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# Elements Of Advanced Transdisciplinary Management In The Medical, Public Health Field

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***Abstract***
*The article deals with the development of advanced transdisciplinary medicine through the non-restrictive action support imposed by standards and procedures through a case study. The holographic structure of medicine (surgery)/public health is a concept extended in the field through this work. The essential aspect pursued is that of generating the decision-making capacity of the medical decision-maker/for example, the surgeon and his team for choosing a disciplinary action formula, to the extent that it is demonstrated during a finite number of stages that a procedure in question belongs or does not belong to the basic set of working formulas. It is concluded that a medical (surgical), medical-sanitary, public health problem always has a decidable procedure, essentially avoiding eclecticism, undemonstrable associations, undefinability and, in addition, being exempted from the non-calculability of the total or compound medical/surgical act. The methods, methodologies and procedures of classical management, applied especially in the economy and in the general social sector, are also found in sub-domains such as public health, but especially in terms of resolving health-medical situations, assistance, remediation and specific intervention issues. At the same time, it is found that information plays a similar role in all domains and sub-domains of societal structures, including the medical field. As such, we are witnessing a transition in the information content and especially in the forms in which data, knowledge, statistical situations are manifested, when various necessary medical activities take place in local, national and regional communities. In fact, it is a matter of transmitting knowledge in the context of transdisciplinarity and transinformation on a general, global alignment to identify solutions aimed at sustainable public health.*

***Keywords:*** *transdisciplinary management, standards, procedures, protocols, decision-making procedure, shared decision-making*

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## I. Introduction

More than ever, in contemporary times, health - medical and public health situations prove to be expressions of absolute priority societal interest.

In general medicine, for example, surgery is considered a scientific and practical discipline of high intellectual and operational level.

The exceptional tradition in the field is associated with the work, talent, innovation and perseverance of surgeons who, over time, have opened important doors in general medicine at a global level.

We believe that currently (2025) the general medical system is open and involved in assuming and practicing the highest management formulas, procedures, protocols that are found at a global level in the field.

Moreover, there is a beneficial advance in knowledge management in the field, although in some stages the complementarities of infrastructure (endowment and competitive investments) have been delayed.

In surgery, for example, it is a priority in the operation of formalizing an Analyzer System with a Repertory of Practices on the Real Surgical Path.

As such, the implementation of managerial trans-disciplinarity in the medical and public health systems appears imperative.

## II. Literature Review

The practical observation about management and decisional surgical procedures, in the context of scientific investigation in this paper, is that, mainly, procedural problems in surgery (protocols) have solutions only if they are adopted by decisions that, as a whole, belong to general management.

Knops A.M., et al., [7], (2013), discusses decision aids for patients facing a surgical treatment decision, and considers that conclusions should be obtained from a systematic review and meta-analysis.

The authors say that "to help patients make deliberate treatment choices, decision aids provide evidence-based information on the disease, treatment options, and their associated benefits and harms. (...) decision aids are not designed to direct patients toward a particular treatment option, it is possible that their introduction will change the proportion of patients that opt for surgery."

Kannan S., et al., [6], in a recent research (2020), investigates surgeons' views on shared decision-making.

These authors conclude that "shared decision-making (SDM) has a significant role in surgical encounters, where decisions are influenced by both clinician and patient preferences. They sought to explore surgeons' practices and beliefs about SDM."

At the same time, "the influence of events preceding consultation suggests that decision-making models should account for spatiotemporal broader spans.

Given surgeons' authority to define patients' conditions and control service provision, SDM may be premised on an overestimation of patients' power to alter the course of decision making once in a specialist's office."

The aspects outlined above are described by Clapp J.T., et al., [1], (2019), when dealing with the topic of surgical consultation as a social process, and implications for shared decision making.

In the field addressed in this paper, the statement that "many decisions in the emergency department (ED) may benefit from patient involvement, even though this setting has been considered least conducive to shared decision-making (SDM).

Many decisions in the emergency department (ED) may benefit from patient involvement, even though this setting has been considered least conducive to shared decision-making (SDM)."

As such, Flynn D., et al., [3], (2012), reinforce the idea that key decisions in the field must take into account engaging patients in health care decisions in the emergency department through shared decision-making.

## III. Research Method, Data Collection And Preparation

Our assessment is that in surgery the management problem of developing this discipline cannot be raised only on the basis of a formal system, in the perspective of *a single axiomatic super-system*, in which the decision procedures are standardized.

