To Study the changes in Physician's perception about Electronic Health records on its usage over a period of time

Submitted By

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Dell Services, Noida

- Dell Inc. (Dell) is a global information technology company that offers its customers a range of solutions and services delivered directly by Dell and through other distribution channels.
- Founded in 1984 and is headquartered in Round Rock, Texas.
- In 1985, the company produced the first computer of its own design, the "Turbo PC", which sold for US$795.
- Dell has grown by both increasing its customer base and through acquisitions since its inception; notable mergers and acquisitions.

Dell Services, Noida

- Perot Systems was an information technology services provider founded in 1988 by a group of investors led by Ross Perot and based in Plano, Texas, United States, which is then renamed as Dell Services.
- On February 3, 2012, it held a worldwide portfolio of 3,449 patents and had an additional 1,660 patent applications pending.
- The Company designs, develops, manufactures, markets, sells, and supports a range of products, solutions, and services.
- The Company also holds licenses to use numerous third-party patents.

Dell Services, Noida

Internship Report

(2nd January 2012 – 30th March 2012)

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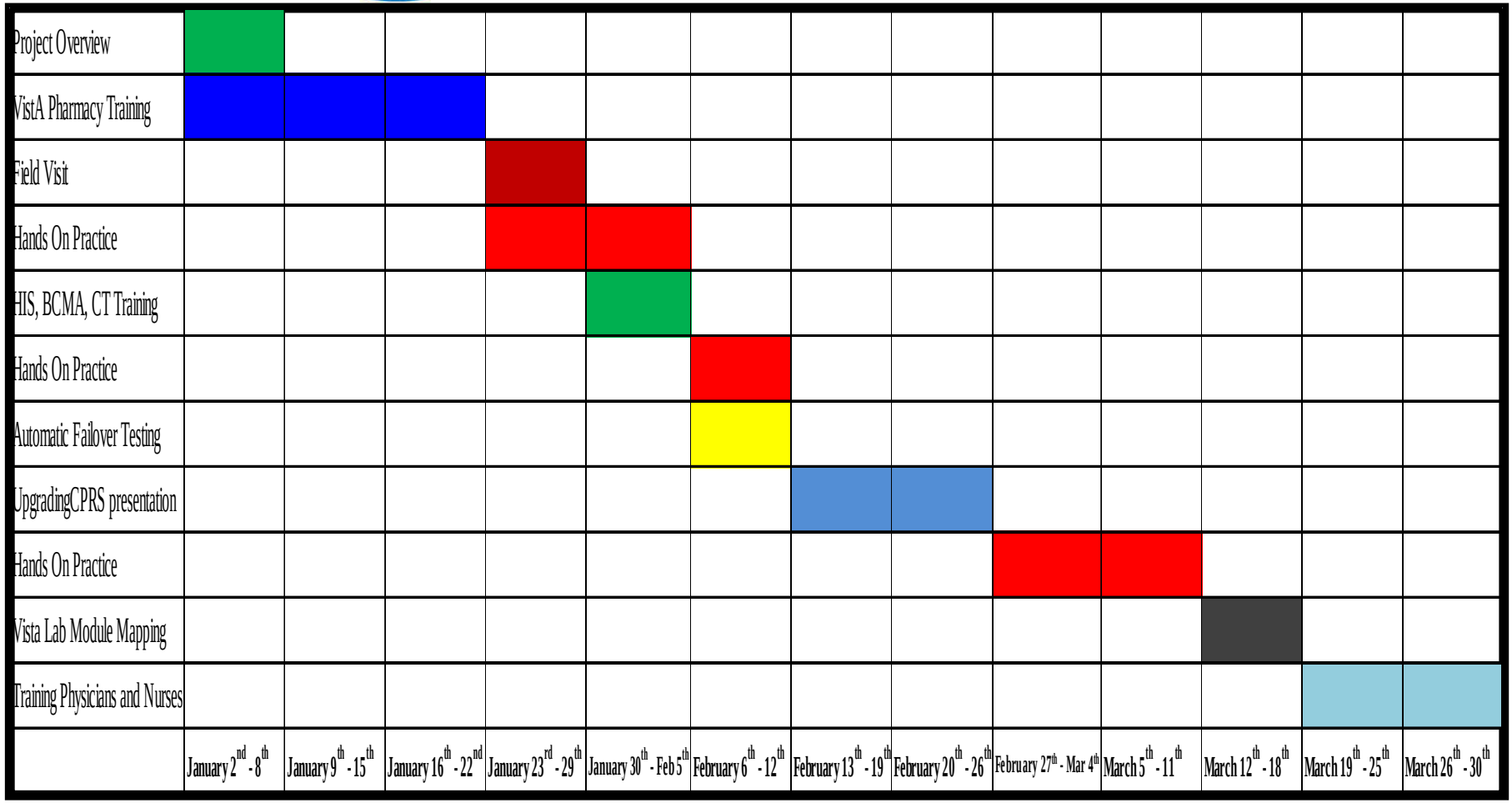

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Lessons Learned during Internship

- VistA and its Modules
  - Open source Software, Mirth Integration engine, HL7 messaging
  - Pharmacy Module and its drug build up
  - Pharmacy space utilization and process optimization
  - VistA CPRS, BCMA, Diet and Lab
  - Configuration and Mapping Process
  - How to train end user and trainers
  - How to schedule
  - What all to cover for training

Dissertation Report

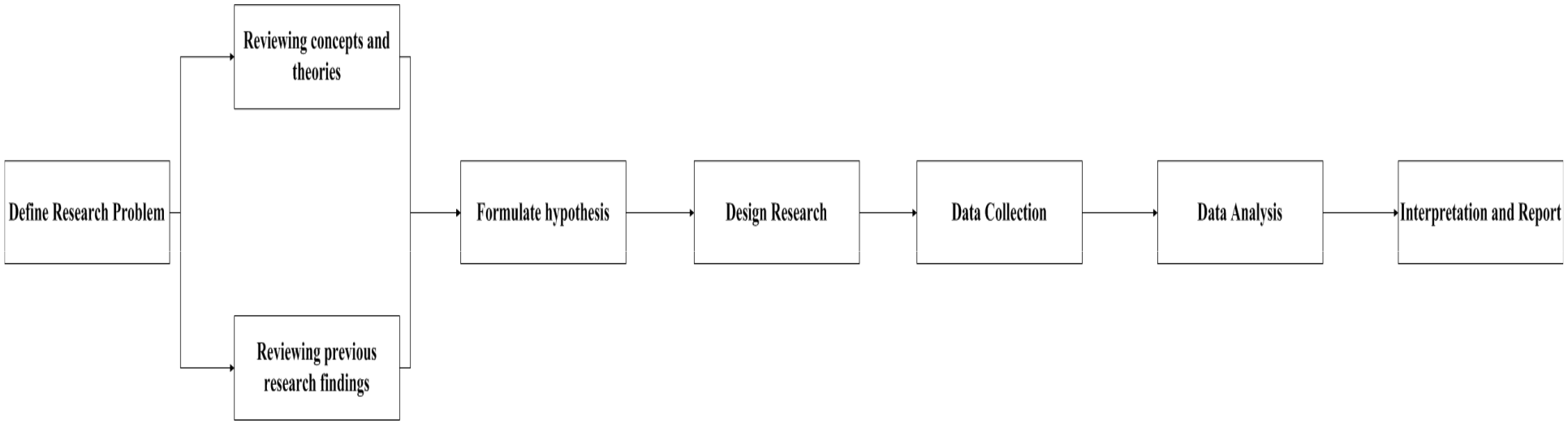
To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Topic

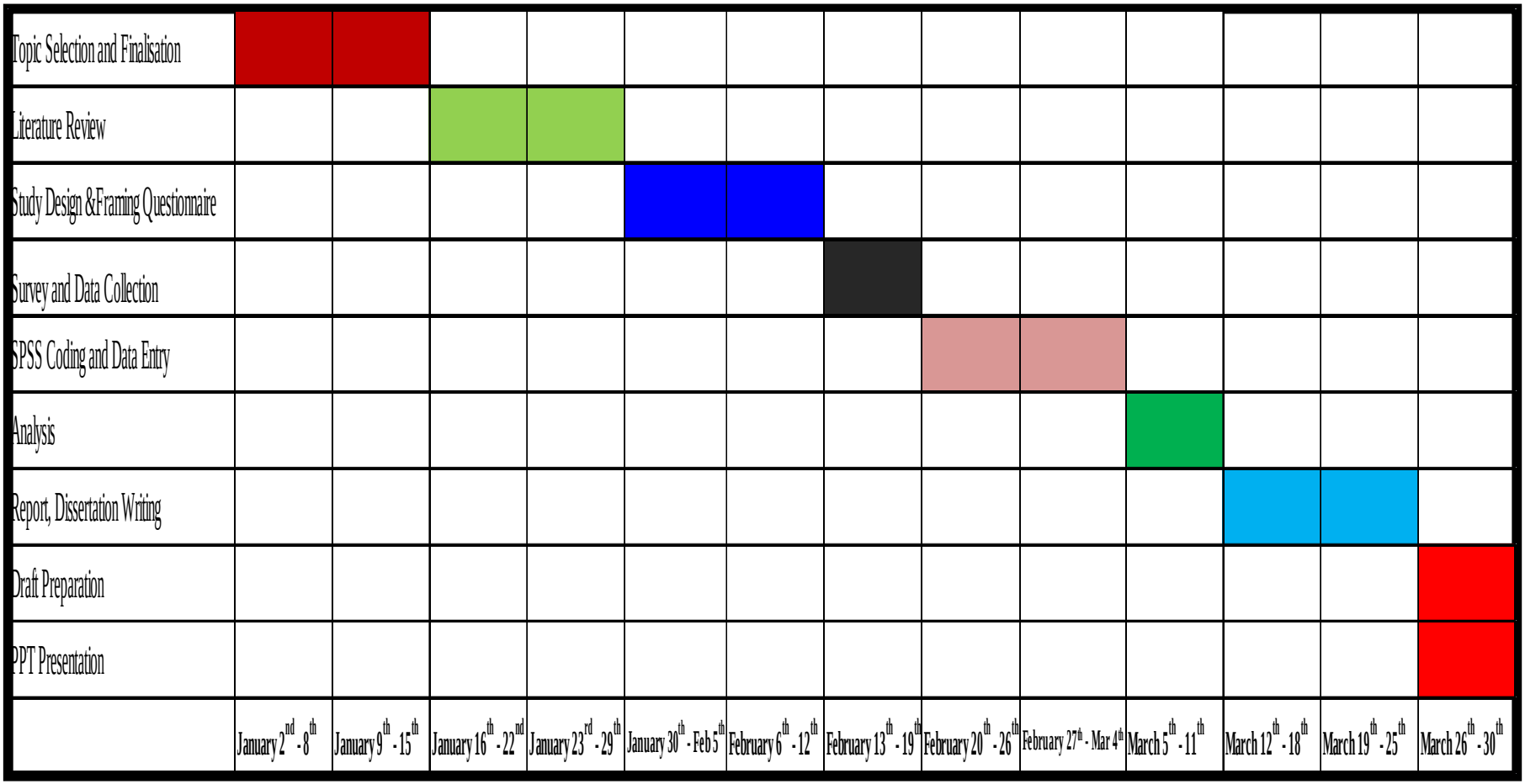
To Study the changes in Physician’s perception about

Electronic Health records on its usage over a period of time

Research Process



To Study the change in Physician's perception about Electronic Health records on its usage over a period of time



To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Research Problem

Most of the EHR/EMR Implementation across the globe has failed. EMR/EHR system implementations have even higher failure rates. Industry studies reveal failure rates of 50%, others as high as 70%.

Among the most notable challenges to implementing clinical information systems are the varying levels of acceptance and use by healthcare providers and employees.

- Why Physician's are reluctant to use this system which has got many advantages?
- Do they really know about these advantages?
- Is this reluctance because of the workload?
- Is there any changes in perception among users over a period of time.

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Research Problem

•To assess whether Acceptance has got dependence on age group, Highest qualification.

• To assess whether Workload/time has got any direst influence on attitude of physician and also acceptance.

•To confirm Technology Acceptance Model and to assess whether EHR acceptance is dependent on Patient Satisfaction on EHR

Purpose of the Study

•The primary purpose is to apply a revised TAM in order to predict & to explain the extent to which the EHR system is perceived as useful and easy to use by physicians.

• To explain whether it is well accepted, adopted, and used by them in their Clinical practice.

•The other objectives of this study are to examine and explain the perceptions-behavioral intentions-behavior relationship within TAM, and test various hypotheses based on these relationships.

•This will further help researchers and practitioners understand the information technology acceptance behavior of physicians in a healthcare organization.

Objectives

General objective

To Study the change in Physician’s perception about Electronic Health records on its usage over a period of time

Objectives

Specific Objectives

- To compare the physician's perception on ease of use about EHR Pre Go Live and Post Go Live.
- To compare the physician's perception on usefulness about EHR Pre Go Live and Post Go Live.
- To compare the physician's perception about workload/ time Pre Go Live and Post Go Live.
- To compare the physician's attitude on EHR and its acceptance Pre Go Live and Post Go Live.
- To study the influence of perception on usefulness about EHR on attitude of the user.
- To study the influence of perception on ease of use of EHR on attitude of the user.
- To study the influence of workload on attitude and acceptance of EHR.
- To study the influence of age and qualification on acceptance of EHR

Literature Review

•Staff Perception Survey before and after EHR/CPOE Implementation, Jean Loes, Marcia Ward, Douglas Wakefield, John O'Brien.

