Statewide Study on Meaningful Use-based Nurses' Experience Using the Electronic Health Record

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Objectives

1. Describe the key components influencing the nurses' experiences using their EHRs.
2. Critique findings of a statewide analysis of nurses' experiences using their EHRs.
3. Apply recommendations for improvement of the nurses' experiences to case study example

1. Provide an update on the Texas Initiative by sharing strategies about the statewide activities

- History
- Charges
- Survey Results

TNA/TONE Health IT Task Force

- Charge: Determine implications of health care informatics for nursing practice and education in Texas
- Include nationally-based Technology Informatics Guiding Education Reform (TIGER) initiative

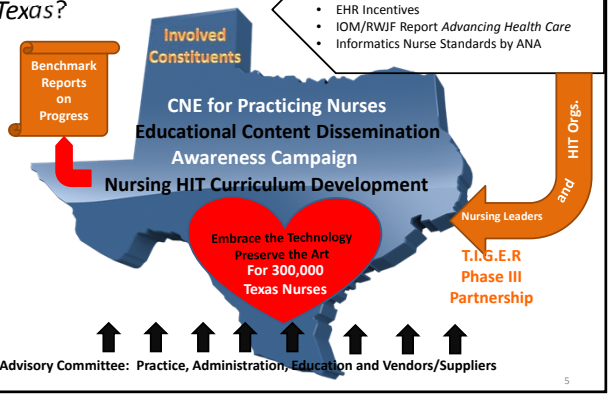
Vision: To enable nurses and interprofessional colleagues to use informatics and emerging technologies to make healthcare safer, more effective, efficient, patient-centered, timely and equitable by interweaving evidence and technology seamlessly into practice, education and research fostering a learning healthcare system.

TNA = Texas Nurses Association
TONE = Texas Organization of Nurse Executives

http://www.thetigerinitiative.org/

Why Does HIT Matter *Deep in the Heart of Texas?*

Environmental Forces:
- Health Care Reform/ARRA
- Advanced Practice Nurse Roles
- EHR Incentives
- IOM/RWJF Report *Advancing Health Care*
- Informatics Nurse Standards by ANA



Advisory Committee: Practice, Administration, Education and Vendors/Suppliers

HIT Taskforce Membership

Composed of TNA and TONE Member from practice and academia

Task Force Members
- Julie Brixey
- Nancy Crider (co-chair)
- Mary Anne Hanley
- Susan McBride (PI)
- Cynthia Plonien
- Elizabeth Sjoberg
- Laura Thomas
- Mari Tietze (co-chair)

TNA
- Cindy Zolnierek [pres./coPI]
- Laura Lerma [educ.]
- Kat Hinson [comm.]
- Ellen Martin [practice]
-]

Web site

http://www.texasnurses.org/?page=HIT

Final Report Available

Charge 1: Survey/Benchmark

Clinical Information Systems Implementation Evaluation Scale (CISIES) Survey*

1) Launched early 2015, statewide
2) Over sampled rural hospitals in an effort to insure representation
3) To date over 1,000 responses received
4) Included a newly-developed** EHR "maturity-index"
5) Preliminary results to follow

* = Gugerty, B.

** = McBride & Tietze

Charge 2: Publication/Commun./Network

1) Support the tool kit content/survey
2) Establish/support local nursing informatics chapters –
   DFW ANIA
   Gulf Coast ANIA
3) Coordinate publication schedule with TNA communications staff
4) Contributed to *Ebola Outbreak* awareness campaign

Charge 3: Toolkit

Content for toolkit
1) Use CISIES survey responses to guide toolkit content
2) Create and place on TNA and TONE Web sites

Two CNE Webinars are being proposed based on trends in the industry:
1) "Workflow versus Work-Arounds to Optimize EHR Patient Safety and Quality."
2) "Interoperability of Electronic Health Records."

Charge 4: Policy/Legislation

Renew the 2010 resolution and add the following content:
1) Interoperability
2) Meaningful Use
3) Interprofessional Education/Collaboration
4) TIGER competencies initiative

TNA-TONE Statewide Study Examining Nurses Use of EHRs

Analysis of Findings

Research Questions

- What are key issues with the current deployment of the electronic health record in the practice setting?
  - What is the relationship between health setting characteristics and the nurses' perceptions of their CIS/EHR?
  - What is the relationship between the nurses' characteristics and the nurses' perceptions of their CIS/EHR?
  - What is the relationship between CIS characteristics and the nurses' perceptions of their CIS/EHR?
- What are the related core HIT competencies that could be covered in nursing education?

