Chapter 3: Self-Reference

The self-reference of a health system is built using meanings and communications about the human body, about diseases and treatments, and about their distribution in the population. As we explained previously, self-reference is made using the meanings a system generates and reproduces in relation to its internal and external environments, and distinctively communicates internally. Self-reference guides the selections of themes, observations and communications according to their pertinence to the system.[1]

Despite the fact that over the centuries many different representations of the human body and disease were proposed and became part of the repertoire of medical meanings available for communications, the human body as a potential "repository" of all signs, symptoms, structures and functions remained a permanent signifier, a symbolic medium supporting the meanings (what is signified) with which the systems communicated.

In the first section of this chapter we talk about consistency. We talk about how throughout history a certain way of seeing and communicating has been preserved continuously. We talk about the preservation of the symbolic representation of the human body and health, and the binary distinction healthy/sick. If we have a history of medicine it is because in one way or another these symbolic representations have been consistently used and universally preserved across the world over time, maintaining the base of what medicine is.

1 The discussions in this chapter are mostly based on Luhmann (1990 and 2022).

Symbolic medium

We can see the human body as a medium whereby, throughout the history of medicine, medical forms (anatomy, physiology, pathology, biochemistry, and so on) progressively took shape. As a medium, the body allows the forms of disease to be distinguished, observed, constructed and communicated about.

It is important to bear in mind that we are talking about a *symbolic medium*. The recognition of something that is not going well in a body is represented in a symbolic realm, where the body is represented as well as the disturbance. Only representations at the level of this symbolic realm can be communicated. Without symbolic representation, there cannot be communication about it. Doctors meet at this symbolic realm where they can communicate and refer back to a concrete body where they observe signs and symptoms. Signs and symptoms are symbols, so to speak; symbolic representations referring to reality and addressed as real. Without symbolic representation there cannot be medicine.

The symbolic nature of medicine is confirmed in its history, where we can see several interpretations of reality succeeding and replacing one another in the search for better "tuned" but still just representations of the real. According to Luhmann, a system cannot directly apprehend its environment; a system can observe the environment, select the elements it wants and can observe, and thus internally construct the meanings the system deals with. The system creates internally a representation of its environment and can then use the meanings to inform and mediate its actions on the environment.

Having said that, now we come back to diseases as forms in the medium of the body. In other words, a communication about a disease portrays it as a form in that medium. As a medium, the body is the full potential, and any specific disease is one of many possible forms that can appear in it (as a piece of wood as a medium may contain an almost infinite number of possible sculptures).[2] If we accept the idea of the

2 However, as opposed to a concrete medium such as a piece of wood or marble, which are exhausted once a sculpture is carved, a symbolic medium is not

body as a medium, the history of medicine is the history of the discovery or construction of forms, i.e. structures, functions and pathologies in that medium.

At one time, diseases took specific anatomical and physiological forms. As time went on, new forms were uncovered in cells and tissues. Subsequently, they appeared in microstructures in the cells, chemical molecules, electric impulses and pathological arrangements of multiple expressions. And the progress continues. Forms have been systematically described since the "birth" of medicine; the historical development, we can say, has consisted in identifying and studying form-constitutive elements (building blocks) and their arrangements.

An ever-increasing repertoire of forms is now available to all practising doctors in their quest to find diagnoses and treatments. These forms are above all communicable forms – forms that can be explained and talked about. Doctors must be able to adequately deploy the meanings of those forms in communications among themselves.

The self-reference of the health system is therefore based on the symbolic medium of the body. Medicine focuses its attention on it and there is no pertinent question that medicine needs to seek elsewhere. However, another symbolic medium of specific nature is also fundamental. Luhmann uses the terms *symbolically generalized medium of communication*, which is a concept Luhmann borrowed from Talcott Parsons. The term denotes the notion of a medium similar to how we talked about the body in the previous paragraphs.