• A Study of factors influencing physician adoption of Electronic Medical Records Technology, Audrey P. Price.

• Among the most notable challenges to implementing clinical information systems are the varying levels of acceptance and use by healthcare providers and employees:

- Research has shown that experiences shape the degree to which users will accept the technology initially (Dixon, 1999; Herbert & Benbasat, 1994).
- Research has shown that users' attitudes regarding risks to service quality and disruptions in workflow hinder implementation (Hu, et al., 2002; Zheng, et al., 2005).

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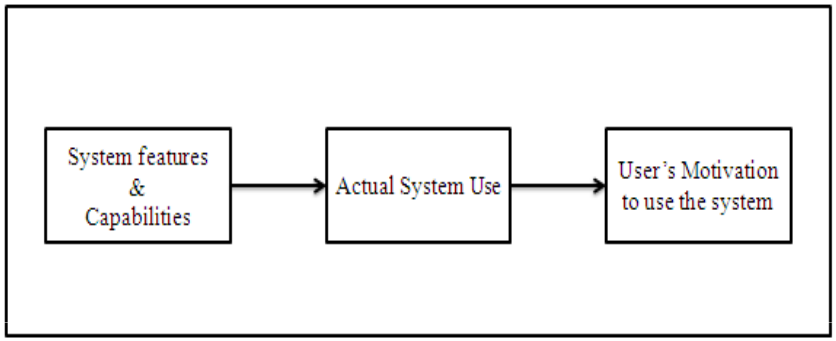
Literature Review continued.....

•All of the significant models of information technology use suggest that perceptions of the impact on work and outcomes are significant determinants of technology use and adoption (Kufafka, et al., 2003).

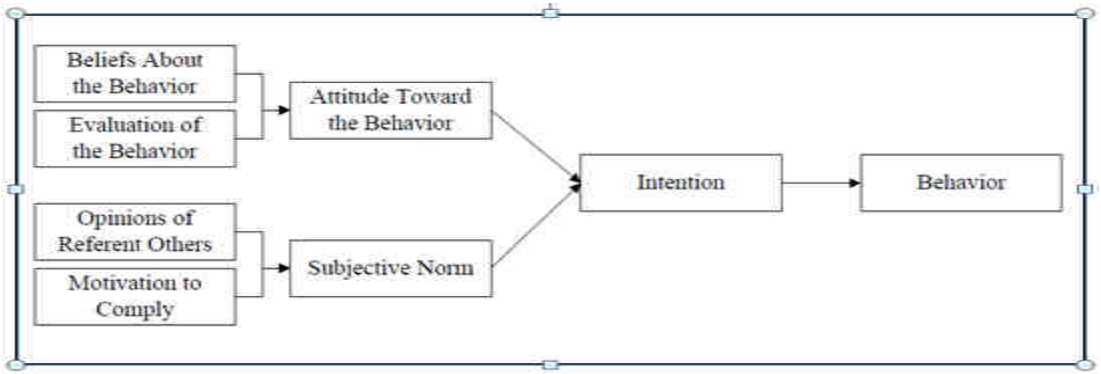
• Measures have been created to explore attitudes toward technology including perceived usefulness and ease of use (Davis, 1989).

Literature Review **continued…..**

Theoretical Framework:



Conceptual Model for TAM

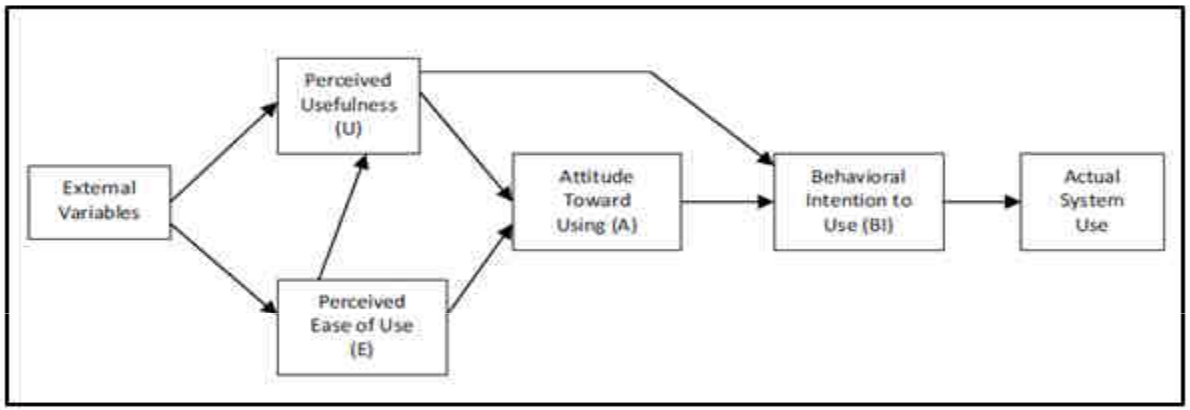


Theory of Reasoned Action

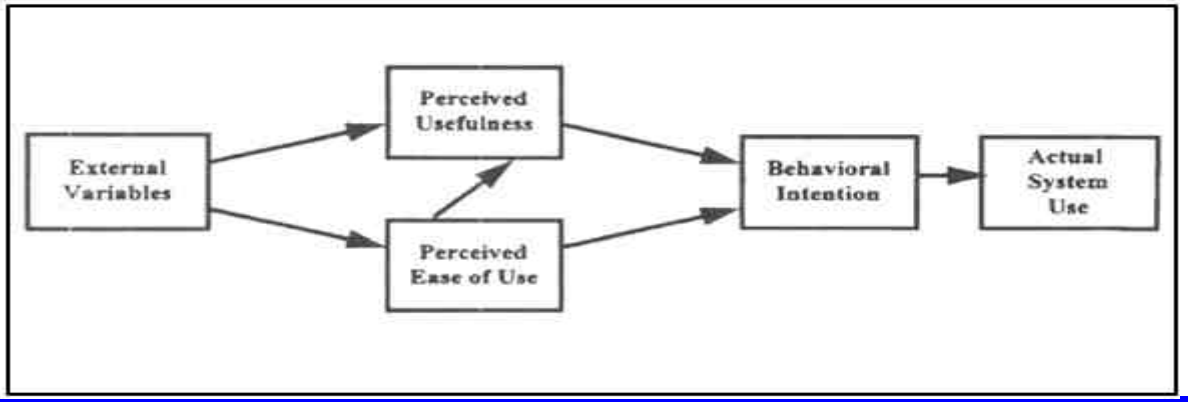
Literature Review **continued…..**

Theoretical Framework:

First Modified version of TAM



Final version of TAM



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Hypothesis

H1: Perceived usefulness will influence physician acceptance of electronic health records.

H2: Perceived ease of use will influence physician acceptance of electronic health records

H3: Acceptance of electronic health records is dependent on satisfaction of patients

H4: Acceptance of electronic health records is dependent on workload

H5: Acceptance of electronic health records is dependent on qualification

H6: Acceptance of electronic health records is dependent on the age of the physician

Research Methodology

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Study Design

- This study was conducted in ABC Multispecialty hospital owned by ABC Business Group at XYZ location.
- The study was designed as longitudinal study and was carried out over a period of nine months.
- The survey for the study was conducted three times.
- Same samples were used for all the three studies.

Study Design

- The study was conducted as follows
  - ➢Wave 1 – June 2011 Before Go Live of EHR (after scheduled training sessions)
  - ➢Wave 2 – November 2011 3 months after Go Live
  - ➢Wave 3 – February 2012 6 months after Go Live
- Go Live – Last Week of July 2011

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Study Design- Variables Studied

- Perception about usefulness
- Perception about ease of use
- Workload/ Time
- Attitude
- Acceptance
- Demographic Characteristics
  - Age group
  - Gender
  - Highest Qualification
  - Prior experience on EHR

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Sample and Sample Size

- Responses from Physician’s were taken
- Selected physician’s whose training schedules were over.
- The regular staff from various different departments of the same hospital.
- Physicians which include Junior Residents, Senior Residents, Consultants, and Senior Consultants.
- A sample size of 100 was targeted
- 100 Respondents were taken for the first study.
- Wave 3 Phase 60 physicians were present, others had either left or were gone to other locations

Sampling Method

- Simple random sampling method

Data

- Primary data collection method used for data collection of this study.

- Primary data were collected with the help of questionnaire which consisted of closed ended questions.

- The responses for these questions were on Likert scale.

- The questionnaire consists of only closed ended questions. 5 Point Likert scale used to rate all the questions i.e.
  - Strongly Disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree

Tools Used

- Data received were entered into SPSS for statistical analysis.
    - Mean
    - Factor Analysis
    - Reliability (Cronbach's alpha reliability coefficient)
    - ANOVA
    - KMO & Bartlett’s Test

Result & Analyses

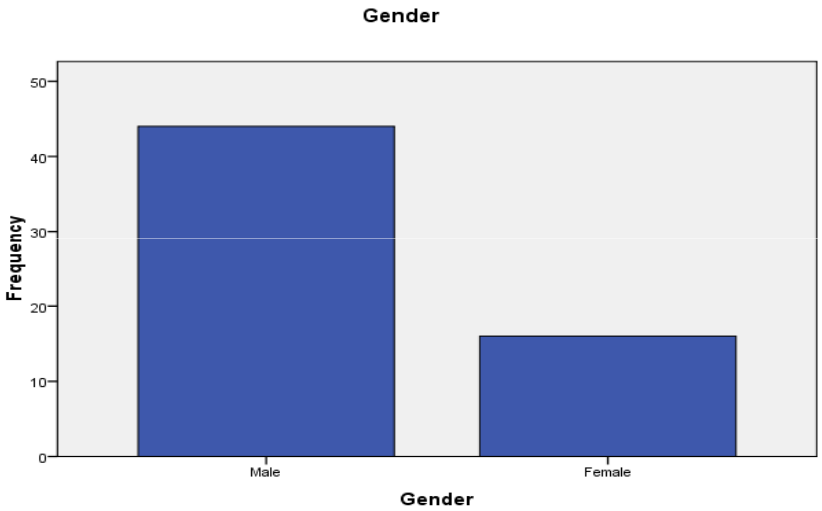
Results & Analyses

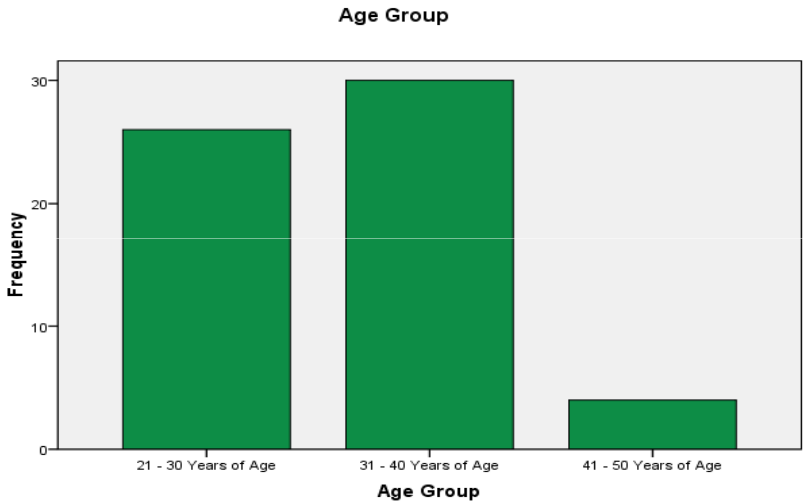
Characteristics of respondents:

		Wave 1	Wave 2	Wave 3
Gender	Male	**44**	**44**	**44**
	Female	**16**	**16**	**16**
Age Group	21 - 30 Years of Age	**26**	**26**	**26**
	31 - 40 Years of Age	**30**	**30**	**30**
	41 - 50 Years of Age	**4**	**4**	**4**
	Above 50 Years	**0**	**0**	**0**
Highest Qualification	Graduation	**22**	**22**	**22**
	Post Graduation Diploma	**11**	**11**	**11**
	Post Graduation	**27**	**27**	**27**
	Doctorate	**0**	**0**	**0**
Prior Experience EHR	Yes	**7**	**7**	**7**
	No	**53**	**53**	**53**

Results & Analyses *continued…..*

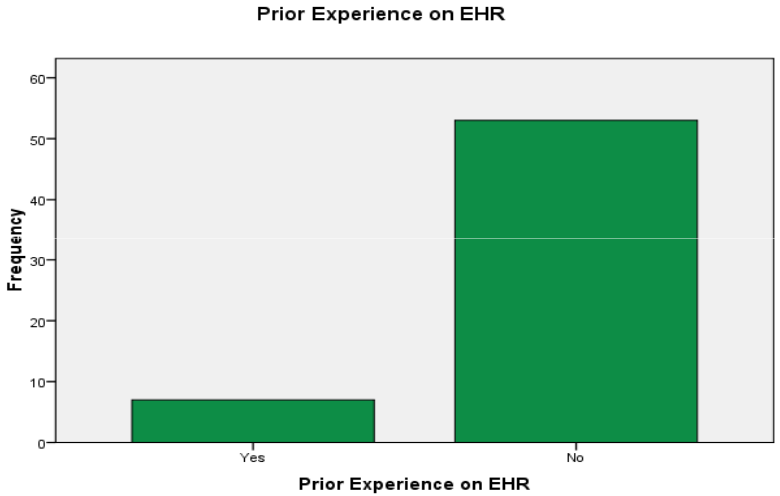
Characteristics of respondents:





Results & Analyses *continued…..*

Characteristics of respondents:



To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Cross Tabulations:

Use computers in daily life * Difficulty in using computers				
		Difficulty in using computers		Total
		Yes	No	
Use computers in daily life	Yes	**3**	**49**	**52**
	No	**6**	**2**	**8**
Total		**9**	**51**	**60**

Attended training session & Understood workflow				
		Understood workflow of CPRS		Total
		Yes	No	
Attended training session on CPRS	Yes	**47**	**7**	**54**
	No	**0**	**6**	**6**
Total		**47**	**13**	**60**

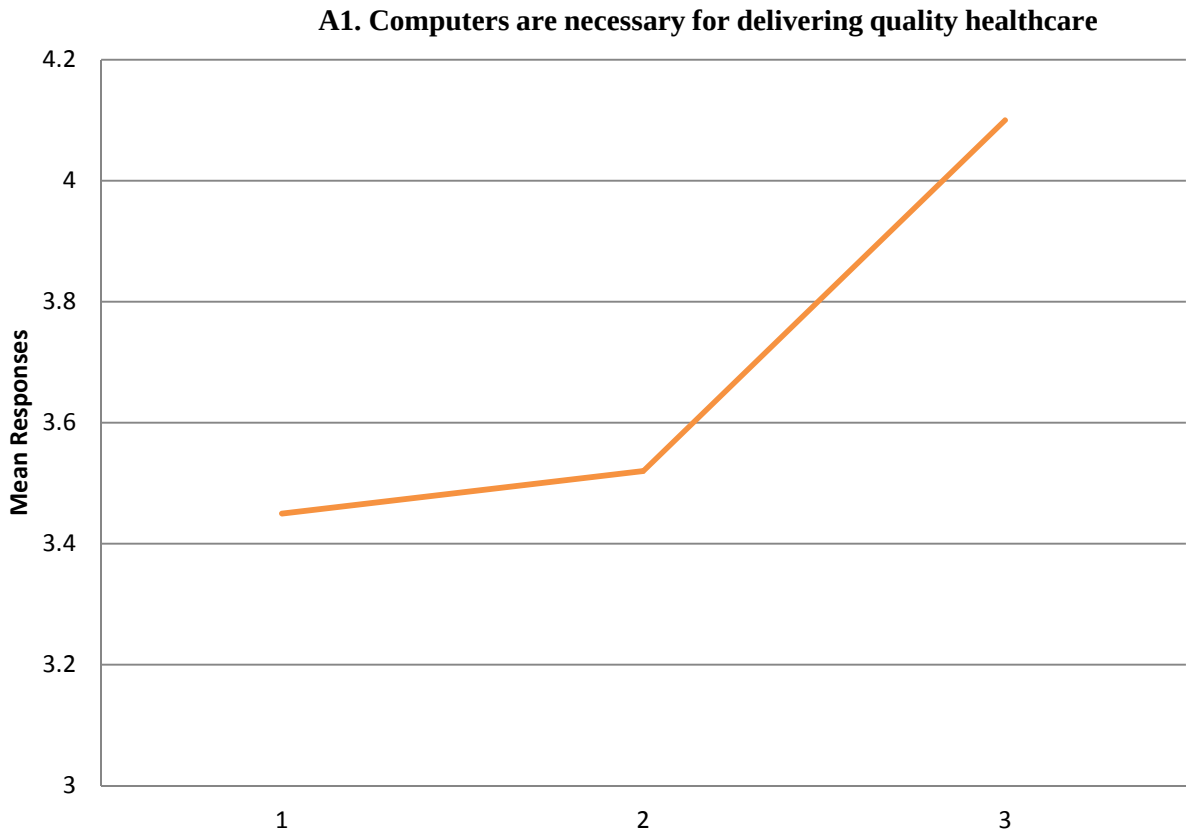
Results & Analyses *continued…..*

Mean Scores Comparison:

		Mean Response		
Code	**Questions**	**Wave 1**	**Wave 2**	**Wave 3**
A1	Computers are necessary for delivering quality healthcare	**3.45**	**3.52**	**4.1**
A2	CPRS will reduce the patient record retrieval time	**3.5**	**3.12**	**4.22**
A3	New system will decrease gap betwen different stake holders	**3.38**	**2.45**	**3.48**
A4	New System will increase coordination between different stake holders	**3.45**	**2.45**	**3.55**
A5	CPRS will optimize patient safety	**3.45**	**2.15**	**3.43**
A6	CPRS will increase workload	**3.73**	**4.77**	**3.08**
A7	CPRS will increase consultation timings	**3.87**	**4.77**	**2.92**
A8	CPRS will decrease the number of patients consulted	**3.55**	**4.12**	**2.97**
A9	CPRS is Userfriendly	**3**	**1.3**	**3**
A10	CPRS will reduce medication errors	**3.65**	**2.1**	**3.37**
A11	CPRS is Useful	**3.43**	**2.1**	**3.43**
AA1	I am satisfied with CPRS	**3.33**	**2.15**	**3.15**
AA2	I will encourage my colleagues for using CPRS	**3.33**	**2.08**	**3.17**
AA3	CPRS will support physicians and nurses in providing efficient care	**3.55**	**2.3**	**3.6**
AOA1	Overall my attitude about CPRS is positive	**3.23**	**2**	**3.13**

Results & Analyses *continued…..*

Mean Scores Comparison:



	A1
Wave 1	3.45
Wave 2	3.52
Wave 3	4.1

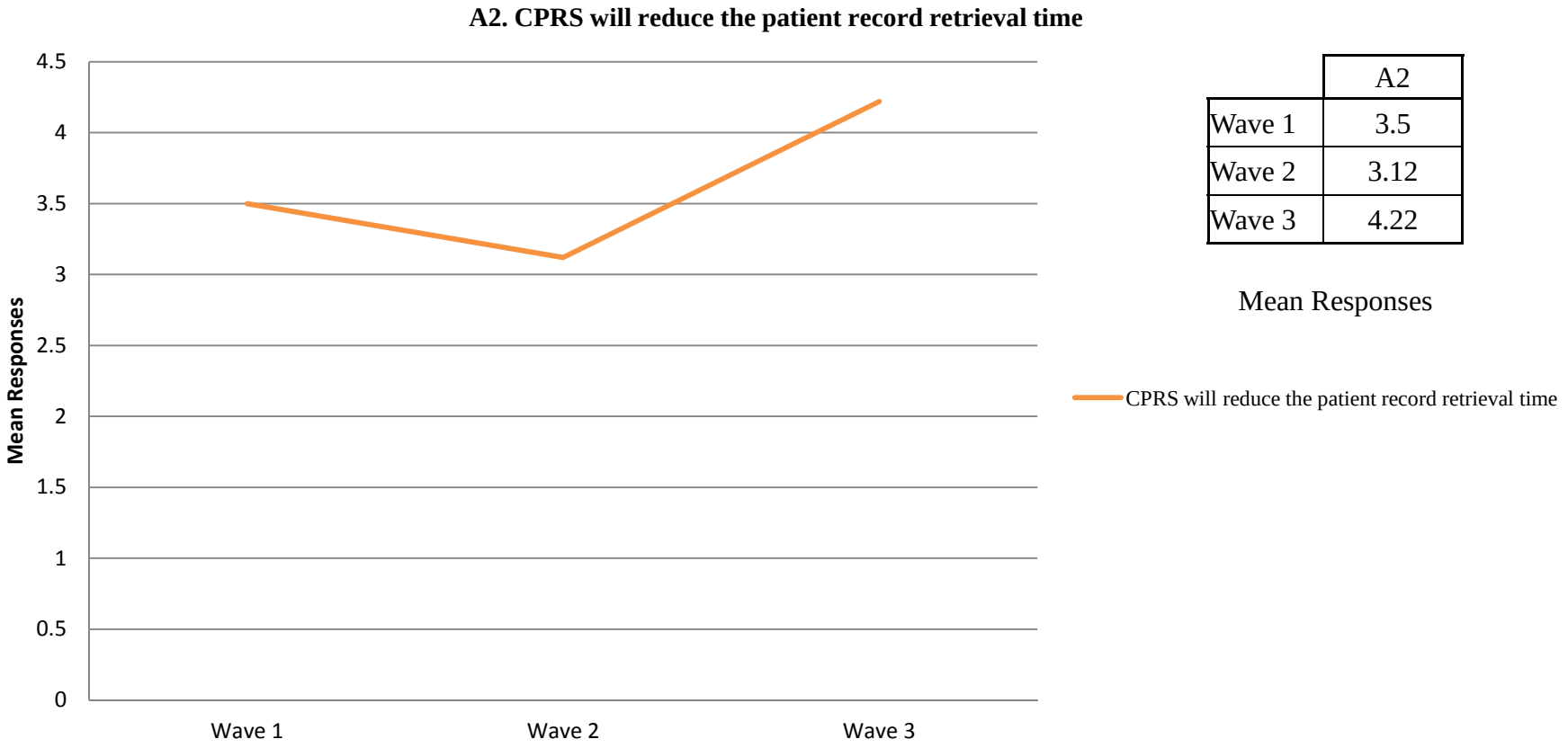
Mean Responses

Computers are necessary for delivering quality healthcare

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



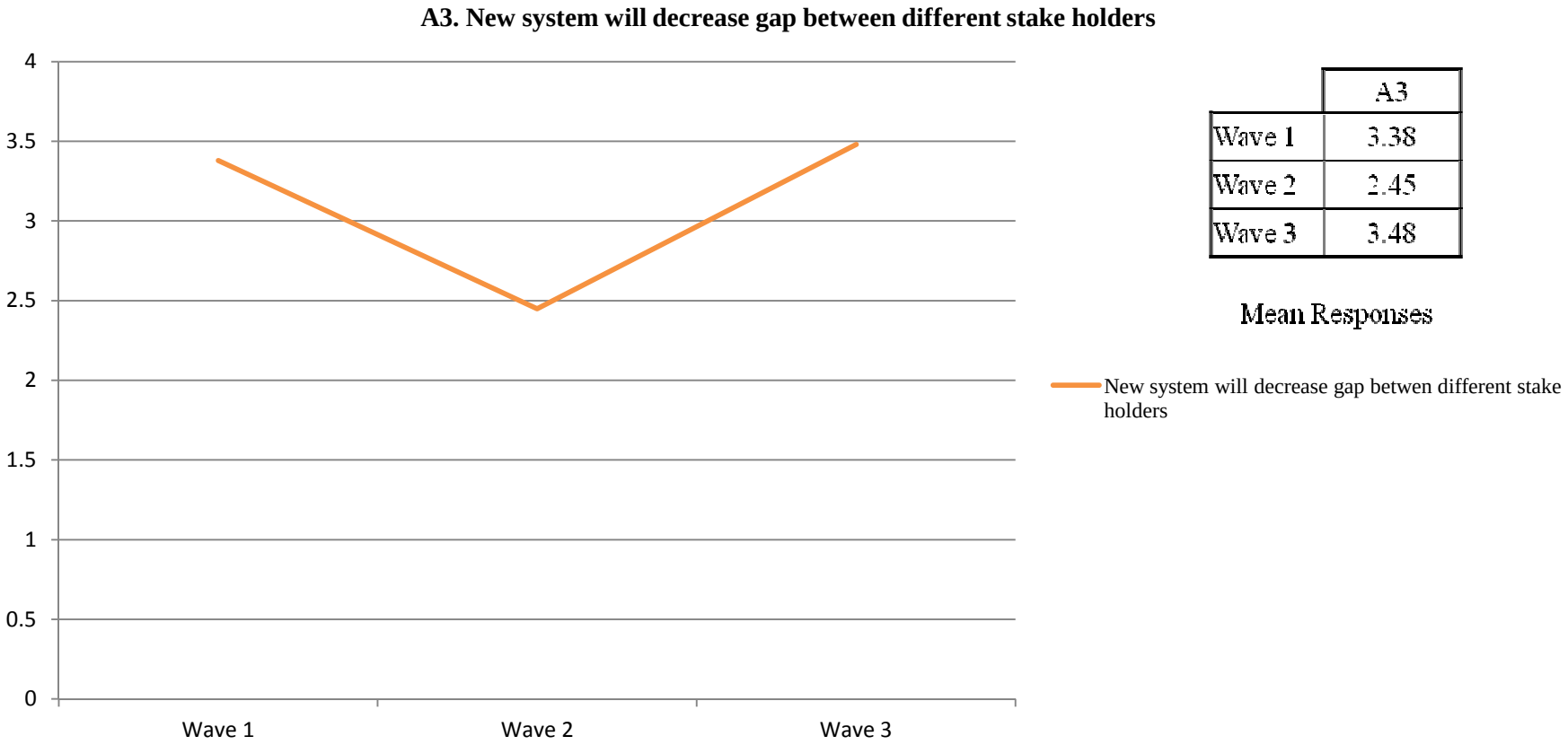
	A2
Wave 1	3.5
Wave 2	3.12
Wave 3	4.22

Mean Responses

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:

