

Universally Accepted Unique Identification Card for Patients — A Study on Success Factors and Utility of UIC

B. Sambath Kumar* and S. S. Rau**

Abstract: The patient identification system is useful to identify patients, link patient medical records, and allow broad sharing, monitoring, research and analysis of the public using computerized medical records linked through the identification cards. The majority of the hospitals perceive that online access to information across locations, centralized-web based applications, transition into digital record keeping, computer network must provide national wide access and enterprise wide access are highly critical for successful implementation of universally accepted unique identification card for patients. The centralized-web based applications and computer network must provide national wide access discriminate best among the five categories of hospitals. . The majority of hospitals opine that universally accepted unique identification card is very useful to hospitals for providing quick and quality health care services.

Keywords: Discriminant Analysis, Hospitals, Patients, Unique Identification Card

1. INTRODUCTION

Healthcare systems are highly complex, fragmented and use multiple information technology systems. With vendors incorporating different standards for similar or same systems, it is little wonder that all-round inefficiency, waste and errors in healthcare information and delivery management are all too commonplace an occurrence. Consequently, a patient's health information often gets trapped in silos of legacy systems, unable to be shared with members of the healthcare community. These are some of the several motivations driving an effort to encourage standardization, integration and electronic information exchange amongst the various healthcare providers.

In order to be meaningful, the health record of an individual needs to be from conception (better) or birth (at the very least). As one progresses through one's life, every record of every clinical encounter represents an event in one's life. Each of these records may be insignificant or significant depending on the current problems that

* Research Scholar, Sathyabama University, Chennai, Tamil Nadu, E-Mail : sam_kumar06@yahoo.co.in

** Registrar Sathyabama University, Chennai, Tamil Nadu, E-Mail : ssrau@rediffmail.com

the person suffers from. Thus, it becomes imperative that these records be arranged chronologically to provide a summary of the various clinical events in the lifetime of a person.

The health data is owned by the patient while the actual records are owned by the care providers who act as the custodians of the data. For creation of a true electronic health record of an individual it is imperative that all clinical records created by the various care providers that a person visits during his/her lifetime be stored in a central clinical data repository or at least be shareable through the use of interoperable standards. Adequate safeguards to ensure data privacy and security must strictly be adhered to at all times. Patients must have the privilege to verify the accuracy of their health data and gain access whenever they wish to do so.

The Healthcare Information and Management Systems in any county aims to collect an accurate identification of the patient and linking of all related information to that individual within and across system are the accurate identification of the patient and linking of all related information to that individual within and across system. The patient identification system is useful to identify patients, link patient medical records, and allow broad sharing, monitoring, research and analysis of the public using computerized medical records linked through the identification cards. A patient identifier that is unique across the entire national healthcare system will facilitate an easy implementation, reduce cost and complexity, and assure timely access to information for patient care, administrative and research purposes. With this background, the present study is attempted to examine the usefulness, critical success factors and utility of universally accepted unique identification system of hospitals in Chennai.

2. METHODOLOGY

Among the different metropolitan cities in India, the Chennai city has been purposively selected for the present study. The hospitals have been selected for the present study by adopting random sampling technique. The different categories of hospitals such as health clinics, private hospital, Government hospital, specialty hospital and corporate network hospitals are selected for the present study. The sample size for the present study is 100 hospitals. In order to accomplish the objectives of the study, the frequency, percentage analysis, ranking, ANOVA test and multiple discriminant analysis are carried out. The data and information pertain to the year 2013-2014.

3. RESULTS AND DISCUSSION

3.1. Usefulness of Universally Accepted Unique Identification Card for Patients

The usefulness of universally accepted unique identification card for patients was analyzed and the results are presented in Table 1.