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Research Design

- A descriptive and exploratory research study of the current nursing workforce in Texas, using a previously validated survey instrument.
- Conducted in select acute care facilities and their associated acute care, ambulatory/episodic care and long term care (LTC) units (Texas Workforce Center) , collectively "Health Care Organization" to answer the research questions.

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Statistical Plan Overview

Table 4 Research Questions and Associated Statistical Analysis

Questions/Hypotheses	Independent Variable (IV)	IV Level of Data	Dependent Variable (DV)	DV Level of Data	Covariate(s) if any, Level of Data	Operational Definitions	Statistical Test	Power Analysis
1. What are key issues with the current deployment of the electronic health record in the practice setting?								
1.a. What is the relationship between hospital characteristics and the nurses' perceptions of their CIS?	region (6), bed size (5), type (6), Magnet status (2)	Nominal and ordinal [categorical]	CISES score total and 7 PCA sub-scores (8)	Ratio [continuous]	CISES Demographic, Q7 a. Ordinal[categorical]	CISES-Demographic, Q 1.a, 1.b, 1.c, 1.d. CISES total scores on 37 items	Multiple regression analysis)	Power = .80 Alpha = .05 Effect size = .02 small A Priori sample size = 1,000
1.b. What is the relationship between the nurses' characteristics and the nurses' perceptions of their CIS?	employment years (5), employment status (4), level of computer expertise (4), age (6)	Nominal and ordinal [categorical]	CISES score total and 7 PCA sub-scores (8)	Ratio [continuous]	Current level of expertise with computers (CISES-Demographic, Q7) [ordinal]	CISES-Demographic, Q 1, 2, 3, 10, 10.a. CISES-PCA total scores on 37items	Multiple regression analysis	Power = .80 Alpha = .05 Effect size = .02 A Priori sample size = 1,000
1.c. What is the relationship between CIS characteristics and the nurses' perceptions of the CIS	Individual CIS characteristics	Ordinal [categorical]	CISES score total and 7 PCA sub-scores	Ratio [continuous]		CISES item score CISES-PCA	Exploratory Analysis	Power = .80 Alpha = .05 Effect size = .02

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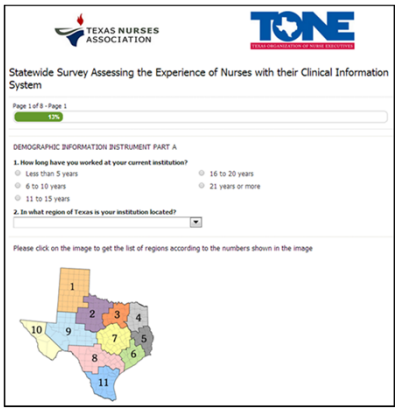
First page of the TNA/TONE state wide online survey



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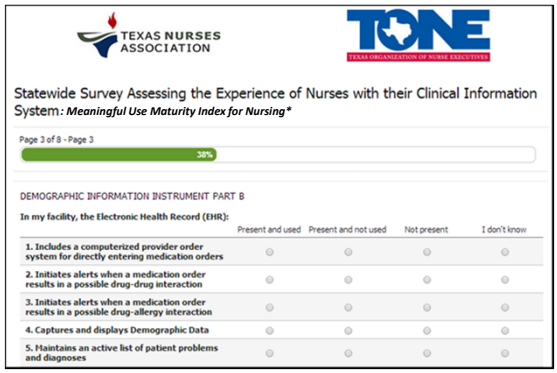
Demographic information about EHR functionality (5 of 24 items)



TEXAS NURSES ASSOCIATION

TONE
TEXAS ORGANIZATION OF NURSE EXECUTIVES

Statewide Survey Assessing the Experience of Nurses with their Clinical Information System: *Meaningful Use Maturity Index for Nursing**

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38%

DEMOGRAPHIC INFORMATION INSTRUMENT PART B

In my facility, the Electronic Health Record (EHR):

	Present and used	Present and not used	Not present	I don't know
1. Includes a computerized provider order system for directly entering medication orders	○	○	○	○
2. Initiates alerts when a medication order results in a possible drug-drug interaction	○	○	○	○
3. Initiates alerts when a medication order results in a possible drug-allergy interaction	○	○	○	○
4. Captures and displays Demographic Data	○	○	○	○
5. Maintains an active list of patient problems and diagnoses	○	○	○	○