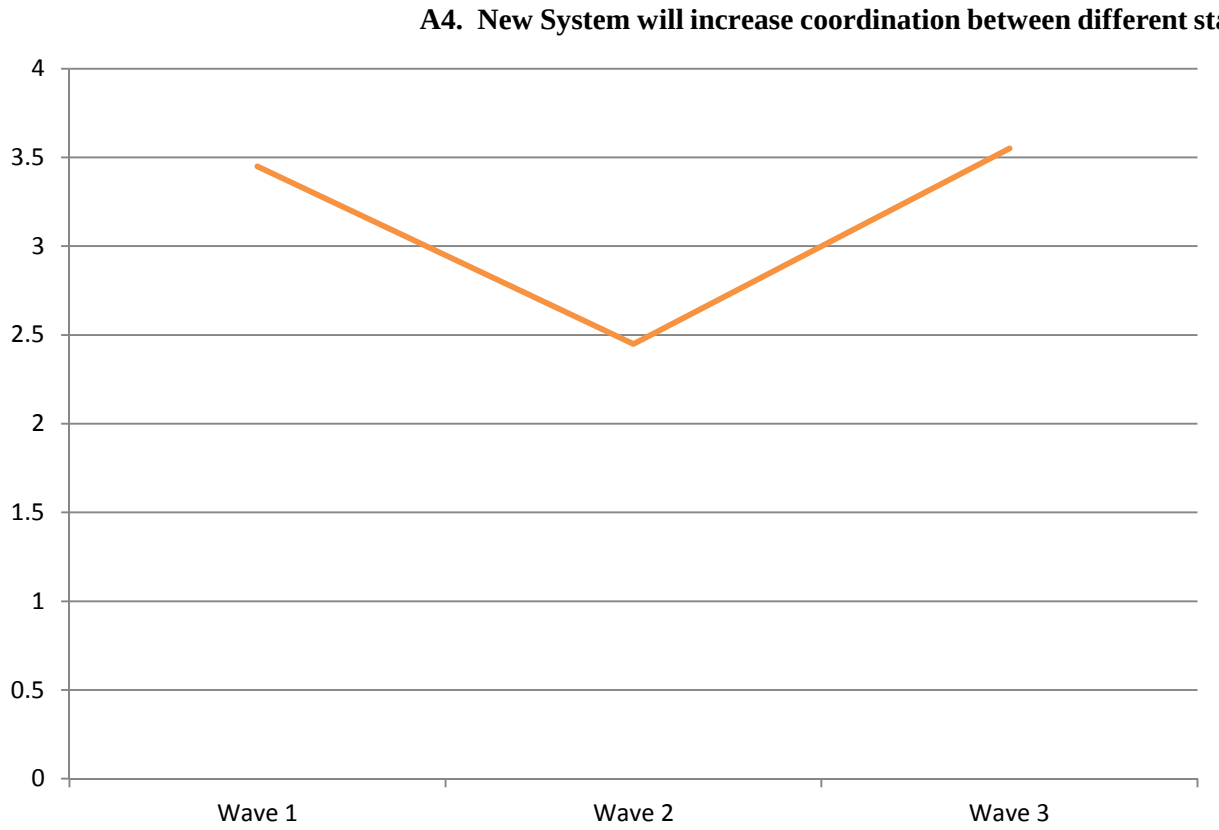


	A3
Wave 1	3.38
Wave 2	2.45
Wave 3	3.48

Mean Responses

Results & Analyses *continued…..*

Mean Scores Comparison:



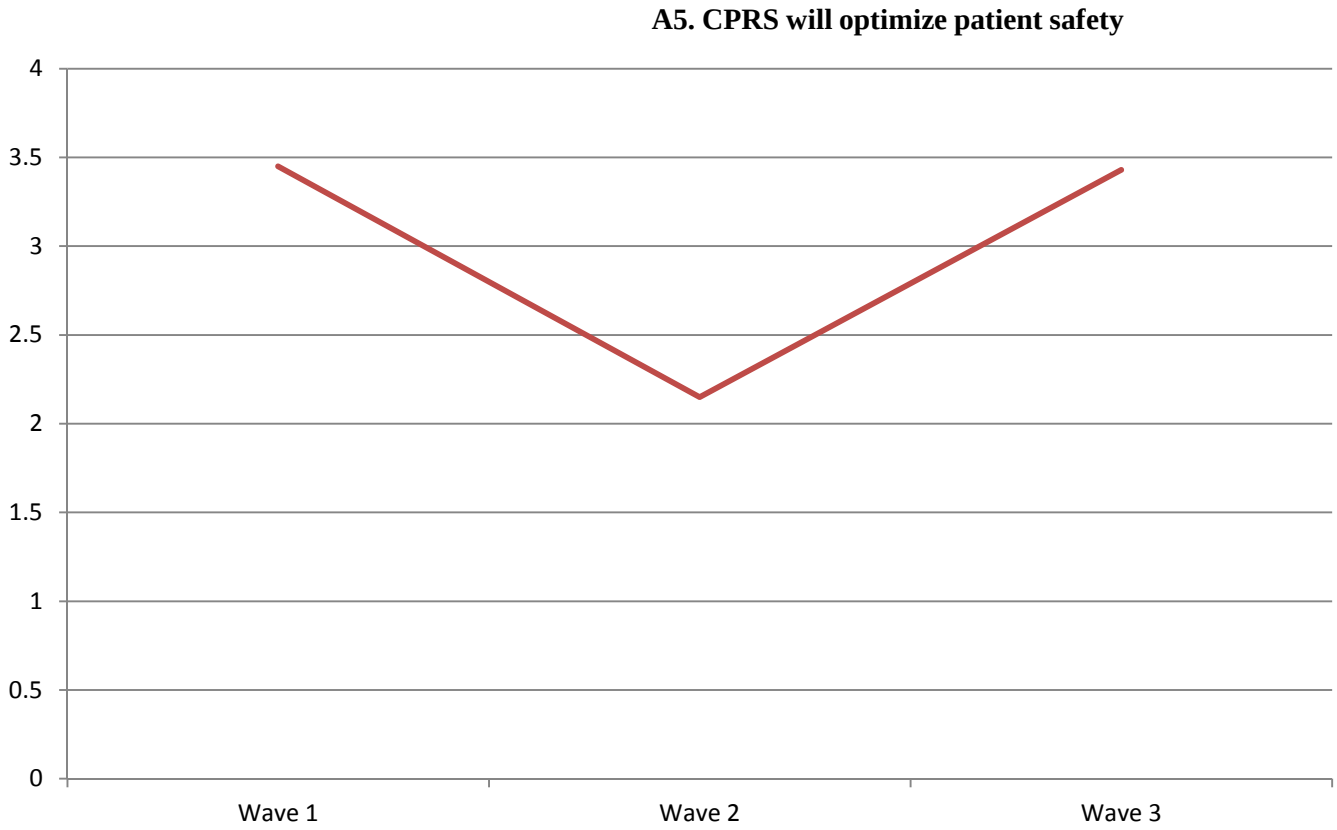
	A4
Wave 1	3.45
Wave 2	2.45
Wave 3	3.55

Mean Responses

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



	A5
Wave 1	3.45
Wave 2	2.15
Wave 3	3.43

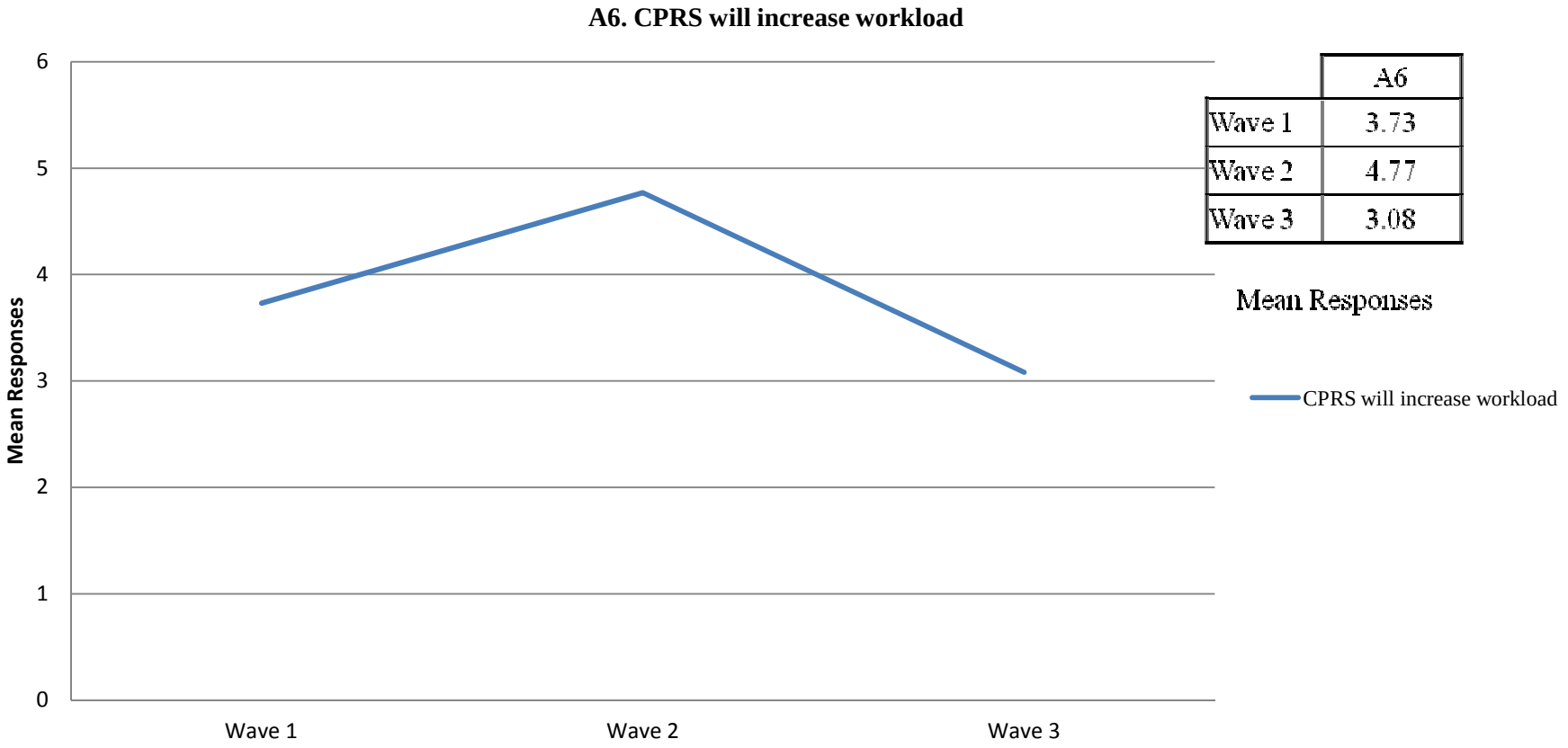
Mean Responses

CPRS will optimize patient safety

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

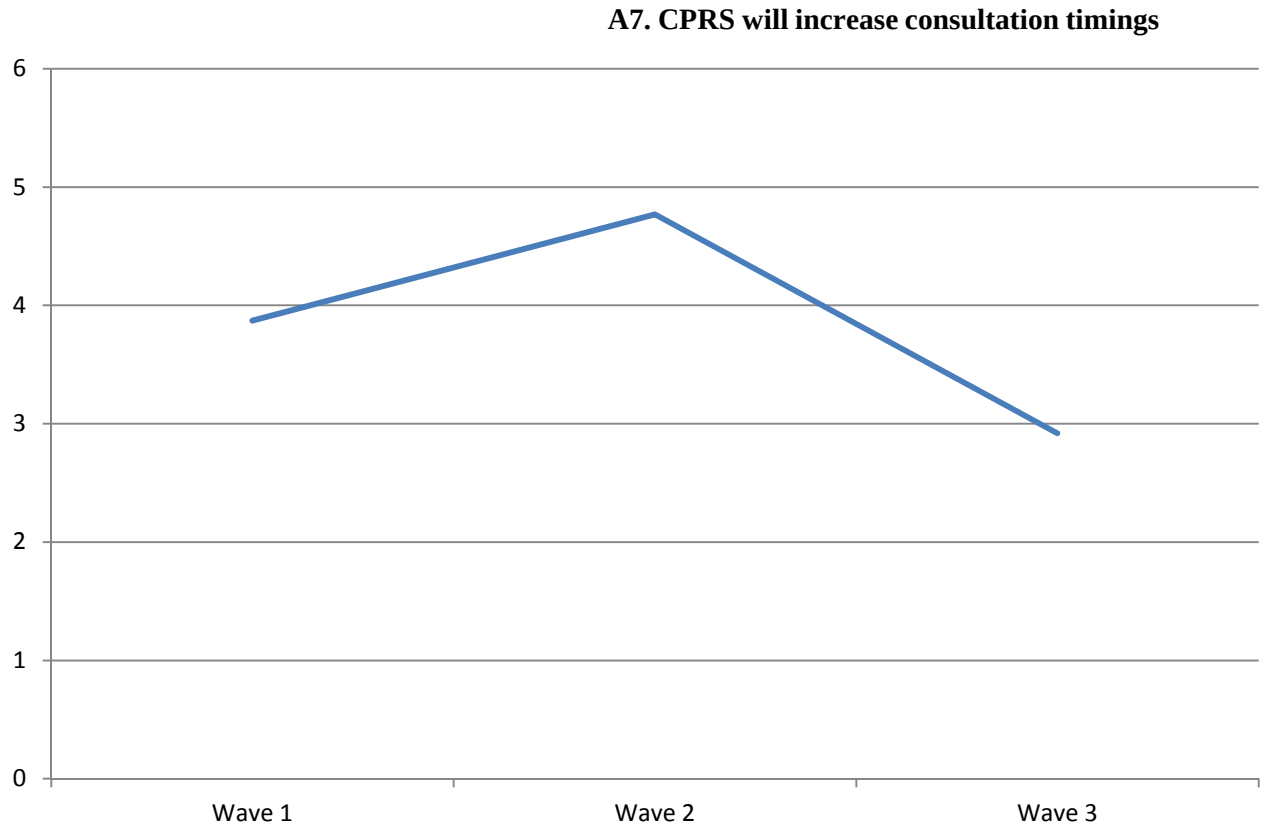
Mean Scores Comparison:



