Chapter 1: Introduction

This book is about the emergence of health as a social system. Ancient medicine is where it all started. The history of medicine tells us the story of the development of the nucleus, the embryo around which future health systems were progressively built. This organic image may help us to see medical knowledge developing, with its ramifications, constructing and shaping health as a social function, concerned with illnesses occurring in the body and the respective risks to societies.

The history of medicine has been thoroughly researched and the literature is vast. The themes recur across publications, with documented or presumed facts being well established without much controversy. The materials are widely available in comprehensive textbooks; we therefore did not need to research original historical documents. We did not intend to bring new facts to light or new versions of the facts.

Our interest is in health as a social system, its rise and particularly the construction of its self-reference. We understand that Niklas Luhmann's Social Systems Theory opens new possibilities for studying the development of medicine and health systems. Luhmann proposed a grand theory explaining how social systems developed over the centuries. His theoretical perspectives are presented in this first chapter.

Through the lens of Luhmann's theory we can see nascent structures leading to the systems differentiation seen in contemporary societies, where social systems achieved a ubiquitous presence. Our aim is to bring together two fields of knowledge: the historical narratives of the evolution of medicine and public health, and the theoretical view of social sys-

tems development. In this way, we believe we can trace the evolution of health systems and understand them better.

Today, healthcare services across countries show characteristics of social function systems, as defined by Luhmann (see Luhmann, 2016; Costa, 2023). Functional differentiation – that is, the structuring of societies into function systems – was consolidated from the eighteenth century onwards, with health systems becoming one of the function systems, among others such as politics, education, science, art, law, the economy. Each function system has its own history, maintaining its differentiation from all the others.

The Social Systems Theory also calls our attention to complexities. Systems are complex and the historical development of a system is also the historical development of its complexities. The evolution of medicine unfolded with progressively more sophisticated models of structures and functioning of the body and its diseases. The complex understandings of the body evolved, with subsequent and correspondingly complex treatments. These were processes whereby complexities increased in all domains; therefore, in our attempt to trace and explain the emergence of health as a social system, we pay attention to complexities.

In the process of reaching the current advanced stage, the history of medicine is the history of discoveries of human bodies' structures and functions, and the history of findings about the changes produced by diseases and treatments. In this history of discoveries, we can see the evolution of medical thinking unfolding with the continuous emergence of new paradigms.

Gradually, medicine as a knowledge discipline became able to revisit, revise, discard or change its own paradigms, developing new ones. In this process we see self-reference in action. Self-reference is a distinctive feature of social systems and also a crucial concept for our analysis in this book.

Since its early stages, medicine has managed its own self-reference, by selecting and deciding on the meanings to keep or discard. With the capacity to internally communicate about itself, medicine acquired autonomy, clearly marking its differentiation from other fields of knowledge. This process developed over the course of centuries, preceding the

advent of health as a social system. This is what we would like to examine in this book.

To give a "road-map" of the book, the text is organized as follows:

- The first part has Chapter 2, containing a summary of Luhmann's concepts relevant for the analysis, followed by Chapter 3, with a discussion about medicine and public health self-reference informed by the concepts of the theory.
- The second part also comprises two chapters. The first (Chapter 4) divides the history of medicine into four periods, in line with our theoretical perspective. The subsequent chapter (Chapter 5) offers presentations and discussions of the ideas of Michel Foucault and Georges Canguilhem, two authors who studied the crucial period in the history of medicine and, from our point of view, for understanding the start of health as a social function system.
- The third part also has two chapters; the first (Chapter 6) is called "'Anatomy' of Public Health"; it discusses health indicators as the backbone of public health self-reference, and the central relevance of the concept of risk. The second chapter in this part (Chapter 7) presents and discusses health as a social system in light of the previous chapters.
- The last chapters bring the conclusions of the book (Chapter 8) and presentations of advanced topics (Chapter 9), in terms of the theoretical elements incorporated into the discussions.

As mentioned earlier, the primary orientation of this book is first to narrate the evolution of scientific medicine, a long historical path of about 2,500 years, during which the knowledge about the body and diseases became increasingly precise. These historical processes offer important clues about the establishment of health as a social system as we know it today.