(*McBride & Tietze, 2015)

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Clinical Information System Implementation Evaluation Scale

Please respond to the following questions:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
01. Overall, I prefer using the system than the old way of doing things	○	○	○	○	○	○
02. I can depend on the accuracy of the system	○	○	○	○	○	○
03. The training I received was adequate	○	○	○	○	○	○
04.I feel confident in my ability to assist others in using the system.	○	○	○	○	○	○
05. Adequate resources were available when I was learning to use the system	○	○	○	○	○	○
06. I feel the use of the system has improved the quality of patient care	○	○	○	○	○	○
07. The use of the system reduces errors	○	○	○	○	○	○
08. The system is more efficient than the old way of doing things	○	○	○	○	○	○
09. The system has improved my practice	○	○	○	○	○	○
10. The system allows me to spend more time on other aspects of patient care	○	○	○	○	○	○

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Response Trend and Demographics

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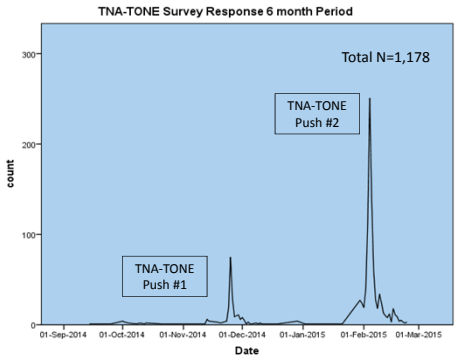
Study Responses Sept 2014-Feb 2015



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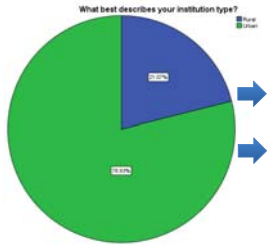
Rural and Urban Represented

What best describes your institution type?

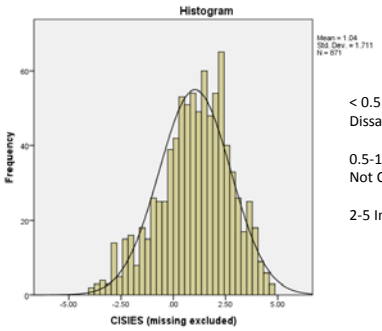
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rural	245	20.8	21.1	21.1
	Urban	918	77.9	78.9	100.0
	Total	1163	98.7	100.0	
Missing	System	15	1.3		
Total		1178	100.0		



Rural respondents were 52.7% acute care & 10.2% ambulatory

Urban respondents were 52.7% acute care & 11.5% ambulatory

CISIES Texas Findings



< 0.5 CISIES Indicates Dissatisfaction

0.5-1.99 Indicates Neutral or Not Completely Satisfied

2-5 Indicates Satisfied

Gugerty, B., Maranda, M., Rook, D. (2006). The Clinical Information System Implementations Evaluation Scale, pp. 621-625. In H. A. Parks, P. Murray, & C. Delaney (Eds.) *Consumer-centered computer-supported care for healthy people.* Landsdale, PA: IOS Press.

Statewide Study*

*Tietze, M. & McBride, S. 2015)

01. Includes a computerized provider order system for directly entering medication orders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Present and used	887	75.3	89.9	89.9
	Present and not used	30	2.5	3.0	92.9
	Not present	17	1.5	1.7	96.7
	I don't know	33	2.8	3.3	100.0
	Total	987	83.8	100.0	
Missing	System	191	16.2		
Total		1178	100.0		

02. Initiates alerts when a medication order results in a possible drug-drug interaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Present and used	684	58.1	69.4	69.4
	Present and not used	26	2.2	2.6	72.1
	Not present	106	9.0	10.8	82.8
	I don't know	169	14.3	17.2	100.0
	Total	985	83.6	100.0	
Missing	System	193	16.4		
Total		1178	100.0		

03. Initiates alerts when a medication order results in a possible drug-allergy interaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Present and used	714	60.6	72.5	72.5
	Present and not used	20	1.7	2.0	74.5
	Not present	91	7.7	9.2	83.8
	I don't know	160	13.6	16.2	100.0
	Total	985	83.6	100.0	
Missing	System	193	16.4		
Total		1178	100.0		