Only in this way can the flow of surgical development be ensured, marked by the expected speed, in accordance with the speed of advance of the complex contemporary management society, dominated by technologies or hyper-technologies. (Figure 1)

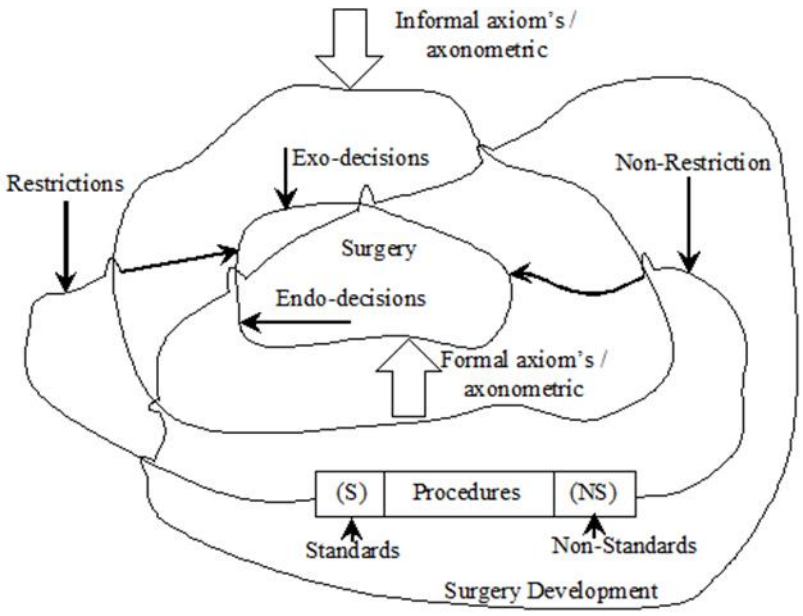


**Fig. 1.** Development of management surgery through action support non-restrictive imposed by standards and procedures (Source: Authors, [8], 2018-2024)

The construction of formal subsystems for different parts of surgery is programmatically accepted, being allowed and useful as a formula for gaining knowledge and applications.

A *primary class* of surgery comprises the formal system of stored, accumulated, accumulated, open, unopened surgical knowledge, etc.

An *upper class* in the field is that of calculation and practical decision for action / intervention in the field.

Axioms, as basic formulas, ensure the development of decisions, creating the framework for "effective, pragmatic decibility" in surgery.

The essential aspect pursued is that of generating the decision-making capacity of the surgeon (of his team) for choosing a formula for disciplinary action, insofar as it is demonstrated over a finite number of stages that the formula in question belongs or not to the basic set of formulas, as follows:

$$\begin{cases} \{F\} \xrightarrow{C} [P(D)] \xrightarrow{\{nE_i\}} P_i(D_i) \\ [P_i(D_i)] \in / \notin \{F\} \end{cases} \quad (1)$$

in which:

{F} = the set of formulas for disciplinary action in surgery; C = the systemic area of surgery (compound disciplinary knowledge and practice in surgery); P(D) = decision issue for a formula from {F} in C; $\{nE_i\}$ = number of stages; $P_i(D_i)$ = a formula from {F} in C.

Relation (1) is the expression of the decision method by which one mode of "surgical operation" is chosen from a multitude of other modes whose statements are all demonstrable.

In the end, the surgeon and his team choose the mode of operation on the chain consisting of a finite number of stages, each stage being preclinically / clinically demonstrable.

A surgery problem always has a decidable procedure ($D_a/N_a$), essentially avoiding eclecticism, unprovable associations, non-definability and, moreover, being exempted from the non-non-calculability of the total or compound surgical act.

The situation is observable, which shows that in surgery there are fewer decision-making procedures in absolute terms than in non-non-decision-making procedures.

After all, the strong outline of a multitude of decision-making procedures in surgery means, in fact, the routine confinement, in standards, between frequently classified limits.

The surgeon is the one who can break through these boundaries through innovative proposals and approaches for each "operating" system.

As such, we would be dealing with a formally closed system which, in such a situation, is completely decidable.

Thus, if two surgeons (two teams) choose, in an independent context, the conditions of their own surgical formulas for the same areas of the set of affected organs in the human body, each case should be completely independent of the results obtained by one or more. another (by one team or another).

Objectively, no *local connection* is taking place. However, there are *non-local connections*, springing from the expression of the decision procedure by which to choose the mode of "surgical operation" from the multitude of modes with demonstrable statements.

On this basis, we advance the idea that in surgery *the predictions can be reconciled with the independence of the results of surgeries.*

As such, the approximation of more general meanings for one surgery or another may be accepted.

The new surgical science, in our opinion, should quantify the approximations in question, remove the uncertainties and, in this way, the surgery would become "more accurate" procedurally-always applied to the human body mastered by the quasi-infinity of elements and characteristics that compose it. the individual self, absolutely unique.