Figure 2.1: A Cloud Based Model for Records that can be Accessed Anywhere

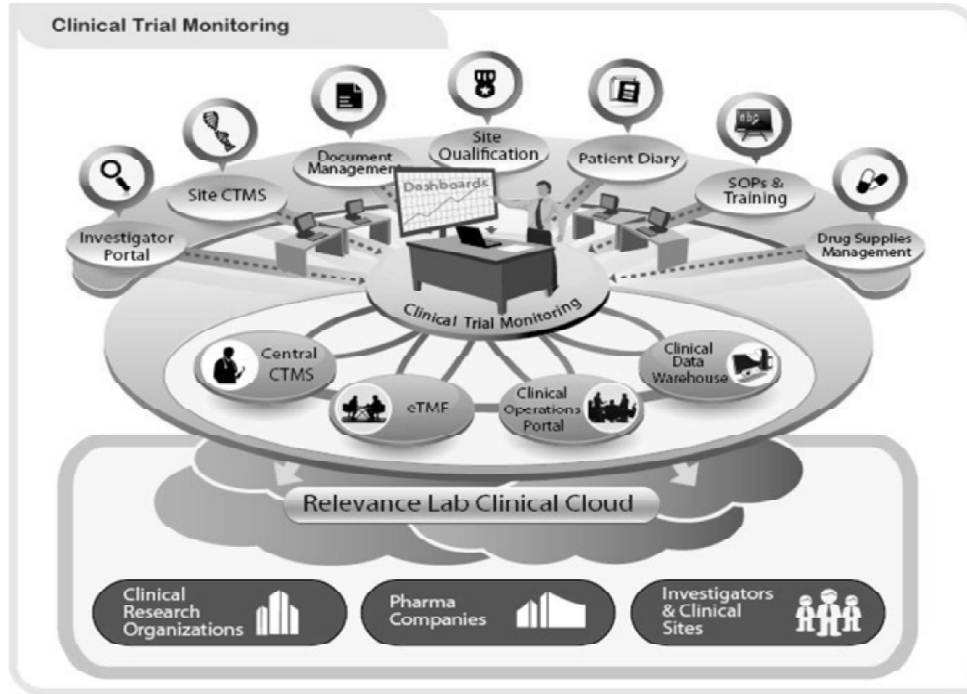


Figure 2.2: A Flow Pattern Diagram of Collecting & Storing Patient Records

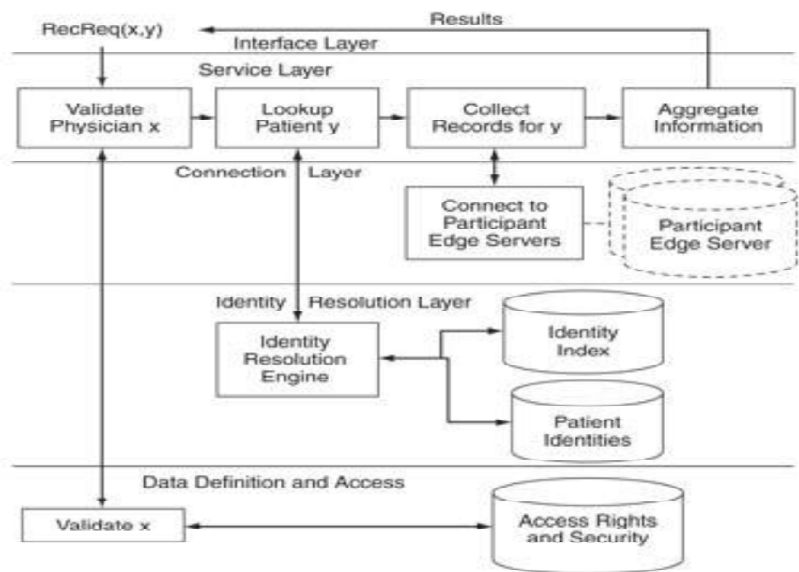


Table 1
Usefulness of Universally Accepted Unique Identification Card for Patients

<i>S.No</i>	<i>Particulars</i>	<i>Rank</i>
1	Decreases medical errors	IV
2	Reduces health care costs	VI
3	Time saving	II
4	Reduces the incidence of medical identity theft and fraud and privacy	V
5	Timely updated information	III
6	Aggregating and providing a lifelong view of a patient's health information	I

The universally accepted unique identification card for patients is useful for aggregating and providing a lifelong view of a patient's health information, time saving, timely updated information, decreases medical errors, reduces the incidence of medical identity theft and fraud and privacy and reduces health care costs in the order of importance as perceived by the hospitals.

3.2. Usefulness of Universally Accepted Unique Identification Card for Hospitals

The usefulness of universally accepted unique identification card for hospitals was analyzed and the results are presented in Table-2.