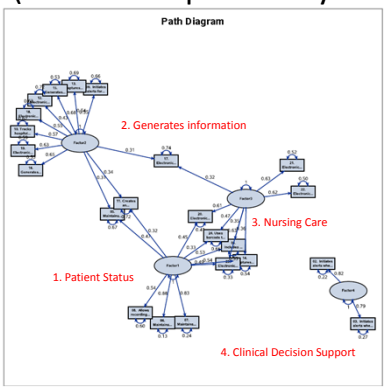
Meaningful Use Maturity Index for Nursing

Sample of 3 of the 24 Item scale aligned with Meaningful Use Stage 1 Measures
0.889 Cronbach's Alpha
Mean of 56.53 (SD 13.85)
Range 0 - 72

Content Validity using Lynn's (1986) method

Lynn, M.R. "Determination and Quantification of Content Validity." *Nursing Research* Vol. 35 No. 6 (1986)

MUNSI Factor Analysis (Variance explained by 4 Factors)



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Clinical Information System Implementation Evaluation Scale©

(Gugerty, B.)

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08. The system is more efficient than the old way of doing things

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	81	6.9	8.5	8.5
	Disagree	73	6.2	7.7	16.2
	Somewhat Disagree	99	8.4	10.4	26.7
	Somewhat Agree	224	19.0	23.6	50.3
	Agree	274	23.3	28.9	79.1
	Strongly Agree	198	16.8	20.9	100.0
	Total	949	80.6	100.0	
Missing	System	229	19.4		
Total		1178	100.0		

09. The system has improved my practice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	194	16.5	20.5	20.5
	Disagree	133	11.3	14.0	34.5
	Somewhat Disagree	149	12.6	15.7	50.2
	Somewhat Agree	168	14.3	17.7	67.9
	Agree	159	13.5	16.8	84.7
	Strongly Agree	145	12.3	15.3	100.0
	Total	948	80.5	100.0	
Missing	System	230	19.5		
Total		1178	100.0		

10. The system allows me to spend more time on other aspects of patient care

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	38	3.2	4.0	4.0
	Disagree	39	3.3	4.1	8.1
	Somewhat Disagree	56	4.8	5.9	14.0
	Somewhat Agree	197	16.7	20.7	34.7
	Agree	165	14.0	18.4	53.2
	Strongly Agree	255	21.6	26.8	100.0
	Total	950	80.6	100.0	
Missing	System	228	19.4		
Total		1178	100.0		

CISIES 37 Survey Questions
Cronbach's Alpha 0.881

49.8% Strongly agree or Agree That the system is more efficient than the old way of doing things

16.2% disagree or strongly disagree

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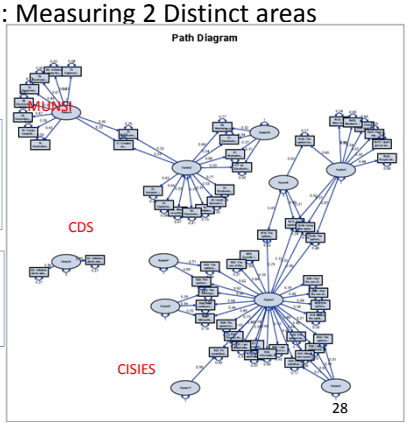
Varimax Rotation CISIES & EHR Path Diagram: Measuring 2 Distinct areas

When alerts ***are present*** for clinical decisions and standards nurses are 2.76 X more likely to be satisfied compared to nurses who indicate the functionality is not present (OR 2.758, 95% CI 1.666, 4.566)

Nurses are 2.8 X more likely to be satisfied when drug-drug and allergy alerts ***are not present*** (OR 2.815, 95% CI 1.591, 4.981 p<.001)



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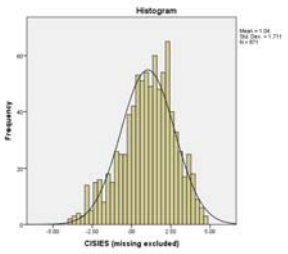
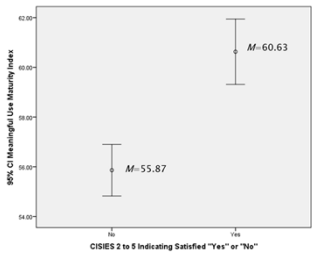
CISIES Distribution: How satisfied are nurses in Texas with EHRs?



< 0.5 CISIES Indicates Dissatisfaction
0.5-1.99 Indicates Neutral or Not Completely Satisfied
2-5 Indicates Satisfied

Differences in Satisfaction with EHRs related to MU maturity.



The MUMSI was calculated for all respondents based on 24 questions related to MU. The index score mean =56.53, median=59, range 0-72 (highest score possible).