However, differently, the symbolically generalized medium of communication implies common understanding and shared meaning among those communicating with it, linking both selections of what is communicated and motivations to accept the selections. In less abstract terms, they are symbols that orient the choices and make the acceptance of what is communicated more probable. Messages about health, for instance, are more likely to draw attention and potential acceptance if

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consumed in the process of creation of forms; new forms can continuously be made intelligible in such a medium.

they come from health professionals rather than professionals of other fields.

Luhmann (2007) presents several examples of symbolically generalized medium of communication, among them particularly power, law, money, love, art and religion. To these we can add health. The motivational aspect of the symbolically generalized medium of communication can be illustrated with the example of communications using the symbolic medium of power. A government decree or an act approved by a Parliament carries the symbolic determination of a deed of power and accordingly motivates compliance and acceptance.

Outside the symbolic domain of power, the communication of a document with the same text as a decree would not elicit any motivation to comply. It is important to also notice that as medium, power can support countless forms (as in the more concrete example of sculptures in the medium of wood), including all sorts of decisions, orders, commands, instructions, regulations, and so on coming from recognized power holders.

Likewise, as for all symbolically generalized mediums of communication, we can see the same. Money elicits motivation for acceptance on both sides of the transaction, the seller and the buyer. Law motivates obeisance among those collectively bound by it. Communications in the medium of art can result in a certain object being accepted or rejected as art. In the medium of love, some messages may be taken as corresponding (or otherwise) with the standard of expected reciprocity. In the symbolic medium of a particular religion, certain communications can motivate recognition of validity. All these mediums operate in symbolic domains. They simplify communication and reduce the complexities that would otherwise expand with lengthy and probably unconvincing specifications, therefore preventing acceptance.

We may say that health entertains the same symbolic type of functionality, presupposing acceptability in certain communicative contexts. The description of a disease form by a doctor surely refers to the symbolic medium of the body but is built in and communicated through the also symbolic medium of health. The description is likely to be accepted and

mobilize further interest in advancing the communication regarding the corresponding treatments.[3]

Medicine is essentially concerned with the human body as a medium, as mentioned earlier. Health, on the other hand, as a generic symbolic medium, is attributable to any living organism. However, inside the health system, there is high willingness and motivation to keep communications about the body and human health going; they are absolutely vital for the existence and reproduction of the health systems. This sounds like a rather obvious thing to say. But let's consider a few more thoughts.

Is there a difference between these two symbolic mediums of the body and health? Are they referring to different things? The answer is yes, there is a difference in the kind of communications they support. The body refers to a concrete, tangible object, conveying the sense of specificity of determined structural and functional configuration. Health, on the other hand, refers to several aspects and types of phenomena. Health may for example refer to conditions of the body; the institutions providing healthcare; observational strategies (health surveys); contextual sets of factors and risks (occupational health, environmental health, and so on); policy orientations. Health as a medium entertains the structures and communication functionalities of social function systems, and the correspondent comprehensiveness of all forms constructed within it, while the body is a medium for the identification of (and communication about) meaningful biological forms.

To sum up, when we study the history of medicine we see that the meanings communicated among health professionals have radically changed many times over the centuries. The second part of this book will take us through those major changes. But we have to admit that the symbolic representation of the body for which the fundamental healthy/sick distinction could be employed has been retained throughout history. Not the body of aesthetic ideals, or sports achievements, or countable in the formations of infantry phalanx, or a legal entity endowed with

3 Additional presentations of the *symbolically generalized medium of communication* topic can be found in Costa (2023) and more extensively in Luhmann (2007).

rights, or a religious sanctuary of divine nature, or some other representation, but the body as the medium where diseases take shape. The very basic binary health/sickness code, from where all subsequent medical codifications sprouted, has been carved onto the preserved millennia-old symbolic medium of the body.

The consistency of the preserved symbolic medium and the instrumental binary code for "sculpturing" it has allowed the systemic progress of medical knowledge and the eventual advances in health systems (including public health). This consistency made possible the global reach of medicine, expanding from its start, projecting a unifying and coherent universal understanding.

