and functional disorders in different body parts are equivalent and described by the same clinical terms. The equivalence bridges the gaps between various specialties.

The etiology partitions onto 11 categories containing harmful agents: heredity, mechanical trauma, macro- and microorganisms, allergens, chemical substances, electro-magnetic radiation, thermal, radioactive radiation, sound and social causes of disorder. The categories are used in all clinical specialties. They make out the patient's spatio-temporal environment.

Harmful agents are transmitted to the patient. Virulence is defined as the transfer of agents into one or more primary affected body parts and causes the transition from health to disorder. The combination of etiology and virulence generalizes Koch's postulates to all etiological agents.

The pathogenesis is defined as the set of processes between the primary and secondary affected body parts. Disorder in a primary affected body part may cause disorder in secondary affected body part. The pathogenesis is grouped into extracellular space, inflammation, hemostasis, spread, intercellular metabolism, humoral regulators and immune reactions. Various specialties deal with one or more of these groups

Time course and prognosis derive from combinations of disorder, etiology and pathogenesis. The number of possible combinations is vast. This explains why groups of specialists are needed to solve many hard, clinical problems. Acquaintance with the general principles of disorder, etiology and pathogenesis may facilitate cooperation across specialties.

### **Conclusions**

CM is a new, comprehensive clinical model. CM uses the common clinically important concepts disorder, etiology, virulence and pathogenesis, and clearly discriminates health from disorder. CM is a novel, versatile and scalable tool that creates a consistent foundation for clinical work.

### **Background**

Health professionals do not seem to have a prototype concept of disease and no common features of disease have been identified (Hofmann 2017). Disease centers on suffering sick subjects (Canguilhem 2015) but diseases do not exist (Wulff 1986). However, here, I concentrate on the structures and functions that cause symptoms, signs and pathological laboratory findings, and develop strict concepts of disorder, syndrome and disease.

Data and knowledge in one specialty differ from those in other specialties (de Lusignan 2005). Accordingly, various clinical specialties perceive themselves as unique. The fragmentation of clinical medicine into numerous specialties is an obstacle to the understanding of clinical problems and communication across the borders between specialties. The present clinical model (CM) that provides a common foundation for all clinical specialties.

The biopsychosocial disease model has gained wide acceptance in clinical medicine (Engel 1977, Engel 1980, Wulff 1993, de Lusignan 2003, Sulis 2017). However, the model is very broad and does not guide, recommend or restrict which features should be evaluated in any domain (Jull 2017) and it is rarely used in medical research (Alonso 2004). In addition, it lacks crucial clinical concepts such as virulence and pathogenesis.

During the last 40 years the pendulum appears to have swung between the biological model and a psychosocial domain (Jull 2017). For example, in Norway, the medical assessment of work disability is largely evaluated by means of the

biomedical model of disease. The biological model provides an ontological concept of objectivity, which is problematic and unjust because it does not take existential, psychological and social aspects of health and disease into account (Solli 2005).

Model-based diagnosis (MBD) aims to troubleshoot systems by starting from a description of their structure and function (Palma 2006). A clear understanding of the clinical concepts etiology, disorder and pathogenesis is a minimal requirement, but these concepts often remain undefined (Palma 2006).

Medical ontologies aim to bridge the gap between human knowledge and the vast medical research literature, and supply physicians with up-to-date knowledge (Duclos 2007, DeLuca 2009, Marwede 2007, Rosse 1998). It is unclear whether a multitude of medical ontologies is required (Smith 2007). The proliferation of ontologies is a major concern and harmonization is needed (Smith 2007, Smith 2008).

The fragmentation of medicine is carried on by ontologies. If different specialties are reigned by different ontologies, then various specialties might be understood differently. This is unfortunate for primary care physicians because they are expected to survey and understand each of a patient's disparate problems, which cover the whole breadth of clinical medicine.

Medical knowledge is the foundation for CM. Knowledge is defined as justified true belief. Justification derives from medical practice and research (see Methods). This makes CM a useful empirical tool for school medicine.

CM is inspired by the biopsychosocial model. The present study extends earlier work (Bassøe 1978, 1981, 1985a, 1985b, 1985c, 1985d, 1986, 1988, 2007a, 2007b, 2009, Hammond 1988) and an accompanying CM of health (Bassøe 2019). We start by describing disorder, and follow up with descriptions of epidemiology, virulence, etiology, risk and pathogenesis. These terms are used to discriminate health from disorder and define disorders, syndromes and diseases.

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