

Table 2: *Informatics Competencies Assessment Tools*

<i>Authors, Date</i>					
<i>Country</i>	<i>Purposes</i>	<i>Target Population</i>	<i>Method</i>	<i>Application</i>	<i>Description Component</i>
<p>(1) Staggars, Gassert, & Curran (2001)</p> <p>USA</p> <p><i>Theoretical farmworker</i></p>	<p>To determine nursing informatics competencies (NIC) for nurses</p> <p>(i.e. beginner, experienced, specialist, & innovator)</p>	Registered nurse.	<ul style="list-style-type: none"> • Comprehensive literature review done & 1159 competencies items extracted • 3 categories (computer skills, informatics knowledge, & informatics skills). • Items reduced from 1159 to 313 • Expert panel validated 313 competencies and 80% threshold for agreement used to achieve consensus. • A matrix was developed to identify categories of statements across the levels of nurses. 	<ul style="list-style-type: none"> • Used by Staggars, Gassert, & Curran, (2002). 	<ul style="list-style-type: none"> • 304 competencies agreed on as final list categorized in four nursing practice Levels: beginner= 43, experienced= 35, specialist=187, and innovator=40 • Each level was subcategories to 3 group: computer skill, informatics knowledge, informatics skill
<p>(2) Staggars, Gassert, & Curran (2002)</p> <p>USA</p>	<p>To produce a research-based master list of informatics competencies for nurses and differentiate these competencies by level of nursing practice.</p>	Nurses in different levels of practice (i.e. beginner, experienced, specialist, and innovator)	<ul style="list-style-type: none"> • List of 304 competencies agreed on by Staggars, Gassert, & Curran, 2001 were used. • Pilot tested. • Three round Delphi study conducted to validate the initial competencies • 80% threshold of agreement of expert panel used to achieve consensus 	<ul style="list-style-type: none"> • Pilot test by Staggars, Gassert, & Curran (2002) • Westra & White-Delaney (2008) • Hart (2010) • Chang, Poynton, Gassert, & Staggars, (2011) 	<ul style="list-style-type: none"> • 281 competencies short listed and achieved 80% agreement • Competencies categorized in four levels of practice beginner= 37, experienced= 32, specialist= 174, & innovator= 38 • Sub-categories: computer skill, informatics knowledge, informatics skill

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Framework:						
Information management framework						
(3) Westra & White-Delaney (2008)	USA	To develop informatics competencies for nursing leaders	Nurse leaders	<ul style="list-style-type: none"> • Three round Delphi technique • Expert panel: 13 participants (nursing leaders, informatics specialist, & researchers) • Questionnaire, based on American Organization of Nurse Executives, 2005; Association of College & research Libraries, 2008; Staggers, Gassert, & Curran, 2002 competencies list. • 4-point Likert-type scale used to rate competencies • 80% threshold level used as agreement level 	<ul style="list-style-type: none"> • Not used in other studies 	<ul style="list-style-type: none"> • 92 competencies meet agreement level: 24 computer skills, 40 informatics knowledge, 28 informatics skills
(4) TIGER				<ul style="list-style-type: none"> • Extensive review of the literature 		