At some point on that long historical path, but more precisely in the last three centuries, a specific field of knowledge became progressively distinct, addressing not diseases in individual bodies but the common causal factors that affected the collective risks of becoming ill. The con-

cerns were thus with populations and causalities that could be attributed to the environment in a broader sense, not only the ecological and physical one, but also the cultural, economic, political and social environment.

With slower development due to its dependence on the progress of medical explanatory models, the then new field of knowledge eventually arrived at what we now know as public health, with its own sets of models and immense literature. Although throughout the evolution of medicine the sub-disciplines called epidemiology and/or social medicine appeared on several occasions in the past, the field remained underdeveloped until health became a political and legal matter to be dealt with by nation states. From then on, we understand, public health evolved as a field of knowledge with a vast array of models and explanatory paradigms with its own self-references.

In short, more specifically, this book discusses the distinctive origins of these two branches of the "same tree" – medicine and public health – both departing from the same binary distinction of health/illness, with one focusing on individual bodies and the other observing populations.

Furthermore, our main intention is to show that the self-reference of medicine was the core which public health, with its own self-reference, complemented, co-evolving together from then on, generating health as a social system. Health systems are therefore sites of the confluence of medicine and public health, comprising all communications of both subsystems.

As we noted in the foreword, we understand the focus of medicine is on the individual. The binary distinction "healthy/sick" is the fundamental building block of the communicative operations of the medicine sub-system. Likewise, in our broader understanding, public health is the sub-system of the health system orientated towards populations, to the collectives as opposed to the individual.

The orientation of the communications characterizing the public health sub-system is the basic binary distinction "at-risk/not-at-risk", the foundation of all public health initiatives, governmental or otherwise, addressing a population's risks of losing or not recovering their health.

Here we feel the necessity to provide the reader with a few explanations about our understanding and use of the concept of risk, which is crucial in our conceptualization of public health as a sub-system. Binary distinctions are at the heart of the function of social systems in Luhmann's Social Systems Theory, and we will talk more about that in Chapter 2.

It is important to keep in mind that we use the term risk in a way similar to its use in epidemiological studies. In very simple terms, "risk" denotes a ratio between cases and a population denominator, in which the cases are observed. For instance, the risk of getting a certain disease is the incidence of that disease – that is, new cases in a given period and population (or segment of the population), sharing the attributable exposure or risk factor(s) plausibly associated with the causation or contribution to the occurrence of the disease.[1]

Thus understood, the concept of risk can be deployed to many relations with similar structures, indicating probabilities of suffering an undesirable outcome among a given population and time. For example, risk can be observed in reference to risks of being exposed to pathogenic factors; risks of getting sick after exposure; risks of not accessing needed healthcare; risks of not getting healthcare of the necessary quality; risks of negative treatment outcomes; risks of being incapacitated; risks of dying; and so on. Public health orientation is therefore always intended to bring about prevention and protection of populations against identified health risks.

Furthermore, the notion of risk (as well as for the healthy/sick distinction) implies a time dimension through which any collective or individual can cross from one to the other side of the distinction. Time is

1 We acknowledge that as expressed in a mathematical ratio format, risk has an "analogical" outlook rather than the "digital" binary health/sick distinction. Between the extremes yes/no of estimation of risks or exposure to risk, for instance, there are continuous degrees of calculable ratios. However, risks may not necessarily be expressed in numbers. Anyway, if the numbers are available, what matters for public health decisions is the comparative proximity or temporal trends towards one or the other extreme of the continuum.

required for anyone at risk to become sick; likewise, time is needed for someone not at risk to cross the line to become at risk, or vice versa. Children who complete the vaccination schemes move from the at-risk to the not-at-risk position for the preventable disease. We will also talk more about the relevance of time in the universe of public health meanings in chapters to come.

Essentially, the focus on risks orientates the communications and respective actions to address the communalities of the direct causes of diseases as well as the contributing factors, and the interventions to tackle them. With such notion of risk, and seeing the collectives subject to it, public health pays attention to the "forest" beyond and surrounding the individual "trees". We believe this metaphor helps us to grasp the notion.

Having said that, we also understand that while trying to reduce a population's defined health risks, public health employs concepts of a range of knowledge domains not strictly speaking related to medical practices. Among these domains we can mention: management, economics, sociology, systems science, anthropology, law, political sciences, psychology.

