**CASE STUDY**

**The Need for Systems Tools in the Practice**

**of Clinical Medicine**

PART 1

With the increasing healthcare concerns, the paper puts forward how the healthcare needs have significantly shifted towards chronic conditions. It brings forward the idea of how our children’s generation is at a greater risk than our own. Non-communicable diseases kill more people every year than all the other causes combined. Based on these facts and figures, systems thinking has been applied to the health field. Background concepts of systems engineering and systems thinking have been discussed in the earlier section of the paper and the section to follow tells about the application of system tools. This model would then allow for the simulation of system behavior thus elucidating the system. Function at the cellular and subcellular levels. A systems approach to the practice of medicine has been presented. Multiple stages involved with clinical medicine and a step-wise approach towards it have been explained. Finally, an example where the action of digestion has been explained through the model sums up content in the paper.

PART 2

It is quite interesting to see how a systems approach to practicing medicine has been brought forward. This is referred to as functional medicine. When 78% of total healthcare costs in the United States are due to chronic disease, this is when the gravity of chronic disease becomes all the way more serious. Considering the multiple interactions in chronic conditions, a more holistic approach to treating the patient is needed. Applying systems thinking in Healthcare Systems Engineering can be viewed as a health application of industrial engineering and operations research. Whereas, applying systems thinking in Systems Biology can be broadly viewed as a convergence of molecular biology and systems theory where the focus shifts to understanding the system structure and dynamics. Functional medicine is an approach to clinical care that is patient-centered, personalized, and grounded in the science of clinical medicine. Clinicians can identify and ameliorate dysfunctions in the physiology and biochemistry of the human body. A step-wise procedure from integrating medical knowledge as a whole, understanding it and transferring the information to certification, support, communication tools, and clinical needs identification a proper procedure has been laid down. Ultimately, the goal of applying systems tools to clinical medicine is to manage the complexity of medical knowledge to effectively improve patient care and health outcomes at lower costs.

PART 3

The medical field is an extremely sensitive field that has almost negligible or no scope for error. Though the paper seems well laid out, there isn’t everything one can put at stake as far as the reliability factor is concerned. The SysML model represents the approach but there must be enough validation research for this project which in turn takes this to a smaller project within itself that will take care of this need. Just presenting a single example may not suffice for the fact that there may be some harsh scenarios where the extremity of this model may be put to test and any unexpected movement may lead to an irreparable loss. There could have been a better discussion on the extreme cases that may already have taken place if any and the mitigation strategies already formulated to neutralize those adverse conditions.

PART 4

Having agreed that they may be the first one to put these models at the patient level calls for a huge concern pertaining to the reliability factor about it. This also tells that there hasn’t been any exposure which could be pretty risky from the practical application’s point of view. A risk mitigation report could be an effective method to ensure that the things brought up have already been tested to their limits, thus ensuring and backing up the claims about robustness. This may turn out to be pretty useful as it seems likely but only for the fact that its scalability, flexibility, and robustness are put to test and an outcome or a score is achieved. There could be a team set up for this task and from thereon increasing the efficiency and providing effective support would be their ultimate goal till the time it is not able to prove itself capable enough.