Wherever medicine was and is practised, it could and can be recognized and validated as such. The use of the universal binary code and its reference to the symbolic medium of the body are the base of the recognition, which includes self-recognition and self-validation of medicine. We can say the self-reference of medicine endows it with universal values; at its core, it is a universal self-reference.

However, that consistency has also been a dynamic process, sustained by the fundamental support of the unique symbolic structure. A hugely complex building has been constructed on a rather simple but extremely stable symbolic base. The building expanded in many unforeseen directions. The history of medicine as it is usually written and taught is the history of discoveries and breakthroughs. It is a history of a discipline progressing within the scientific system. We can say it is the history of a science discipline evolving as it increased its repertoire of information on its subject, developing new ways of approaching it.[4]

4 The last section of Chapter 9, "Advanced topics", presents some additional explanations on the symbolic medium of the body and the symbolically generalized medium of communication.

Medicine self-reference as science and as practice

We now direct our attention to the more operational and pragmatic side of medicine progress. Surely there have been time lags between what medical science has produced and what became incorporated into medical practices. Therefore we need to talk about a distinction between medicine as a distinctive discipline in the scientific domains and medicine as a core component of health systems, providing actual healthcare (diagnosis and treatment).

While medical scientists throughout history have been concerned with describing what they uncovered in their research, medical practitioners as providers of healthcare have always been concerned with what could be done for the patient they had in front of them. Treatment of actual patients hardly offers the optimal conditions for scientific study; treatment decisions are to be made with what is available, independent of the best knowledge on the matter. Uncovering new scientific knowledge is not a priority in such a context. The settings of these two exercises, medical science and medical practice, are distinct, although they may overlap, for example when treatments are delivered in clinical trials, or when records made by doctors in their daily work are used for statistical analysis in exploratory and epidemiological studies.

Nevertheless, during its history, as a knowledge discipline and as a field of practice, medicine exercised its self-references. Here we try to explain self-reference in simple terms and examples. As a scientific discipline, medicine progressively acquired and exerted its competences to revisit, revise, reconstruct, discard or change its settled notions, developing new ones, in a rational process of knowledge selection.

In comparison, in the practice of treating patients, medicine has always been constrained by what is feasible in the circumstances where healthcare has to be delivered. Even where doctors have scientific inclination and comprehensively search the literature for the issue they need to decide on, the limitations of the situation and the time constraints are determinants of what can be done.

Any doctor, at any point in history, would be able to say whether they were exploring scientific horizons or doing what they could to treat a

given patient with the knowledge and conditions available. The distinction would be and still is clear for any professional. The communicative operations of medicine in the social function systems of science and in the social function system of health are also distinct, reflecting the aims they pursue and the understandings they strive to achieve. The science system primarily is orientated at deploying the binary code true/false as scientific knowledge (Luhmann, 2013), while the health system, as mentioned earlier, is primarily concerned with the healthy/sick binary code (Luhmann, 2016).

In line with these observations, we can say that since its early stages, be it in scientific explorations or in daily practices of treating patients, medicine has managed its own self-references, selecting and making decision on what to keep or discard. This is a common feature of self-reference construction of any discipline, whether as applied knowledge or as a scientific exploratory domain. With the capacity to internally communicate about itself, medicine acquired autonomy, strengthened its self-references, making complete its differentiation from other fields of knowledge (we will return to this in many following sections).

Public health

If we now look at public health, we can say that the same distinction between scientific and service provision can be made. In the history of medicine, public health appeared as a concern with conditions that affected populations. If at the beginning it had specific population groups in mind, such as soldiers for the benefit of keeping armies fit and ready to fight, or workers in mines, construction sites, plantations or other activities involving large human concentrations, the concern with collectives was also acute, particularly when epidemics were frequent and constituted recurrent threats to countries' entire populations.