Table 2
Usefulness of Universally Accepted Unique Identification Card for Hospitals

<i>S.No</i>	<i>Particulars</i>	<i>Rank</i>
1	Improved patient identification	III
2	Increased administrative efficiency	IV
3	Improved medical records management	I
4	Improved quality of care	II
5	Supporting population-based research and development	V

The universally accepted unique identification card is useful for hospitals for improved medical records management, improved quality of care, Improved patient identification, Increased administrative efficiency and supporting population-based research and development as perceived by the hospitals.

3.3 Critical Factors Affecting the Success of Universally Accepted Unique Identification Implementation

The critical factors affecting the success of universally accepted unique identification implementation was analyzed and the results are presented in Table 3. The results show that about 42.00 per cent of hospitals opine that online access to information across locations has the high degree of importance for the success of implementation

of universally accepted unique identification followed by extremely high (18.00), neutral (18.00 per cent), low(12.00) and very low (10.00 per cent).

The results indicate that about 36.00 per cent of hospitals opine that centralized-web based applications has the high degree of importance for the success of implementation of universally accepted unique identification followed by extremely high (32.00), neutral (12.00 per cent), low and very low (10.00 per cent).

Table 3
Critical Factors Affecting the Success of Universally Accepted Unique Identification Implementation

S.No	Critical Success Factors	Extremely High	High	Neutral	Low	Extremely Low	Total
1	Online access to information across locations	18 (18.00)	42 (42.00)	18 (18.00)	12 (12.00)	10 (10.00)	100 (100.00)
2	Centralized-web based applications	32 (32.00)	36 (36.00)	12 (12.00)	10 (10.00)	10 (10.00)	100 (100.00)
3	Transition into digital record keeping	24 (24.00)	45 (45.00)	19 (19.00)	8 (8.00)	4 (4.00)	100 (100.00)
4	Computer network must provide national wide access	42 (42.00)	39 (39.00)	15 (15.00)	4 (4.00)	0 (0.00)	100 (100.00)
5	Enterprise wide access	34 (34.00)	37 (37.00)	18 (18.00)	9 (9.00)	2 (2.00)	100 (100.00)

It is observed that about 45.00 per cent of hospitals opine that transition into digital record keeping has the high degree of importance for the success of implementation of universally accepted unique identification followed by extremely high (24.00), neutral (19.00 per cent), low (8.00 per cent) and very low (4.00 per cent).

It is clear that about 42.00 per cent of hospitals opine that computer network must provide national wide access has the extremely high degree of importance for the success of implementation of universally accepted unique identification followed by high (39.00), neutral (15.00 per cent) and low(4.00 per cent).

It is apparent that about 37.00 per cent of hospitals opine that enterprise wide access has the high degree of importance for the success of implementation of universally accepted unique identification followed by extremely high (34.00), neutral (18.00 per cent), low (9.00 per cent) and very low (2.00 per cent).

In order examine the difference between categories of hospitals and critical factors affecting the success of universally accepted unique identification implementation, the ANOVA test has applied and the results are presented in Table 4.

Table 4
Categories of Hospitals and Critical Factors Affecting the Success of Universally Accepted Unique Identification Implementation - ANOVA

<i>Source</i>	<i>SS</i>	<i>Degrees of Freedom</i>	<i>MS</i>	<i>F</i>	<i>Sig</i>
Between Groups	8.152	4	2.038	4.004	.000
Within Groups	48.328	95	.509		
Total	56.480	99			

The F-value of 4.004 is significant at one per cent level indicating that there is a significant difference between categories of hospitals and critical factors affecting the success of universally accepted unique identification implementation.

3.4. Discriminant Analysis for Critical Factors Affecting the Success of Universally Accepted Unique Identification Implementation

In order to discriminate the category of the hospitals based on the critical factors affecting the success of universally accepted unique identification implementation, the discriminant analysis has been applied and the results are hereunder discussed.

3.4.1. Selection of Discriminating Variables

In order to determine the critical factors affecting the success of universally accepted unique identification implementation which significantly contribute to the differentiation of category of hospitals, the F test is used for Wilks' Lambda. The ANOVA results are presented in Table-5. The F test is significant for three variables of online access to information across locations, centralized-web based applications and computer network must provide national wide access.