Similarly, as the meanings of the universe of medical communications increased over the centuries, the elements and relations now composing the universe of public health meanings have also increased enormously. With the incorporation of those scientific domains into public health communications, their respective complexities were also imported with them.[2]

Nevertheless, despite the dimensions of these huge universes of meanings (medicine and public health), the tasks to locate meanings in one or the other side of the distinction remain relatively easy. We therefore believe the use of a distinction between medicine and public health is appropriate. Even if controversies may still appear, this distinction should facilitate the apprehension of the message of this book about the historical emergence of health as a social system.

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2 The reader will find an in-depth discussion of the theme of *risk* in the concluding remarks of Chapter 6 and in the last sections of Chapter 9 on advanced theoretical topics, at the end of the book.

To summarize, the book addresses the following thesis:

- With the development and eventual consolidation over the course of approximately 2,500 years, medicine developed the functionality of self-reference fundamental for the genesis of health as a self-referential social system. By consolidating its self-referential *closure* (by which only medicine could judge what belonged to it or not), medicine made possible the formation of health systems.
- Health systems, as differentiated social function systems, have a history of around 300 years. For their genesis, the health systems needed the fully grown structural systemic features medicine had already developed. This includes: medicine's singular exclusive codes and semantics; the closure of its communications; its self-assessment and self-reproduction; and the distinctive way of approaching and observing its object (the human body).
- The health systems hence developed around the core structures of medicine, subsequently expanding and encompassing the health of populations, establishing public health, comprehending not only observation and communications about the sick but also health risk factors affecting populations comprised of people not yet sick but potentially at risk of becoming sick.
- With these two central concerns, the health systems came to include complementary knowledge also linked and orientated by the binary *healthy*/*sick* codification. With these developments health systems expanded, incorporating practices that were not strictly medical, but befitted the system as supporting, supported or relating to medical treatments, therefore likewise orientated by the same general *healthy*/*sick* code. This includes nursing, dentistry, clinical laboratories, pharmacology, nutrition, physiotherapy, and psychotherapy and logo therapy.
- Specifically, public health as a key sub-system of health systems, elaborates health systems' own *self-reference as a social system*. The very idea of health as a social system is within the scope of public health concerns and attributions. More explicitly, while medicine reflects on itself vis-à-vis individual patients diagnosed and treated, public

health reflects on its meanings, concerning recognition and decrease of health risks of populations by operations carried out by the health system. The health systems is a comprehensive whole, with dual complementary self-references: medicine and public health. Public health already had its tentative incipient beginnings when ancient dominant classes and governments paid attention to epidemics and particularly the health of specific groups such as soldiers and workers.

- By paying attention to social horizons, in recent centuries, public health meanings became instrumental for health communications with the political and legal systems, while medicine became too complex for communicating with other systems beyond its limits. In turn, though, public health also became progressively more complex with the influx of concepts, paradigms and research methods from other disciplines such as political science, statistics, economics, sociology, anthropology, psychology, communication science, management science and systems science, thus being able to reach broader audiences, increasing its own complexity in the process.

We can say in short that we believe that by studying the history of medicine we can see the unfolding of these developments. The questions we aim at answering throughout the book are thus:

1) How does the history of medicine show the development of self-reference? For that we discuss:

- The development of singular exclusive codes and semantics;
- The closure of medical communications;
- The establishment of medicine's command of its self-assessment and self-reproduction;
- The consolidation of medicine-specific ways to approach, observe and communicate about its subject (the human body)

2) How did medicine self-reference become the foundation of the self-reference of health systems?

3) How did the coupling of the self-references of medicine and public health create the health systems?

In Chapter 7 we present a summary of the answers to these three questions. Furthermore, relevant to our reflections, as already mentioned, is the understanding that public health also has the function of constructing for the health system the identity of the health system as a system, a function social system of which medicine is part. In this sense, this book has been written within the universe of meanings of public health, bringing inputs from Social Systems Theory in an attempt to construct descriptions of health systems for those health systems, more precisely to bring conceptualizations of the descriptions of health systems for those who study and/or work in health systems.