Directing attention to collectives rather than single individuals, population-wide phenomena required decisions by the governments in place, in whatever form they existed at the time, even if the only anti-epidemic measure known during long periods in history consisted of

simply isolating entire cities and villages, forbidding foreigners to enter and residents to leave.

From the start, while medicine concentrated on the human body, tracking diseases in their hidden sites, concerns with the health of populations expanded wider and wider, incorporating all sorts of knowledge related to the collective. However, historically, the scientific public health perspective had to wait for the development of medical knowledge, particularly for the understanding of etiological links such as transmission, risk factors and vectors. The scientific conceptualization of risk started to be formulated by the eighteenth century (Luhmann, 2008b). Furthermore, the emergence of public health also depended on the constitution of national states and respective governments, applying methods of counting and statistical analysis addressing population's dynamics.

In the last three centuries, the public health field advanced, tackling many common causal factors that affected the risks of becoming ill. The concern with causalities attributable to the environment in a broader sense began to include not only the ecological, biological and physical domains but also the cultural, economic and social realms. The focus on populations eventually arrived at what we now know as public health, with its own sets of statistical and epidemiological models.

As noted earlier, although throughout the evolution of medicine the concerns with epidemics, epidemiology and/or social medicine appeared in several occasions in the past, the field remained underdeveloped while the medical knowledge advanced, but the decisive change occurred when health became a political and legal matter for national states. From then on, public health evolved as a field of knowledge with a vast array of explanatory paradigms with its own self-references. Public health became instrumental for the coupling of health systems with political systems, as political systems faced legitimacy challenges related to the health of their populations.

In short, these two branches of the "same tree" – the medical and public health sub-systems – both based on the same basic binary distinction of healthy/sick, with one focusing on individual bodies and the other looking at risks at population level, evolved together over the last three centuries. Endowed with the initial self-reference of medicine at

its core, which public health complemented with its own self-reference, health as a social system became the configuration and co-evolution of the two sub-systems together.

As with medicine, the scientific and service provision sides of public health are also distinct. The scientific orientation of public health is observable in public health research institutes and departments of medical schools throughout the world. The scientific production is vast. Besides that, public health is the driving orientation of Ministries of Health and public health authorities everywhere. Decisions concerning healthcare service production, health investment, healthcare coverage, effectiveness, equity, efficiency, and many other indicators with focus on needs and delivery of benefits to collectivities, are matters of daily communications by health authorities.

In contrast with the optimization often secured in scientific endeavours due to the specific limited focus and scope of the studies, public health offices have to address as many of the population's health issues in any given country, making optimization of healthcare distribution a very difficult task.

In fact, public health inescapably acknowledges that the difficulty is not only related to the distribution of healthcare but also to the distribution of all sorts of risk factors. We can formulate risks in many different forms – for instance, the risk of becoming exposed, becoming ill, not accessing necessary care, not getting the required quality of care, not achieving the best outcomes, not surviving the treatment. Such objectives, more or less specific or general, fall within the universe of public health concerns. In the sense we use here, risk is broadly also understood as the chance or probability defined for a collective or a given population of not obtaining defined desirable health-related events (be it: prevention of diseases, access to care, access to quality care, cure of the diseases, avoidance of death, and suchlike).

Risks are attributable to populations, not individuals. An individual who belongs to a certain population with a given risk of illness cannot be said to have the same risk of becoming ill; factors affecting a population do not affect every single one of its individuals in the same way. But while

treating a patient, a doctor will consider information about the exposure to risk factors existing in the patient's community.

Furthermore, and very importantly, public health incorporates and further develops the self-reference of the health system as a system. By scrutinizing everything related to needs, planning and evaluation of healthcare provided by the system, public health creates the narratives about the operations of the system itself. The self-observation of a health system is thus performed by public health. In this sense, public health creates the key narratives of the self-reference of the health system. In doing so, public health also generates the visions for the future of the health system and its environment, composing the scenario of diseases, their relevance, risks and priorities, as well as overall aggregated pictures of the burden of the diseases for the society.