Table 5
Tests of Equality of Group Means

<i>Critical Factors</i>	<i>Wilks' Lambda</i>	<i>F</i>	<i>df1</i>	<i>df2</i>	<i>Sig.</i>
Online access to information across locations	.494	3.717	4	95	.021
Centralized-web based applications	.478	2.775	4	95	.023
Transition into digital record keeping	.491	.896	4	95	.222
Computer network must provide national wide access	.494	2.803	4	95	.023
Enterprise wide access	.494	.688	4	95	.200

3.4.2. Estimation of Discriminant Function

In this study, the discriminant analysis is carried out for five categories of hospitals and it results four discriminant functions and consequently the four eigen values and the results are presented in Table 6.

Table 6
Eigen Values

<i>Function</i>	<i>Eigen Value</i>	<i>% of Variance</i>	<i>Cumulative %</i>	<i>Canonical Correlation</i>
1	.247	59.20	59.20	.794
2	.219	25.70	84.90	.551
3	.207	11.00	95.90	.327
4	.201	4.10	100.00	.214

The highest value (0.25) corresponds to the first discriminant function, which shows that it has the strongest power of discrimination of the four functions. Also, the first function accounts in a ratio of 59.20 per cent for the dispersion of the group means, as compared to the second function accounts 25.70 per cent, followed by second function (25.70 per cent), third function (11.00 per cent) and fourth function (4.10 per cent) The canonical correlation coefficient, measuring the relation between discriminant factorial coordinates and the grouping variable show that 63.04 i.e. $(0.794)^2$ of the total variance accounts for the differences among the five categories of hospitals through the first discriminant function.

3.4.3. Standardized Canonical Discriminant Function Coefficients

The standardized coefficients for the discriminant function were calculated and the results are presented in Table 7. The discriminant function coefficients are used for calculating the discriminant score for each case in particular.

Table 7
Standardized Canonical Discriminant Function Coefficients

<i>Critical Factors</i>	<i>Function 1</i>	<i>Function 2</i>	<i>Function 3</i>	<i>Function 4</i>
Online access to information across locations	.139	-.040	-.093	-.007
Centralized-web based applications	.427	-.192	.118	.079
Transition into digital record keeping	.263	.199	-.137	.028
Computer network must provide national wide access	.416	-.034	.257	-.029
Enterprise wide access	.112	-.167	.235	-.034

Taking into the account that the first function has the highest discriminating power, the first discriminant function is:

$$Z = 0.419Z_1 + 0.407 Z_2 + 0.363 Z_3 - 0.316Z_4 + 0.112Z_5$$

The Z_1 to Z_5 are standardized X_1 to X_5 variables.

The size of the coefficients variables of value of centralized-web based applications and computer network must provide national wide access discriminate best among the five categories of hospitals.

3.4.4. Structure Matrix

The structure matrix coefficients are presented in Table-8. From the table, the results indicate the correlation between each predictor measures and the discriminant function. For the first discriminant function, it can be seen that correlation coefficients have high values for two measures *viz.*, centralized-web based applications and computer network must provide national wide access which means that these measures are strongly correlated with the first function. These measures would probably characterize best division of five categories of hospitals. Based on the discriminant function, 74.00 per cent of the measures have been correctly classified.

Table 8
Structure Matrix

Critical Factors	Function			
	1	2	3	4
Centralized-web based applications	.650*	.115	.180	.135
Computer network must provide national wide access	.647*	.057	.173	-.187
Transition into digital record keeping	.285	-.153*	.126	.138
Online access to information across locations	.222	.152	.154*	.280
Enterprise wide access	.206	.149	.124	.298*

Note: * indicates largest absolute correlation between measure and discriminant function

3.5. Utility of Universally Accepted Unique Identification System

The utility of universally accepted unique identification system was analyzed and the results are presented in Table-9. The results show that about 44.00 per cent of hospitals are agreed with universally accepted unique identification system facilitates the decision process followed by strongly agree (38.00 per cent), neutral (10.00 per cent), disagree (5.00 per cent) and strongly disagree (3.00 per cent).