If the "small" phenomena and parts of the "small" surgical infinity are not equivalent, we express the opinion that the "large" phenomena and parts of the surgery are "quasi-equivalent".

"Surgical macro-manipulations" can be manageable (they offer the creation, creativity, innovation common in surgery).

However, "surgical micro-manipulations" cannot exist as expressions of effectiveness unless they advance in the cellular, intra-cellular, atomic, sub-atomic micro-cosmos, and so on.

In fact, a surgeon (his team) does not always rule on a method of surgery but rather on statistical predictions about the success of the surgery itself.

It is observed that not all the "surgical" type elements absolutely confirm the statistical predictions in the field, but rather we can speak of a "complementarity of surgical realities".

It is important, in our opinion, to identify any "hidden variables" of the surgical procedure.

However, the human body in its n-dimensionality does not cause "instantaneous, rupture changes" that overturn the known surgical formulas at a given time.

In a broader context, we appreciate that the formulas in question are cumulative and refined, being real the capacity to give up, adjust, articulate, compose, etc. of any formula, advancing in the field quickly when vector-supports (such as information technologies) appear in the phenomena, surgical processes with contributing contribution of knowledge and application.

However, it is potentially true to note that, in fact, almost most of the predictions based on formulas are in line with the predictions expected by the surgeon and his team.

Even if, in essence, the surgery remains rational, causal, it can be concluded that, in fact, the local causalities in the surgical interventions are under the cover of the "particularism" given by the scientific objectivity in the field.

In fact, we find that in surgery there is a visible degree of "disciplinary self-consistency."

The dynamic peri-operative stages in surgery are parts of the medical reality, a reality defined in the "space-time" referential system.

Each preclinical / clinical value is a constituent of the set of decision-making formulas of disciplinary nature in surgery.

The surgeon and his team are pragmatic mediators in the system, relating the sub-events to an identity surgery of their own. [2]

Surgeons must build a logical way of medical action, non-contradictory, relying on organization / self-organization, leadership / self-management, respecting the coexistence of disciplinary / surgical situations.

It would be possible to appear and manifest failure only on faults, cracks, niches, etc. of disciplinary incompleteness, assuming the null hypothesis of malpractice.

The above table contributes to the formalization of the concept of *"surgical circularity",* introduced for the first time in the literature through these lines.

On a higher, conceptual and action level, we issue the idea that, in fact, the surgeon must not induce his movement, his attitude, he must not put himself as a pseudo-central character in the surgical act, but to center the patient in a field of probability conserved, protected, preserved.

The composition of all peri-operative surgical probabilities should reach the unitary (quasi-theopretic, quasi-practical) probability.

In a situational matrix, the compound "surgeon-patient" behaviors should be tangent-asymptotic, the surgeon and the patient being sub-constituents of the surgical event.

*"Topological surgery"* (original notion, launched for the first time in this paper) should recover all types of steps, formulas, methods, actions and values for a supra-systemic conciliation in the field, thus sustainably substantiating the surgical decision.

"Topology in surgery" or "topological surgery" can become in medicine subjects of qualitative knowledge, respectively of peri-operational surgical behavior.

The preclinical and clinical parts (stages, segments, values on determination scales), expressing the discontinuity, are joined to the continuity line, to the whole surgical phenomenon, in a continuous medical value chain.

Therefore, a symbolic application of graph theory in surgery highlights its disciplinary topological properties.

The surgeon has his start in relation to the patient from the point where the complexity is considered "zero", but, as pre-clinical / clinical data are acquired, the complexity of the surgical phenomenon / process is increased, given the orientations, meanings , joints, compositions, etc. of values and new elements of knowledge and decision appear.

The degrees of complexity in the surgical value chain offer variants of *topological hierarchies,* being brought in the world of surgery specific visions and tools of conceptualization, work.

Going further with the present analysis, it is important to understand the systemic, all-encompassing surgical action chain, relying on identifying the links between parts and whole (preclinical analyzes, preparations and surgical interventions, etc.), respectively between the spatio-temporal elements of the patient's home. until the closing of the loop, with the return of the same patient to his home, benefiting from the results of the surgical operation.

In this situation, we can talk about *the holographic structure of surgery*, a new concept introduced in the field through this paper.

The holographic model of surgery shows that the information / knowledge used in the discipline is not limited to punctuality, but proves to be *holistic*, being found dissipated throughout the conceptual and practical envelope in the field.

Finally, we can also accept for surgery the property of separation, by analog extension, based on Kolmogorov's theories, which assumes the fact that, in fact, "at least one of two distinct points (for example, biochemical values in surgical knowledge preclinical) admits an *open neighborhood*, which contains the other point (value). "

This theory has a modeling role in the holographic-holistic structure of surgery.