As, historically, the self-reference of medicine endowed medicine with the power to revise its own paradigms and pursue better answers to the questions it formulated concerning individuals' sickness, likewise the self-reference of public health pursues the optimization of the tools it uses and its capacity to explain itself as the function of the health system to address (identify and tackle) the health risks of the population, thus explaining to the health system what the health system is about.

Public health always should have something to say in all matters of healthcare decisions for benefiting populations, with estimations of risks of becoming sick, being diagnosed, being treated and obtaining favourable outcomes (or not), and so on. These themes of interest can refer to any level within the health system and the population.

The two "branches" – medicine and public health – grew in different directions, while relying on each other in several respects for what they address and decide. A kind of partnership (in technical terms, the theory calls it coupling) developed between them, observing each other and communicating. As both exist within the health system, they understand each other's codes, sustaining nevertheless the specificity of their respective domains.

When, for instance, a public health sub-system carries out a health survey, it will rely on medical communications about diagnosis and treatment occurring in a defined population. The health system, through

its public health sub-system, can then organize interventions informed by the results of the survey, and medicine can benefit from the knowledge of the health of the collectivity that public health makes available. It may be sufficient to say that description of any particular disease includes epidemiological assessment of the distributions of causes, occurrences and treatment outcome probabilities.

Still, in contrast with medicine and its concrete symbolic medium of communication, the human body, public health does not have a similar material medium with the same level of "materiality", so to speak, and has to rather use the society as a symbolic medium – making forms appear in the medium of collectivities (as indicators of prevalence, incidence, mortality, lethality, coverage, equity, effectiveness, and so on). In that, different from medicine, it often requires both higher levels of abstraction and numerical expressions.

Health systems

A health system has to cope with the fact that these two self-references are not always aligned, and address issues in complementary fashion without friction. For example, a not uncommon situation, while doctors may wish to have at hand all the items necessary for treating their patients, from a public health perspective prioritizing and rationing is often necessary, perhaps saving resources for patients with better chances of being cured.

Within the distinct closure of each self-referential sub-system, on one side doctors report and are accountable to their peers, who can judge the appropriateness of their medical conduct, while on the other side, within the public health sphere, the internal pressures to deliver according to adopted indicators and the respective political accountability are of high stakes.

Such differences are often not easy to reconcile because the two self-references work with different dimensions of time, perceptions of need, expectations, urgency and sense of obligation. For instance, the omnipresent potential of conflicts between insurers and health-

care providers, or insurers and healthcare beneficiaries, or healthcare providers and beneficiaries, are well acknowledged in health insurance arrangements (Costa, 2011). Similarly, but with perhaps lower potential for conflict, in contexts where instead of insurers there is public funding, conflicting interests also cannot be ruled out.

Although comprehensible from a health system perspective, the observation and understanding of the dual nature of health systems' self-references still does not guarantee stable permanent solutions; tension and conflict have to be solved as they appear. The possibility of a subsystem undermining or trying to undermine the other is real. This often requires a third perspective of another observing system, such as the legal system, or the science system, or the political system.

However, while an external system observing the scene can have some degree of influence on public health decisions (as for example when the political system weighs in on decisions on prioritization of health programmes based on trade-offs of cost-effectiveness versus equity), no external observing system can decide on medical matters that are the absolute prerogative of medical professionals.

In this sense, the core of the health system where medicine is located remains untouchable by any other system, preserving the fundamental system differentiation, distinguishing social health systems from all other social systems in the society. This has profound significance for public health self-reference, because public health sits in the convergence of external pressures (from the political system, for instance) but also the internal pressures from medicine itself (assertive in its sovereignty). Figuratively speaking, we can say that public health self-identifies with a buffer zone, cushioning conflicts, but also being a conveyor of tensions and a communication channel of pressures, acting in both directions, internal and external to the health system.