To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



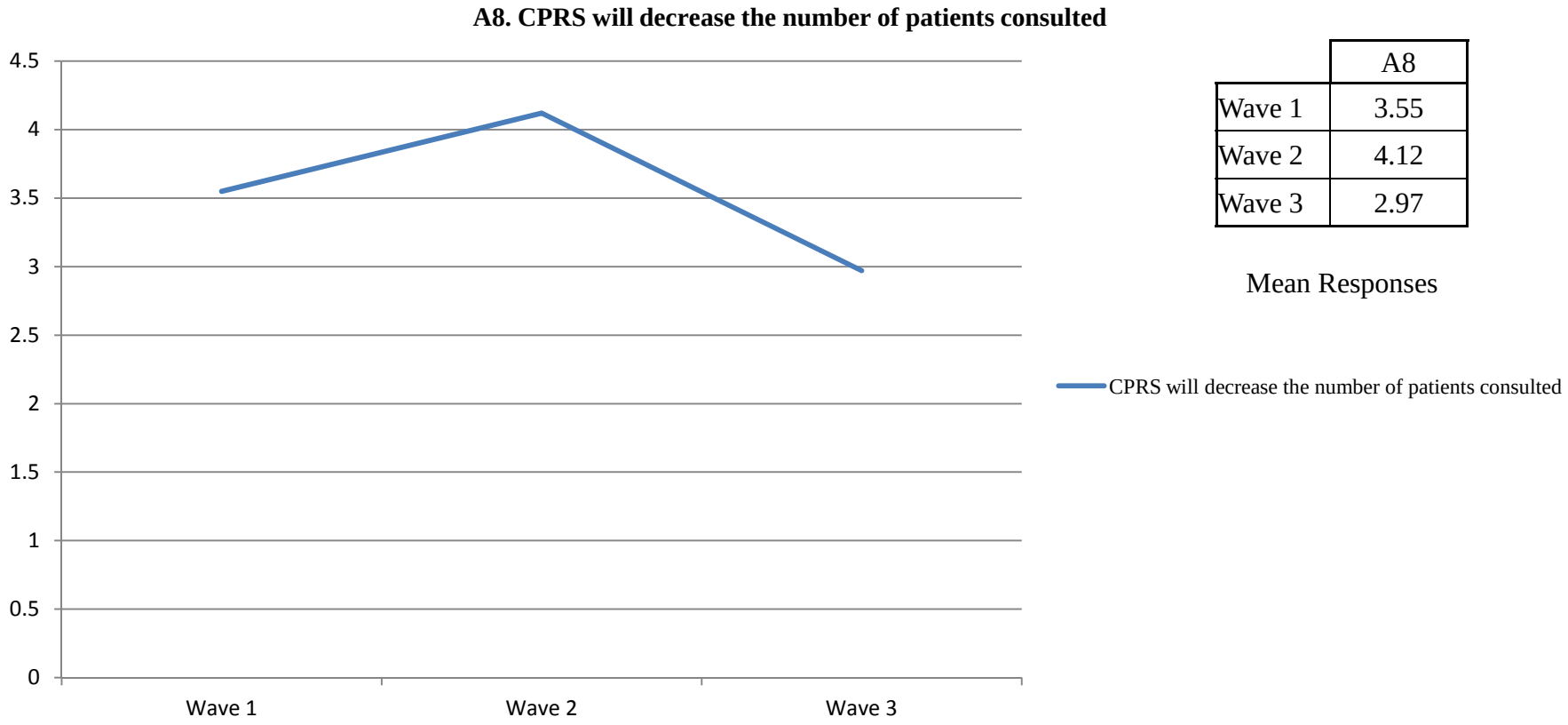
	A7
Wave 1	3.87
Wave 2	4.77
Wave 3	2.92

Mean Responses

CPRS will increase consultation timings

Results & Analyses *continued…..*

Mean Scores Comparison:

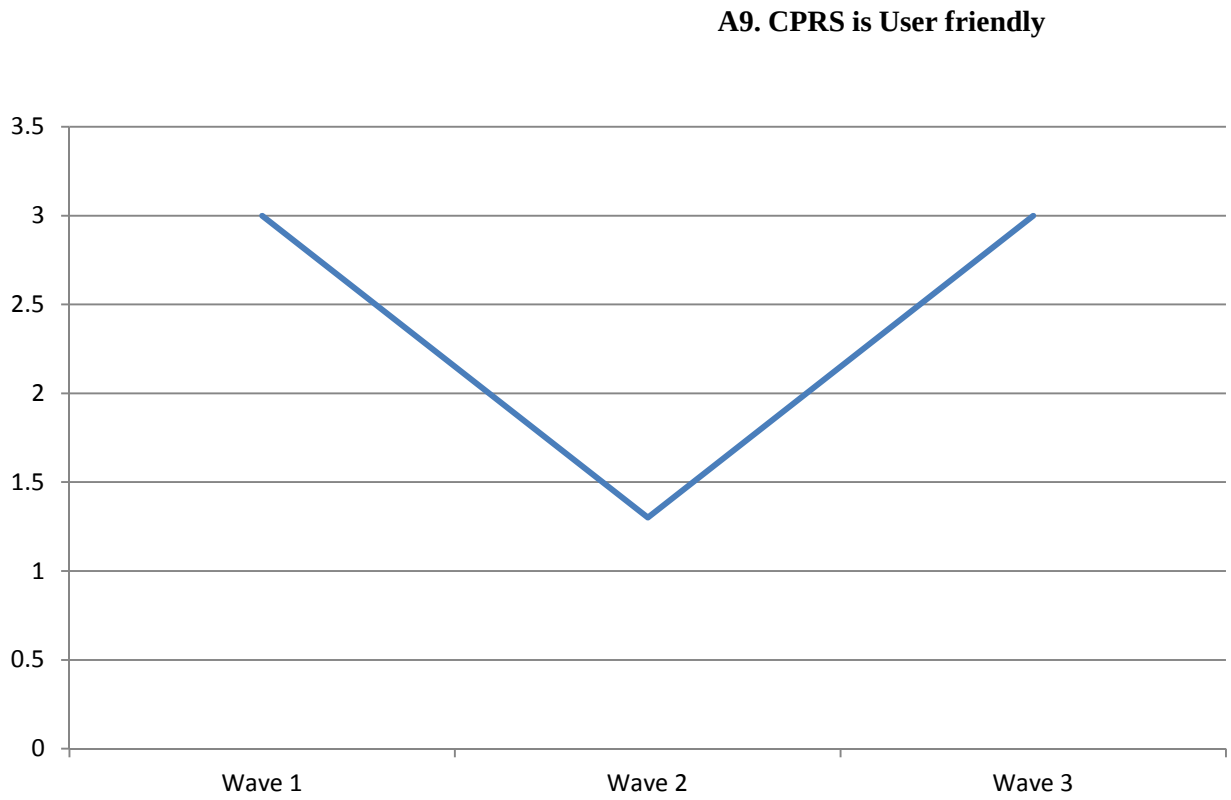


	A8
Wave 1	3.55
Wave 2	4.12
Wave 3	2.97

Mean Responses

Results & Analyses *continued…..*

Mean Scores Comparison:



	A9
Wave 1	3
Wave 2	1.3
Wave 3	3

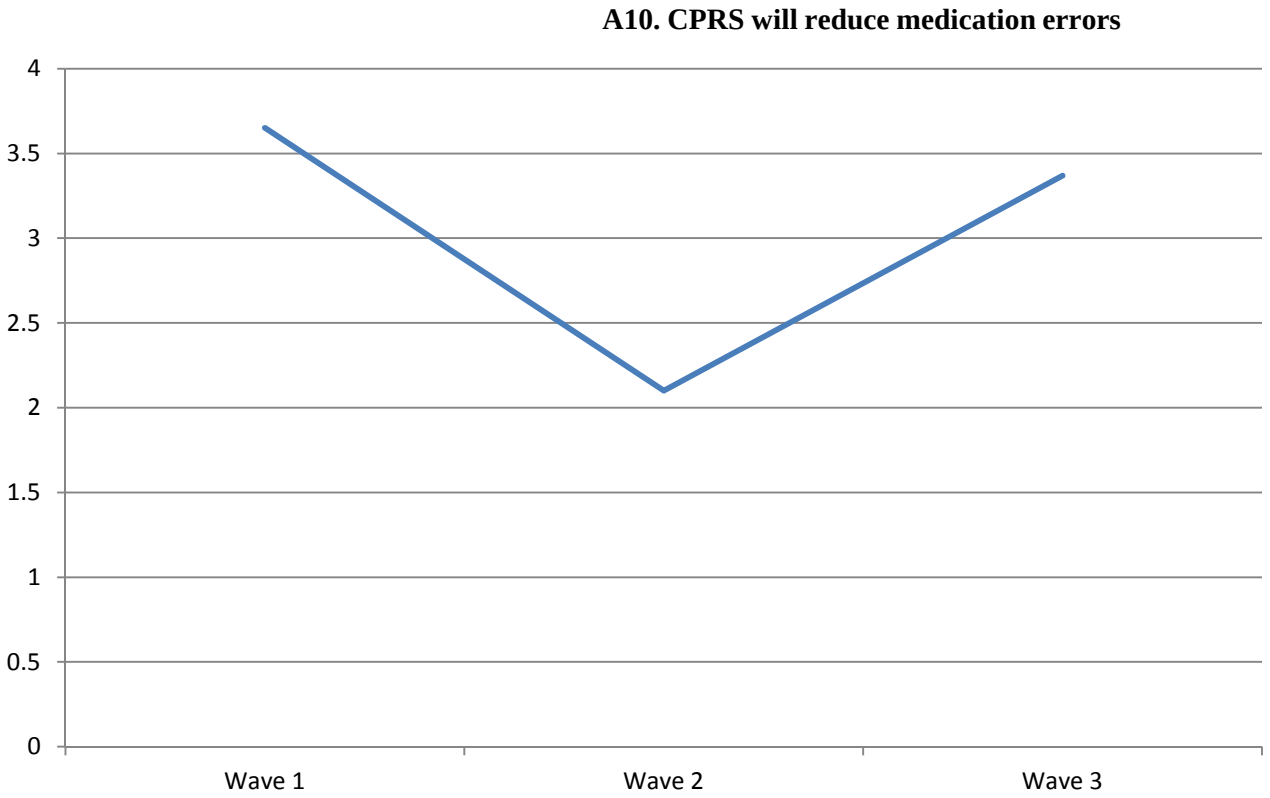
Mean Responses

CPRS is Userfriendly

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



	A10
Wave 1	3.65
Wave 2	2.1
Wave 3	3.37

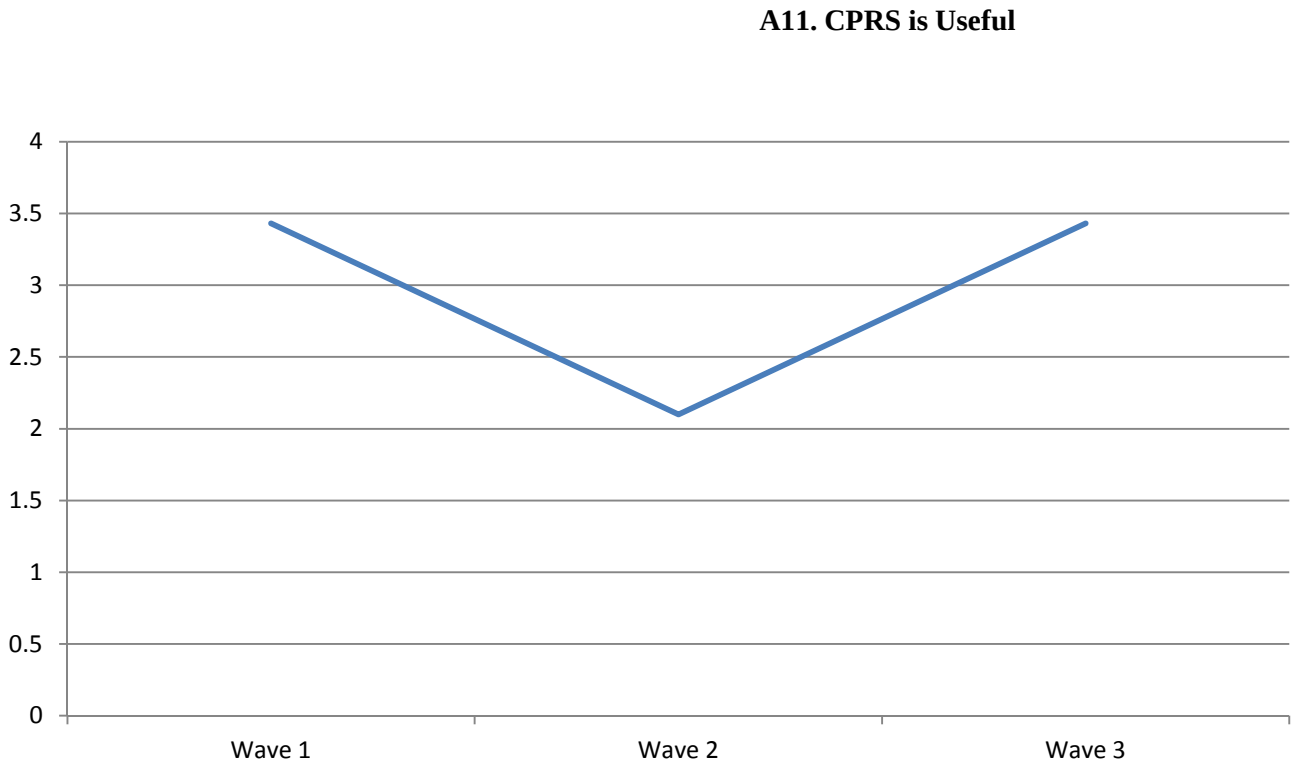
Mean Responses

CPRS will reduce medication errors

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



	A11
Wave 1	3.43
Wave 2	2.1
Wave 3	3.43

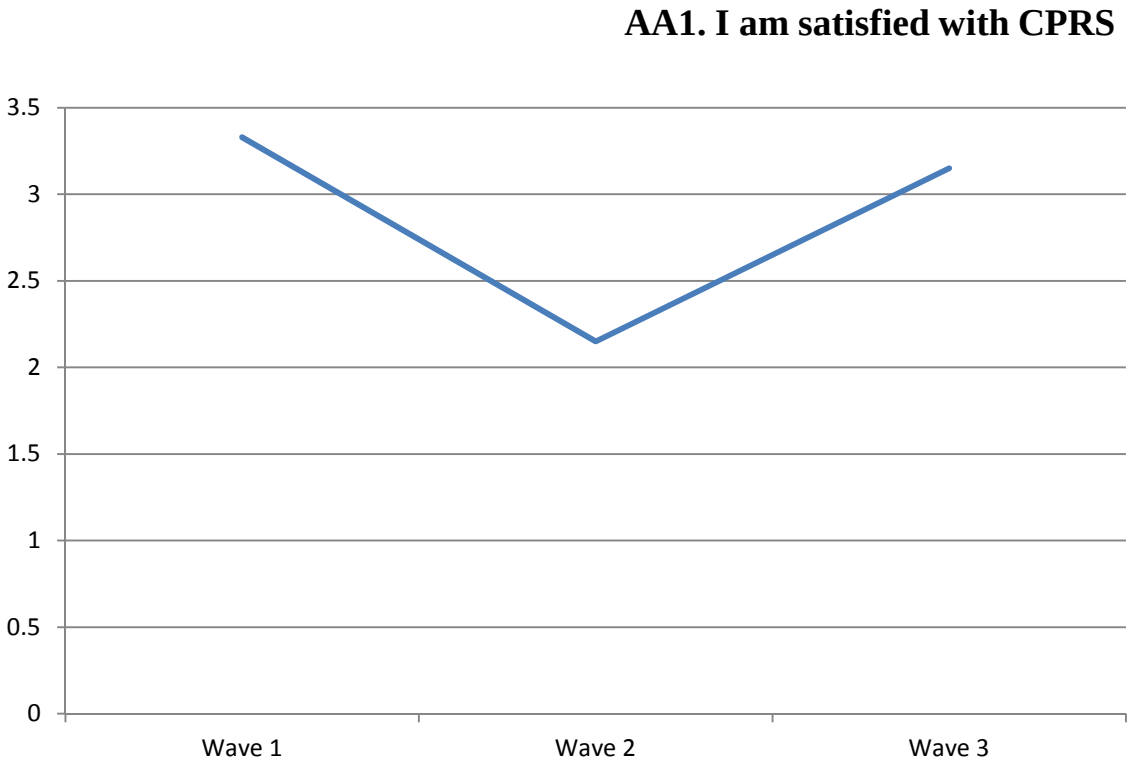
Mean Responses

CPRS is Useful

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



	AA1
Wave 1	3.33
Wave 2	2.15
Wave 3	3.15

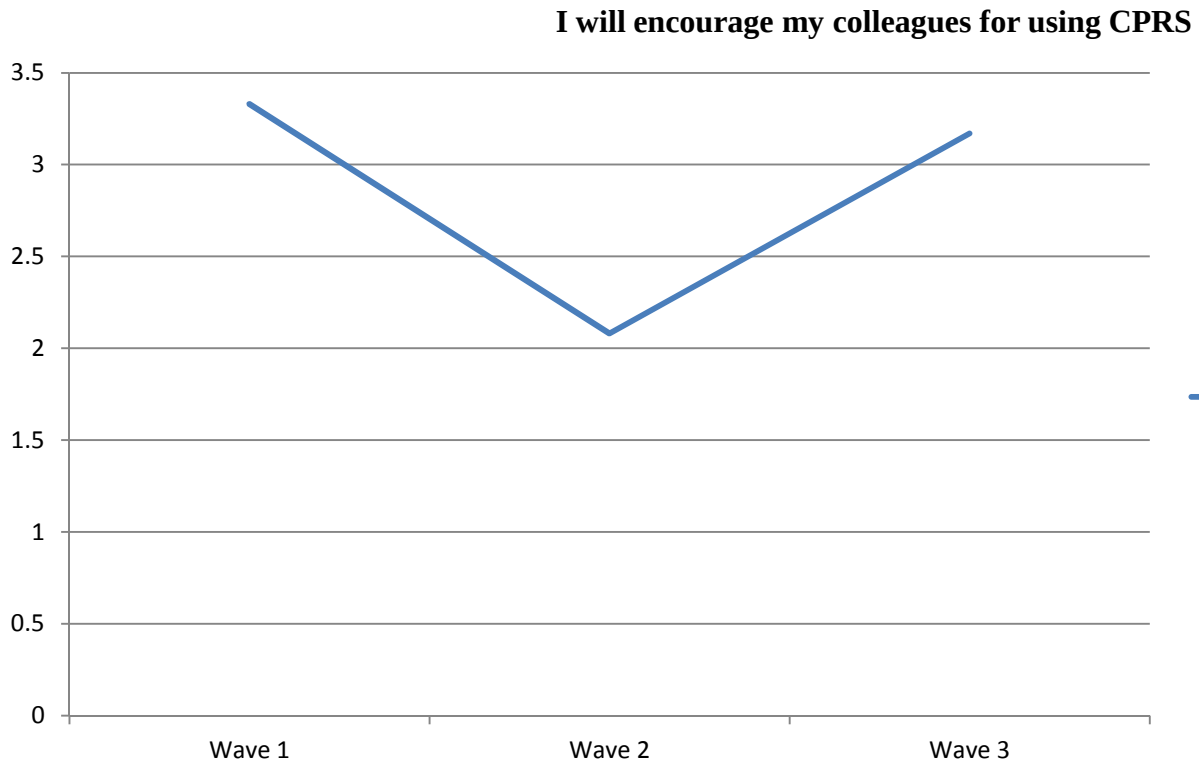
Mean Responses

I am satisfied with CPRS

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



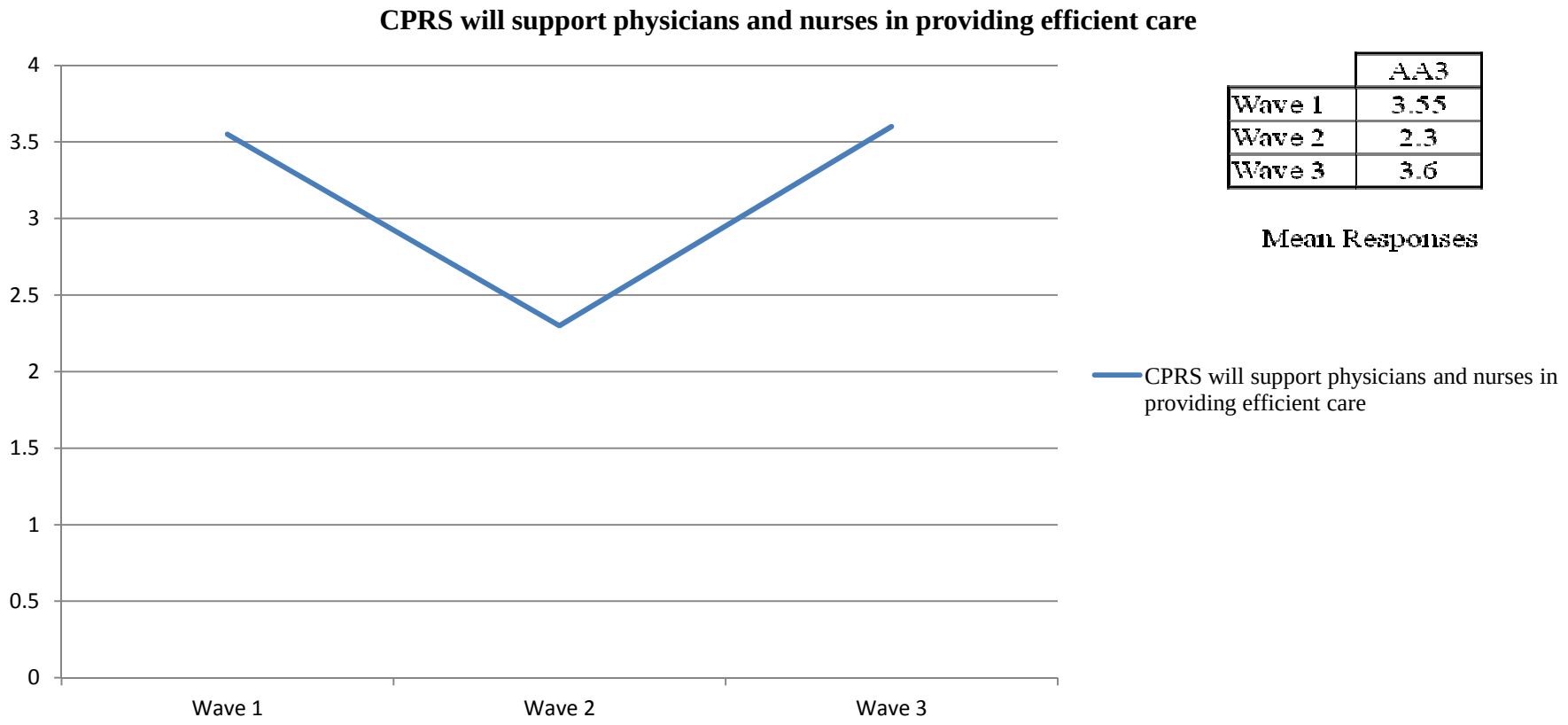
	AA2
Wave 1	3.33
Wave 2	2.08
Wave 3	3.17