The results indicate that about 48.00 per cent of hospitals are agreed with universally accepted unique identification system improves the reliability of the decision process followed by strongly agree (36.00 per cent), neutral (10.00 per cent), disagree (4.00 per cent) and strongly disagree (2.00 per cent).

It is clear that about 36.00 per cent of hospitals are agreed with universally accepted unique identification system increases the level of operation over control followed by strongly agree (23.00 per cent), neutral (17.00 per cent), disagree (13.00 per cent) and strongly disagree (11.00 per cent).

It is observed that about 39.00 per cent of hospitals are agreed with universally accepted unique identification system facilitates the co-ordination of tests followed by strongly agree (27.00 per cent), neutral (19.00 per cent), disagree (10.00 per cent) and strongly disagree (5.00 per cent).

Table 9
Utility of Universally Accepted Unique Identification System

<i>S.No</i>	<i>Particulars</i>	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Total</i>
1	It facilitates the decision process	38 (38.00)	44 (44.00)	10 (10.00)	5 (5.00)	3 (3.00)	100 (100.00)
2	It improves the reliability of the decision process	36 (36.00)	48 (48.00)	10 (10.00)	4 (4.00)	2 (2.00)	100 (100.00)
3	It increases the level of operation over control	23 (23.00)	36 (36.00)	17 (17.00)	13 (13.00)	11 (11.00)	100 (100.00)
4	It facilitates the co-ordination of tests	27 (27.00)	39 (39.00)	19 (19.00)	10 (10.00)	5 (5.00)	100 (100.00)
5	It offers reliability	32 (32.00)	38 (38.00)	16 (16.00)	9 (9.00)	5 (5.00)	100 (100.00)
6	It reduces the need for control surveillance and conferencing	35 (35.00)	40 (40.00)	17 (17.00)	5 (5.00)	3 (3.00)	100 (100.00)

It is apparent that about 38.00 per cent of hospitals are agreed with universally accepted unique identification system offers reliability followed by strongly agree (32.00 per cent), neutral (16.00 per cent), disagree (9.00 per cent) and strongly disagree (5.00 per cent).

The results reveal that about 40.00 per cent of hospitals are agreed with universally accepted unique identification system reduces the need for control surveillance and conferencing followed by strongly agree (35.00 per cent), neutral (17.00 per cent), disagree (5.00 per cent) and strongly disagree (3.00 per cent).

In order to examine the difference between categories of hospitals and utility of universally accepted unique identification system, the ANOVA test has been applied and the results are presented in Table 10.

Table 10
Categories of Hospitals and Utility of Universally Accepted Unique Identification System - ANOVA

<i>Source</i>	<i>SS</i>	<i>Degrees of Freedom</i>	<i>MS</i>	<i>F</i>	<i>Sig</i>
Between Groups	8.194	4	2.049	3.685	.000
Within Groups	52.796	95	.556		
Total		99			

The F-value of 3.685 is significant at one per cent level indicating that there is a significant difference between categories of hospitals and utility of universally accepted unique identification system.

3.6. Usefulness of Universally Accepted Unique Identification Card

The usefulness of universally accepted unique identification card was analyzed and the results are presented in Table-11.

Table 11
Usefulness of Universally Accepted Unique Identification Card

S.No.	Particulars	Frequency	Percentage
1	Extremely Useful	38	38.00
2	Very Useful	52	52.00
3	Moderately Useful	10	10.00
	Total	100	100.00

4. CONCLUSION

The aggregating and providing a lifelong view of a patient's health information is the most usefulness of universally accepted unique identification card for patients and it helps hospitals for improved medical records management. The majority of the hospitals perceive that online access to information across locations, centralized-web based applications, transition into digital record keeping, computer network must provide national wide access and enterprise wide access are highly critical for successful implementation of universally accepted unique identification card for patients.

The centralized-web based applications and computer network must provide national wide access discriminate best among the five categories of hospitals. There is a significant difference between categories of hospitals and critical factors affecting the success of universally accepted unique identification implementation. There is a significant difference between categories of hospitals and utility of universally accepted unique identification system. The majority of hospitals opine that universally accepted unique identification card is very useful to hospitals for providing quick and quality health care services.

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