

# Foray into the Stroke Management study using ICT solutions

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**Abstract:** E-health is a collective term aiming to reflect all types of electronic healthcare delivery via electronic communication means. E-health applications bring technology to patient care ranging from prevention and diagnosis to follow-up, allowing the usage of modern communication equipment and the ability of services to link distant healthcare stations and individuals for the real-time provision of healthcare services to groups of remote patients. It also gives the possibility to minimize the paperwork involved in the healthcare delivery, optimize the provided services and ensure seamless communication and access to information, regardless of geographical limitations.

**Keywords:** E-health, stroke, patient management, database, prediction, rehabilitation.

## 1 Introduction

Having studied the impact of the information technology era to the healthcare industry, e-health matter focuses on the e-health tools and practices, recent R&D efforts and outcomes and investigates the current and future trends in the e-health field along with the relevant policy and standardization processes.

Stroke is one of the leading causes of morbidity. According to World Health Organization, stroke is a major cause of death in the developed countries as well. Many people are not aware that stroke is actually preventable and that stroke survivors can live a normal life afterwards. Raising awareness and early prediction of stroke is therefore one of the main agendas of my research.

Stroke is the second most common cause of death and the most frequent cause of severe adult disability in the Republic of Moldova.

70,000 individuals are living with stroke and its consequences and each year there are approximately 15,000 new stroke events. Immediate mortality rate is far above the medium and around 20% of stroke patients die within 30 days.

For those who survive, the recovery of neurological impairment takes place over a variable time span. About 10% of survivors are fully independent within three weeks, growing to nearly 30% by six months. These numbers can be increased by offering solutions that can predict and manage stroke. Stroke is a preventable and treatable disease.

In Moldova doctors struggle for years to obtain the right information to help address the needs of stroke survivors. Upon initial interview it became clear that they need an information system with flexible and extensible medium for content collection, prediction and delivery.

## **2 State of the art**

The idea of healthcare management system performance appeared in recent years and has been discussed in [1]. It is emphasized that the performance of healthcare management systems are far behind compared to the service and manufacturing industries. Healthcare organizations are nowadays dealing with greater disease ranking, while their costs, quality and delivery have not improved significantly and even the discrepancies with other industries seem to have further increased.

There is a growing concern about maintaining health indicators and population's age. Mobile/sensor technologies are expected to provide real-time information about vital signs and other physiological indicators of one's health and fitness. Such monitoring systems are expected to find greater use in such applications as hospitals, home health monitoring, physician's offices, elderly care facilities, fitness centers and health research studies. The solution was given in [2], where the authors referred to the Internet to deliver services in remote areas.

Nowadays there are a lot of general views over the IT solutions to support the decision, but all of them are oriented either to a general view, or to a specific disease. Our interest is stroke related information systems, in particular the hospital-based stroke registry which is useful for understanding different clinical characteristics of stroke related to risk factors.

In 1978 a clinical stroke data-bank study was initiated by the National Institute of Neurological and Communicative Disorders and Stroke from Maryland in order to collect information systematically on a large number of patients as a data source for clinical research. Dr. Donald Tower [3]

found the possibilities of a data bank to stimulate clinical research on neurovascular disorders.

Another attempt to start a stroke database was done by WHO team, specifically in [4]. The WHO stroke register was started in May 1971 as a joint undertaking of WHO and a number of collaboration centers. It was the first attempt to collect data on stroke in the community in a uniform manner from countries with different social, cultural and environmental backgrounds. They defined the stroke as rapidly developing clinical signs of focal disturbance of cerebral function lasting more than 24 hours or leading to death with no evident cause other than that of vascular origin. In their research they excluded the transient episodes of cerebral ischemia and the cerebral-vascular lesions at autopsy without showing clinical signs in life were not registered as stroke as well.

Table 1. Stroke databases analysis

Nr	Parameters	Laussane database [5]	Dundee database [6]	Corvedell National Acute Stroke registry [7]	OpenClinica [8]
1.	General patient data	x	x	x	x
2.	Management Acute Parameters before/after stroke	x	x	x	x
3.	Controllable risk				
4.	Uncontrollable risk				
5.	List of investigations	x	x	x	x
6.	Initial treatment	x	x	x	x
7.	Follow up treatment	x	x	x	x
8.	Prediction				

A group of available software's and open databases were analyzed and from the Table 1. one can determine good characteristics and weak points of analyzed systems.

### 3 Conclusion

Stroke databases will provide us extremely valuable information on the epidemiology, etiology, clinical characteristics and short term prognosis for stroke patients. This kind of full information it would not have been possible to be collected in existing databases without patient's pre accident management, statistics follow for periods, years. It is easy to observe that parameters as controllable and uncontrollable risks are not followed in databases. Also the statistics and prediction methods are not applied over collected data. Our research aim is to provide solutions for a wide data processing.

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