With the theoretical references explained in this and the previous chapter, we can say that our purpose of looking at the history of medicine and public health through the lens of Social Systems Theory is to reflect on the following points:

1) The primary orientation is to look for the revealing stories, where we can see medicine constructing its self-reference as a distinct discipline, establishing procedures to approach diseases and treat them.
2) The historical narratives should allow us to assess the types of social system that could exist at each stage.[5]
3) We should see medical practices appearing historically in the *organization systems* format. Organizations may have had diverse purposes, such as bringing doctors together to protect the craft (guilds); as initiatives for organizing provision of medical care in hospital facilities; as training arrangements between students, masters and, later on, in universities; as bodies such as collegium, councils or associations, with self-regulatory roles.
4) In its historical development, medicine preceded the establishment of health as a social system. Medicine developed its specific semantics well before the emergence of health systems.
5) We should see medicine at some point becoming legally, politically and socially accepted as a legitimate field of knowledge and practice. That included the recognition of the prerogative of using medical semantics.
6) We should be able to observe that the restricted use of medical semantics did not require the assignment of responsibilities to any specific overseeing medical institution. We may find the exercise of valid medical communications taking place in many different sites, wherever medicine could recognize itself in line with its self-recognizable rules of communication.
7) Evolving from that, however, we will be able to see the correspondent semantic closure, by which medicine came to be fully in charge, to ex-

5 To briefly recall, there are three types of communication-based social systems: *interaction systems*, *organization systems* and *function systems* (see Chapter 2). Conditions at each stage of historical development may have been adequate for the existence of one type of system but not for the others. Function systems could only appear when functional differentiation became the way societies structured themselves (which happened around the second half of the eighteenth century).

clusively ascertain the validity of medical communications. For that, university courses, as well as the guilds, surely played the crucial role.

8) In that process, we see the embryonic social health system establishing uniform stable regulations for medical training, licensing and professional recognition.
9) The historical assessment should thus reveal the stage when and how medicine became part of *social function systems*.[6]
10) We should gain insights into *health* achieving *systemic form* with the recognition by other systems (particularly the political and legal systems), with medicine as an integral part of the established *health system*.
11) In reference to the theme of complexities, each historical period should be characterized by the complexity of practices and knowledge. Historical evolution is the history of the advent of increasingly complex models, practices and settings.
12) At the same time, evolution also required reduction of complexities in order to avoid crossing threshold beyond which internal and related external complexities could become overwhelming for the system. A system's self-reference reflects the level of complexity the system handles and the strategies adopted to keep complexities manageable, expanding or reducing it accordingly.
13) Therefore, we should identify the expedients for reduction of complexities in the historical development of health systems. Among such strategies, internal regulations play a key role. The components of the system should exercise regulatory roles in accordance with their self-references.
14) The historical narratives also talk about medicine and the advent of public health as sub-functions of the emerging health system. The construction of the health system, we will see, corresponds and is sustained by the combination of those two sub-systems' self-references, one concerned with individuals (medicine) and the other with

6 Generally speaking, a function system appears with its differentiation from other function systems, whereby each system has the respective orientation, distinctive code and self-reference.

collectives (public health). The self-reference of the health system is comprehensive and reconciles this dual self-reference.

15) Correspondingly, the advent of a public health sub-system brought the social into the health system. The health system became a *social health system* as the health of societies became part of the system's semantics, and thus part of the communications that the health system sustained and reproduced;
16) Furthermore, the health system should continuously couple with other *social function systems*. For that, we try to see how the public health sub-system acquired the crucial task of developing the self-description and self-identity of the health system, explaining internally and externally what the *health system* is about.

These points are covered in the subsequent chapters. We hope that the text is clear on these subjects, which are often rather complex.

The reader will find occasionally that we need to bring in some of the theoretical topics presented in this first part of the book. We may add here and there theoretical elements to explain better the issues at stake.

Nevertheless, the themes of complexity and self-reference do reappear often in the discussions. This is essential, as they are the key concepts for our discussions.