Gugerty, B., Maranda, M., Rook, D. (2006). The Clinical Information System Implementations Evaluation Scale, pp. 621-625. In H. A. Parks, P. Murray, & C. Delaney (Eds.) *Consumer-centered computer-supported care for healthy people*. Landsdale, PA: IOS Press.

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Qualitative Text Analysis

SPSS Text Analysis for Surveys
and NVIVO
and
Thematic Content Analysis

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Step 1. NVIVO Word Frequency Analysis

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Step 2. Patterns Identified in Text Analysis coded as dichotomous variables at respondent level

- EMR = 75 (6.4%)
- Charting = 65 (5.5%
- Nurses = 42 (3.6%)
- Information = 52 (4.4.%)
- Computer Sys = 189 (16%)
- Software = 110 (9.3%)
- Patient = 82 (7%)
- Care = 40 (3.4%)
- Time = 41 (3.5%
- Health = 16 (1.4%)
- Questions = 23 (2%)
- Healthcare = 61 (5.2%)
- Drugs = 20 (1.7%)
- Physicians = 31 (2.6%)

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Step 3. Thematic Content Analysis

- Most effective in identifying concepts and themes.
- We will examine categories or "themes" we have identified in the qualitative analysis, four examiners are looking at detailed text and have done the following:
  - Indicate "yes" I agree, or "no" I do not agree
  - If "no", then suggest what you would "name" the category of questions
- We need you indicate whether or not you believe we have "named" these themes correctly given subcategories associated with the themes/concepts.

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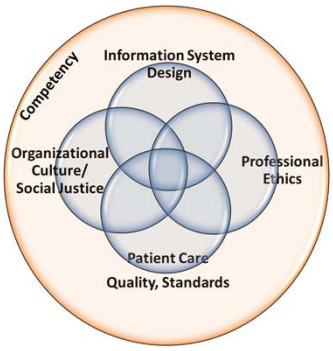
Narrative Themes Regarding Nurse Experiences with CIS



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Sample Statements Amplifying Themes

- Explanation
- Case study example.

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Information System Design

- Multiple systems/Navigation
- Product & equipment support
- Data
  - Information quality
  - Documentation
  - Outcomes

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Patient Care, Quality and Standards

- Patient care delivery
  - Responses to care
- Time spent in CIS/
  - Workflow
  - Benchmark time with and away from patient
- Regulatory and Legal Issues

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Organizational Culture and Social Justice

- Institutional standards and goals
  - Purpose of system
- Administration
  - Allocation of Resources:
    - Human
    - Physical
    - Financial

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Professional Ethics

- Purpose and Role of Nursing
- Values
- Professional Comportment
- Satisfaction

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2. Outline a sustainable health IT roadmap for other state, chapter, regional and local leaders to consider (Case Example)

- Partner with nurse executive organization
- Partner with academia [deans and faculty]
- Listen to practicing nurses
- Focus on competencies/skills such as TIGER Initiative
- "Connect the State"
- Include policy-based stakeholders
- Cross-pollinate with other national committees

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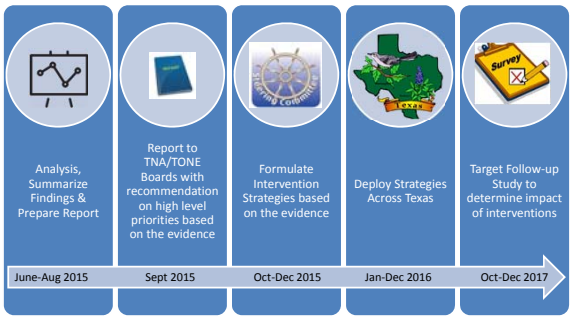
3. Summarize lessons learned in the planning, development and implementation of health IT for Texas

- Carefully select partners for research/surveys
- Be realistic about Internal Review Board (IRB) activities
- Address data ownership issues explicitly
- Test and double test all survey items
- Plan for succession early on
- Include adequate number of committee member to do the work
- Budget for at least one face-to-face meeting per year
- Consider strategy to engage with more legislative committees

Recommendations of HIT Task Force

- Creation of educational content and dissemination
- Campaign to Raise Awareness
- HIT CNE for practicing nurses
- Nursing HIT curriculum development
- Constituent involvement [incl. TIGER]
- Benchmarking Reports Towards Progress
- Formation of Advisory Structure

Projected Timelines



Contact

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