After all, surgery, from this perspective, can be studied as a "process", not necessarily as an "object".

The circularity of surgery encompasses almost identical cases of the performance of surgeons and their teams, in different spatio-temporal situations.

The surgical art requires the observance of the non-conflicting, non-antagonistic procedural elements, respectively of those related to the same types of medical events.

In the circularity invoked above are found the quasi-infinite "particular-general" binomials of preclinical / clinical nature.

As such, surgery is a "recipient" discipline that receives any procedural particularity for serving the "general" medical.

Moreover, only the molecular / atomic behavior is not enough in the surgical knowledge without opening and assuming the pathophysiological behavior of the patient.

Knowledge of the factors and mechanisms of structural changes, of the interconnections between medical structures and specialties, of the ways of building the new type of structure related to sustainable sanitation and public health constitutes an objective practical necessity.

The controllable values (outputs) and the non-controllable ones (inputs) are found in parametrically redefined sets, since the quasi-continuity of performance measurement and the reactions (corrections) are multi-loop, respectively infinitesimal actionable.

In the national public health system, the real outputs (health-medical results) must have imposed quasi-continuous increases. , [9]

It is of interest that, for example, in Romania, there is a reconsideration of management methods and techniques in the field of unpredictable events of a health-medical and public health nature.

In the social contemporaneity marked by complexity, the models of health-medical risk management and public health may suffer a "reversal" towards the risk generated by the management of unpredictable events. Result-type signals are increasingly beginning to no longer be found distributed Gaussian. [5]

Hospital managers are gripped by the fear that pure random manifestations could only be apparently localized in this type of characterization and thus, in the competition for health raised to the rank of natural imperative, opposing actors (other competitors, neighbors or from the hospital cluster) could sooner discover certain laws/statistics that would indicate to them, in the conception of normal distribution, mastered, - the certain, operational, pragmatic means of achieving medical success.

Other managers in the health sector focus their organizational and leadership operations precisely on those types of alignments that host unpredictable events, appreciating that in the area of uncertainty there are niches available for successful action. , [4]

They rationally confront knowledge, advance with the help of any formalizing means of medical managerial knowledge through "finite infinitesimal elements".

The launch of the concept of "adaptive medicine" determines new managerial skills within hospitals, respectively the possible emergence of new management methods and techniques.

Those responsible for the management of health-medical and public health risk within a cycle of interventions-treatments must have the ability to translate information regarding specific objectives and resources into a true "map" of risk.

This must be updated and improved depending on the developments in the real health environment; what can happen, why and how it can happen is analyzed.

The formalization of trans-informational knowledge in the medical sector is the result of the successive concentration of data, information and knowledge (Figure 2).

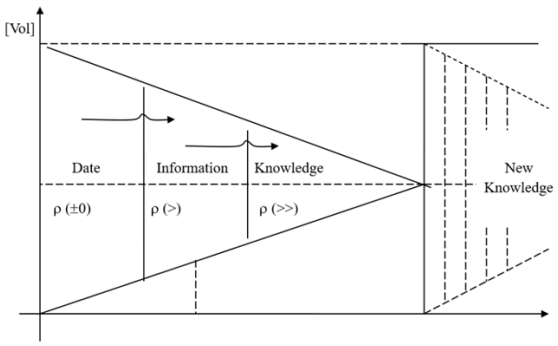


Fig. 2. Successive competition of data, information and knowledge for the establishment of trans-informational knowledge in general medicine ρ (±0) = low density (individual, dispersed existence); ρ (>) = medium/high density; ρ (>>) = max/very high density; [Vol] = the axis of data volumes, information and knowledge. (Source: Authors, [4], 2018-2024)

It is found that data in the hospital environment has high volume and low density, and information has medium volume and medium density.

In contrast, knowledge has a low volume, essentialized, but is characterized by a large and significant ratio of value and meaning/understanding.

Only after knowledge is outlined is it possible to formalize knowledge.

## IV. Conclusions

- In general medicine, we can talk about the holographic structure of surgery, a new concept introduced in the field through this paper.
- The degrees of complexity management in the surgical value chain offer variants of topological hierarchies, being brought in the world of surgery specific visions and tools of conceptualization, work.
- Surgeons must build a logical way of medical action, non-contradictory, relying on organization / self-organization, leadership / self-management, respecting the coexistence of disciplinary / surgical situations.
- The idea is advanced that in surgery the predictions can be reconcilable with the independence of the results of the surgical interventions.
- It is concluded that in surgery the problem of developing this discipline cannot be raised only on the basis of a formal management system, in the perspective of a single axiomatic super-system.

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