Mean Responses

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



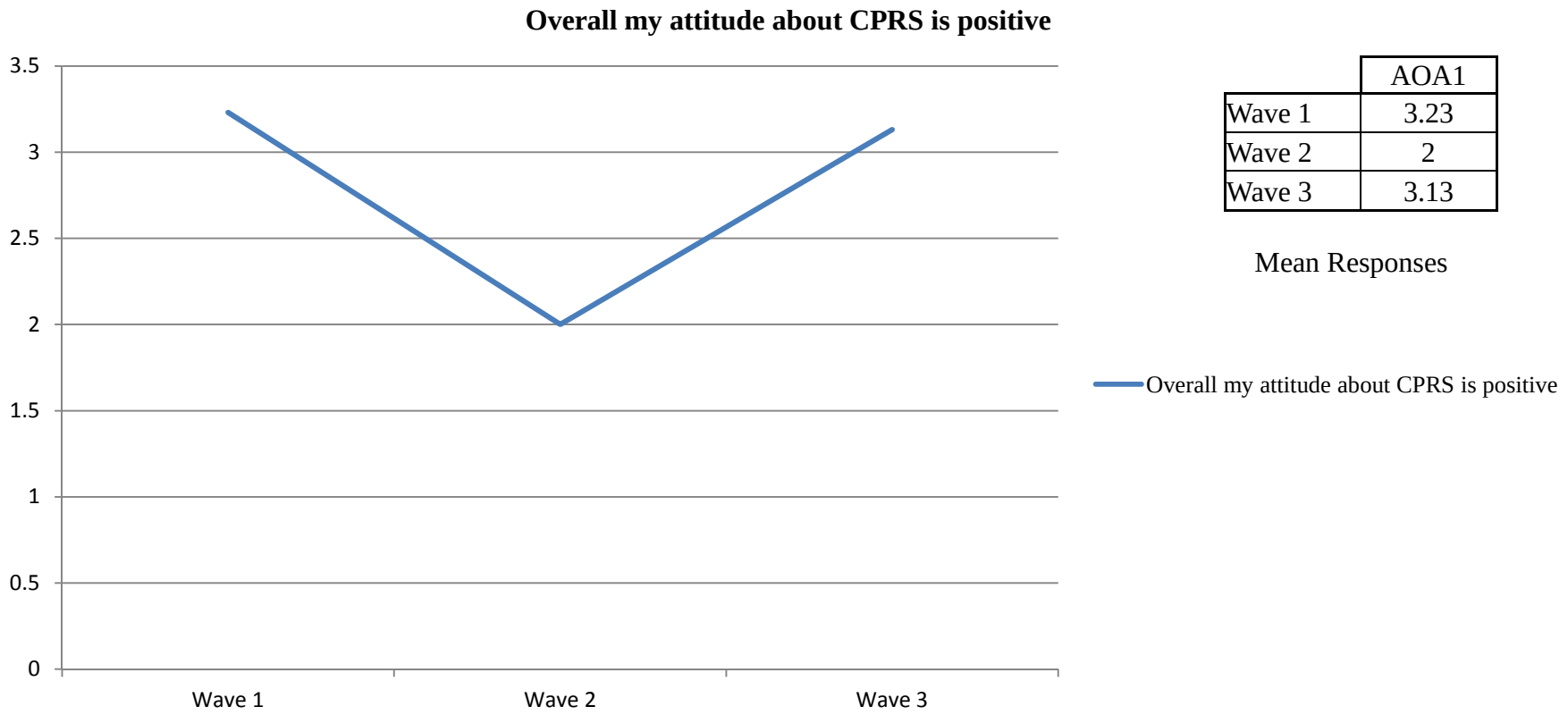
	AA3
Wave 1	3.55
Wave 2	2.3
Wave 3	3.6

Mean Responses

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Mean Scores Comparison:



	AOA1
Wave 1	3.23
Wave 2	2
Wave 3	3.13

Mean Responses

To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

Factor Analysis Results:

SPSS Codes	Factor	No. of Items	Factor Item Codes	% Variance	Cumulative %
	Wave 1				
AUse	Perception about Usefulness	5	A2,A3,A4,A5,A10	68.339	68.339
AEoU	Perception about Ease of Use	2	A9,A11	75.983	75.983
ATime	Time	2	A6,A7	72.659	72.659
AATT	Attitude	3	AA1,AA2,AA3	81.583	81.583
	Wave 2				
BUse	Perception about Usefulness	5	B2,B3,B4,B5,B10	87.766	87.766
BEoU	Perception about Ease of Use	2	B9,B11	94.307	94.307
BTime	Time	2	B6,B7	100.00	100.00
BATT	Attitude	3	BA1,BA2,BA3	95.129	95.129
	Wave 3				
CUse	Perception about Usefulness	5	C2,C3,C4,C5,C10	56.688	56.688
CEoU	Perception about Ease of Use	2	C9,C11	76.19	76.19
CTime	Time	2	C6,C7	85.309	85.309
CATT	Attitude	3	CA1,CA2,CA3	74.462	74.462

Results & Analyses *continued…..*

Component Values – Factor Analysis- Wave 1:

Wave 1	**Perception about Usefulness**	
A2	CPRS will reduce the patient record retrieval time	0.774
A3	New system will decrease gap betwen different stake holders	0.89
A4	New System will increase coordination between different stake holders	0.895
A5	CPRS will optimize patient safety	0.768
A10	CPRS will reduce medication errors	0.797
	Perception about Ease of Use	
A9	CPRS is Userfriendly	0.872
A11	CPRS is Useful	0.872
	Time	
A6	CPRS will increase workload	0.852
A7	CPRS will increase consultation timings	0.852
	Attitude	
AA1	I am satisfied with CPRS	0.934
AA2	I will encourage my colleagues for using CPRS	0.928
AA3	CPRS will support physicians and nurses in providing efficient care	0.844

Results & Analyses *continued…..*

Component Values – Factor Analysis- Wave 2:

Wave 2	**Perception about Usefulness**	
B2	CPRS has reduced patient record retrieval time	0.93
B3	New system has decreased the gap between different stake holders	0.969
B4	New system has increased coordination between different stake holders	0.969
B5	CPRS has optimized patient safety	0.908
B10	CPRS has reduced medication errors	0.906
	Perception about Ease of Use	
B9	CPRS is userfriendly	0.971
B11	CPRS is useful	0.971
	Time	
B6	CPRS has increased workload	1.000
B7	CPRS has increased consultation timings	1.000
	Attitude	
BA1	I am satisfied with CPRS	0.985
BA2	I encourage my colleagues for using CPRS	0.974
BA3	CPRS supports physicians and nurses in providing efficient care	0.967

Results & Analyses *continued…..*

Component Values – Factor Analysis- Wave 3:

Wave 3	**Perception about Usefulness**	
C2	CPRS has reduced patient record retrieval time	0.467
C3	New system has decreased the gap between different stake holders	0.906
C4	New system has increased coordination between different stake holders	0.885
C5	CPRS has optimized patient safety	0.764
C10	CPRS has reduced medication errors	0.654
	Perception about Ease of Use	
C9	CPRS is userfriendly	0.873
C11	CPRS is useful	0.873
	Time	
C6	CPRS has increased workload	0.924
C7	CPRS has increased consultation timings	0.924
	Attitude	
CA1	I am satisfied with CPRS	0.89
CA2	I encourage my colleagues for using CPRS	0.869
CA3	CPRS supports physicians and nurses in providing efficient care	0.829

Results & Analyses *continued…..*

Reliability Test Results:

S. No.	Factor	Chronbach's Alpha	No. of items
	Wave 1		
1	Perception about Usefulness	0.879	5
2	Perception about Ease of Use	0.684	2
3	Time	0.619	2
4	Attitude	0.886	3
	Wave 2		
1	Perception about Usefulness	0.958	5
2	Perception about Ease of Use	0.841	2
3	Time	1.000	2
4	Attitude	0.972	3
	Wave 3		
1	Perception about Usefulness	0.797	5
2	Perception about Ease of Use	0.687	2
3	Time	0.825	2
4	Attitude	0.813	3

Results & Analyses *continued…..*

Hypothesis Testing:

H1: Perceived usefulness will influence physician acceptance of electronic health records.

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.233	33	.371	2.142	.024
Within Groups	4.500	26	.173		

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	43.799	9	4.867	23.854	.000
Within Groups	10.201	50	.204		
Total	54.000	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.243	30	.308	1.570	.114
Within Groups	5.690	29	.196		
Total	14.933	59			

Results & Analyses *continued…..*

Hypothesis Testing:

H1: Perceived usefulness will influence physician acceptance of electronic health records.

- **The hypothesis is significant and Hypothesis is accepted for Wave 1 and Wave 2 , Rejected for Wave 3.**

- From this we can infer that acceptance of EHR is influenced by perceived usefulness in initial days of implementation but over a period of time perception about usefulness is not dependent.

Results & Analyses *continued…..*

Hypothesis Testing:

H2: Perceived ease of use will influence physician acceptance of electronic health records.

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.912	13	.455	1.933	.051
Within Groups	10.822	46	.235		
Total	16.733	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	39.829	3	13.276	52.465	.000
Within Groups	14.171	56	.253		

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.838	8	.730	4.092	.001
Within Groups	9.095	51	.178		
Total	14.933	59			

Results & Analyses *continued…..*

Hypothesis Testing:

H2: Perceived ease of use will influence physician acceptance of electronic health records.

- **The hypothesis is significant and Hypothesis is accepted for Wave 2 and Wave 3 , rejected for Wave 1.**

- We can infer that physicians realize that EHR is easy to use after using it over a period of time and on usage of application this will influence acceptance of EHR. After training the physician's felt that it’s not user friendly and system is difficult to use**.**

Results & Analyses *continued…..*

Hypothesis Testing:

H3: Acceptance of electronic health records is dependent on satisfaction of patients

Wave 1 : Pre implementation. Patient satisfaction question was not included

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	29.891	2	14.946	35.336	.000
Within Groups	24.109	57	.423		
Total	54.000	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.307	3	.769	3.411	.024
Within Groups	12.626	56	.225		
Total	14.933	59			

Results & Analyses *continued…..*

Hypothesis Testing:

H3: Acceptance of electronic health records is dependent on satisfaction of patients

- **The hypothesis is significant and Hypothesis is accepted for Wave 2 and Wave 3 .**

- Acceptance of EHRs is dependent on satisfaction of patients. The hypothesis is proved in both the waves. This means that satisfaction of patients will influence acceptance of EHR.

Results & Analyses *continued…..*

Hypothesis Testing:

H4: Acceptance of electronic health records is dependent on workload

Wave 1 : Reliability Test value was poor.

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.679	2	8.840	13.872	.000
Within Groups	36.321	57	.637		
Total	54.000	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.276	10	.328	1.377	.219
Within Groups	11.657	49	.238		
Total	14.933	59			

Results & Analyses *continued…..*

Hypothesis Testing:

H4: Workload caused by electronic health records will influence acceptance

- **The hypothesis is significant and Hypothesis is accepted for Wave 2 . In wave 3 Hypothesis is Rejected**

- Acceptance of EHRs is dependent on time/ workload. The hypothesis is proved in Wave 2. This means that workload caused by EHR will influence acceptance of EHR.
- Wave 3 tells that workload doesn't have much influence on acceptance of EHR as time passes.

Results & Analyses *continued…..*

Hypothesis Testing:

H5: Acceptance of electronic health records is dependent on qualification of the user

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.195	2	.097	.335	.716
Within Groups	16.539	57	.290		
Total	16.733	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.000	2	.000	.000	1.000
Within Groups	54.000	57	.947		
Total	54.000	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.268	2	.134	.522	.596
Within Groups	14.665	57	.257		
Total	14.933	59			

Results & Analyses *continued…..*

Hypothesis Testing:

H5: Acceptance of electronic health records is dependent on highest qualification

- **The hypothesis is not significant and Hypothesis is Rejected for all the three Waves.**

- Acceptance of EHRs is not dependent on Highest Qualification of Physician.

Results & Analyses *continued…..*

Hypothesis Testing:

H6: Acceptance of electronic health records is dependent on the age of the physician

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.482	2	.241	.845	.435
Within Groups	16.251	57	.285		
Total	16.733	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.335	2	1.667	1.876	.163
Within Groups	50.665	57	.889		
Total	54.000	59			

ANOVA

Overall my attitude about CPRS is positive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.422	2	.211	.828	.442
Within Groups	14.512	57	.255		
Total	14.933	59			

Results & Analyses *continued…..*

Hypothesis Testing:

H6: Acceptance of electronic health records is dependent on the age of the physician

- **The hypothesis is not significant and Hypothesis is Rejected for all the three Waves.**

- Acceptance of EHRs is not dependent on age of Physician.

Results & Analyses *continued…..*

Hypothesis Testing:

	Hypothesis	Wave 1	Wave 2	Wave 3
H1	**Perceived usefulness will influence physician acceptance of electronic health records**	**Accepted**	**Accepted**	**Rejected**
H2	**Perceived ease of use will influence physician acceptance of electronic health records**	**Rejected**	**Accepted**	**Accepted**
H3	**Acceptance of electronic health records is dependent on satisfaction of patients**	**NA**	**Accepted**	**Accepted**
H4	**Workload caused by electronic health records will influence acceptance**	**NA**	**Accepted**	**Rejected**
H5	**Acceptance of electronic health records is dependent on highest qualification**	**Rejected**	**Rejected**	**Rejected**
H6	**Acceptance of electronic health records is dependent on the age of the physician**	**Rejected**	**Rejected**	**Rejected**

Results & Analyses *continued…..*

Correlation Analysis:

Wave 1

	Usefulness	Ease of Use	Workload	Attitude	Overall
Perception Usefulness	1	**.664****	-0.052	**.749****	**.591****
Perception Ease of Use	.664**	1	-0.238	**.488****	**.346****
Perception Time/ Workload	-0.052	-0.238	1	0.201	0.021
Attitude	.749**	.488**	0.201	1	**.738****
Overall CPRS is positive	.591**	.346**	0.021	.738**	1

Results & Analyses *continued…..*

Correlation Analysis:

Wave 2

	Usefulness	Ease of Use	Workload	Attitude	Overall
Perception Usefulness	1	**.841****	-0.626	**.841****	**.821****
Perception Ease of Use	.841**	1	-0.68	**.796****	**.763****
Perception Time/ Workload	-0.626	-0.68	1	-0.524	-0.496
Attitude	.841**	.796**	-0.524	1	**.946****
Overall CPRS is positive	.821**	.763**	-0.496	.946**	1

Results & Analyses *continued…..*

Correlation Analysis:

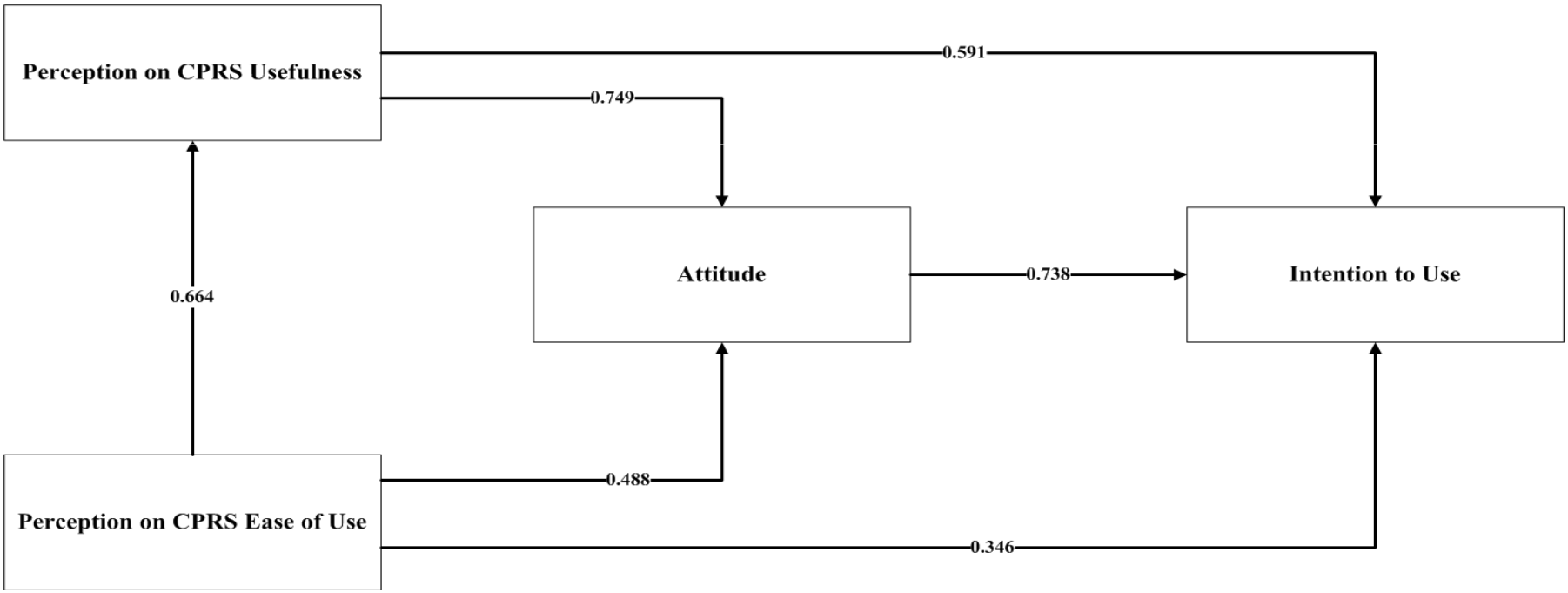
Wave 3

	Usefulness	Ease of Use	Workload	Attitude	Overall
Perception Usefulness	1	**.530****	-0.334	**.444****	**.515****
Perception Ease of Use	.530**	1	-0.287	**.431****	**.469****
Perception Time/ Workload	-0.334	-0.287	1	0.005	-0.82
Attitude	.444**	.431**	0.005	1	**.731****
Overall CPRS is positive	.515**	.469**	-0.82	.731**	1

Results & Analyses *continued…..*

Pre Go Live Correlation :

Wave 1

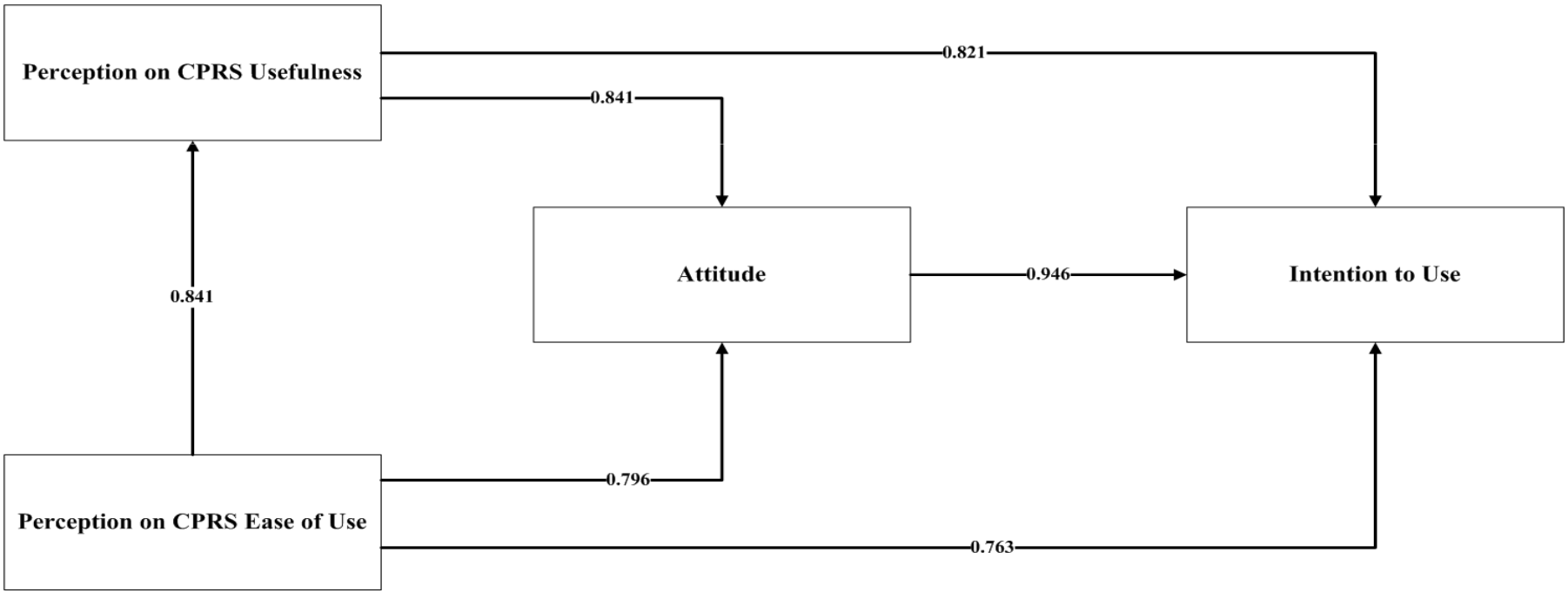


To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

90 Days Post Go Live:

Wave 2

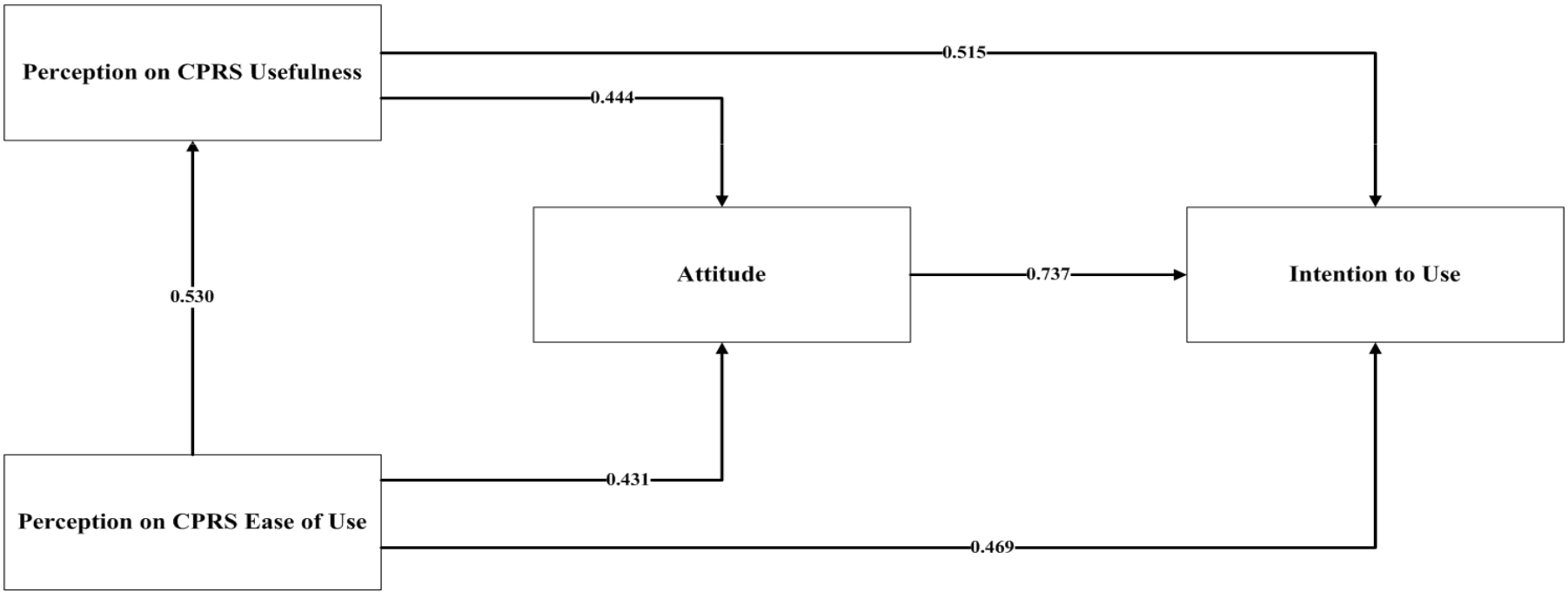


To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Results & Analyses *continued…..*

180 Days Post Go Live:

Wave 3



To Study the change in Physician's perception about Electronic Health records on its usage over a period of time

Conclusion

- There is a strong correlation between Perception about usefulness and ease of use on attitude of the user in the early days of implementation.
- There is a strong correlation between Perception about usefulness and ease of use on acceptance of the EHR by user in the early days of implementation.
- There is a strong correlation between attitude of the user and acceptance.
- There is no correlation between the acceptance of EHR and workload caused by it.

Lessons Learned

- Lack of communication about vision & benefits creates ambiguity in the minds of users.
- Success of Implementation is directly related to end user interest and commitment.
- Workflow changes/ clinical transformation is difficult in established locations.
- According to physicians more time is consumed in making records in the system.
- Lack of infrastructure makes the users irritated.

Recommendations

Recommendation 1

•When the users are called for the training sessions, the very first thing they need to be communicated is the Vision in detail (Communicating the Vision).

•After that they need to be given a brief overview of the complete system by communicating them about all the different modules in that system.

•They need to be made aware of the benefits of the complete system.

•The entire change in work flows can be demonstrated during the training sessions and also reinforced with in the mind of the users. This will help to avoid confusion during Go- live.

•Proper and systematic training should be given to all users & stakeholders

Recommendations *continued…..*

Recommendation 2

•There should be a strong leadership in pharmacy which keeps a check that the pick list is being delivered at the scheduled time to the wards.

Recommendations *continued…..*

Recommendation 3

•Identifying Super Users/ Trainers

•Choose the person who is having good communication & leadership skills, sound computer knowledge and work processes. As the success of implementation depends on training, these criteria's should be followed

•Super user & End user training

•There should be a systematic training for both the users.

•After a detailed theory session, they can be shown with the live scenarios.

•Hands on practice can be done along with theory sessions.

•But after the entire theory sessions few practical session should be there, in which the user will enter the patient records into the system systematically.

Recommendations *continued…..*

Recommendation 4

•When the users are called for the training sessions, the very first thing they need to be communicated is the Vision in detail (Communicating the Vision).

•After that they need to be given a brief overview of the complete system by communicating them about all the different modules in that system.

•They need to be made aware of the benefits of the complete system.

•The entire change in work flows can be demonstrated during the training sessions and also reinforced with in the mind of the users. This will help to avoid confusion during Go- live.

•Proper and systematic training should be given to all users & stakeholders

Recommendations *continued…..*

Recommendation 5

•All the Super users & End users can be provided with the suitable training materials and quick reference guides which should contain step by step process of operating the system.

•They can be provided with the animated presentations. The users can refer to these documents whenever they forget any step while operating the system. This will be of great help to them and feel comfortable in using the system.

Limitations

•Getting responses from the physicians were difficult.

•The Post go Live was only 6 months Back. Time frame between Wave 1 and Wave 2 is just 3 months.

• Sample size less as compared to targeted sample for the study (100 samples were targeted, but for analysis purpose only 60 were used).

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References

•Afreen F. *To Analyze the Scope and Acceptance of Electronic Medical Records among doctors in India*. A study in Institute of Management Studies [Thesis]. Ghaziabad, 2011.

•Aldosari, B. *Factors affecting physicians' attitudes about the medical information system usage and acceptance through the mandated implementation of integrated medical information system at the Saudi Arabia National Guard Health System, a modified technology acceptance model [Thesis]*. Publication No. ATT 30976022003,2003.

•Anderson J. G, Aydin C. E. & Jay S. J. *Evaluating health care information systems: Methods and applications*,1994, 69-115.

•Anderson, J. G. *Clearing the way for physicians' use of clinical information systems*. Communications of the ACM, 1997, 40(8):83-90.

•Ash, J. S. & Bates, D. W. *Factors and Forces Affecting EHR System Adoption: Report of a 2004 ACMI Discussion*. Journal of the American Medical Informatics Association, 2005, 12(1):8-12.

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