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<i>Theoretical framework</i>						
Informatics Competency Collaborative team (2009)		To define the minimum set of informatics competencies that all nurses need to succeed in practice or education.	Nurses	<ul style="list-style-type: none"> • Collect informatics competencies from over 50 healthcare organization • List developed for nursing practice • Final list evaluated and categorized into three parts (basic computer competencies, information literacy, & information management). • Categories aligned with the existing set of competencies developed by other organizations. 	<ul style="list-style-type: none"> • Hunter, McGonigle, & Hebda, (2013) and Hunter et al., (2015) • Hubner, et al., (2016) 	<ul style="list-style-type: none"> • List of 231 nursing informatics competencies • Categorized into three components: 108 basic computer competencies, 47 information-literacy competencies, 76 information management competencies
(5) Hart, (2010)	USA	To determine core informatics competencies appropriate for generic nurse manager positions.	Nurse managers	<ul style="list-style-type: none"> • Used master list of informatics competencies developed by Staggers, Gassert, & Curran (2002) • Three round Delphi (threshold of 75% as level of consensus). • Purposive sampling: 25experts nurses (nurses, experienced nurses, & informatics specialists) 	<ul style="list-style-type: none"> • Yang, et al., (2014). 	<ul style="list-style-type: none"> • Nursing practice Level: 1= beginner nurse, 2=experienced nurse were selected as proper levels for nurse managers role. • List of 49 informatics competencies was selected & met the threshold agreement level. • Categories (computer skills, informatics knowledge, informatics skills).
(6) Poynton,		To identify nursing informatics competencies	Nurses in Taiwan	<ul style="list-style-type: none"> • Delphi method; list of 323 competencies developed from: 281 	<ul style="list-style-type: none"> • Pilot test by Chang, Poynton, Gassert, & Staggers (2011) 	<ul style="list-style-type: none"> • 318 items achieved expert agreement

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<i>Theoretical framework</i>					
Gassert, & Staggers, (2011) Taiwan Information management framework	required of nurses in Taiwan		<p>competencies from Staggers, Gassert, & Curran (2002) & 42 competencies extracted from the literature.</p> <ul style="list-style-type: none"> • Five nursing informatics expert evaluated competencies (60% threshold of agreement) • 323 competencies included in the questionnaire & rated through three rounds. • Questionnaire categorized into four levels & subcategorized into (computer skills, informatics knowledge, informatics skills) • The questionnaire evaluated the importance of each competency and if it placed in correct place by using 4- (point Likert type scale. • Purposive and snowball sampling: 32 experts nurses 	<ul style="list-style-type: none"> • Chung & Staggers, (2014) 	<ul style="list-style-type: none"> • Competencies list categorized into four levels of nursing practice: beginner, experienced, informatics specialist, and informatics innovator • Each level was subcategorized in to : (computer skills, informatics knowledge, informatics skills) • 97.8% similar to Staggers, Gassert, and Currant's study results
(7) Hunter, McGonigle, & Hebda (2013) Hunter et al. (2015) USA	To develop a reliable, valid instrument for self-assessment of perceived nursing informatics competencies.	Nursing Students, faculty, and Nurses in healthcare.	<ul style="list-style-type: none"> • Three rounds of reviews • Researchers examine & review TIGER competencies to remove any conceptual duplication. • Nursing informatics experts review & examine relevance list by using Likert-scale. • Content validity assessed by using content validity index (CVI) =1. • Competencies divided into 4 categories (beginner, comfortable, proficient, and expert). 	<ul style="list-style-type: none"> • Pilot test by Hunter, McGonigle, & Hebda (2013) 	<ul style="list-style-type: none"> • 85 competencies included: (51 basic computer competencies, 25 information-literacy competencies, 9 clinical information management competencies)

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	<i>Theoretical farmworker</i>			<ul style="list-style-type: none"> • Pilot tested and the questionnaire content converted to format of a Qualtrics online survey. • Survey 184 participants (161 respondents were registered nurses). 		
(8) Hubner, et. al., (2016)	24 countries in the Americas (6 countries), Europe (10 countries), Asia (6 countries), and Australia/Pacific (2 countries).	To empirically define a framework of globally accepted core competencies in informatics among various roles nurses can hold. To match these findings within country specific need	Nurses in various role	<ul style="list-style-type: none"> • International survey conducted with participant of 24 countries to evaluate and prioritize a broad list of informatics competencies within five categorize • Personalized link questionnaire with scale from 0% to 100% 	Pretest and survey done by Hubner, et. al., (2016) to evaluate the tool	<ul style="list-style-type: none"> • 6 core informatics competencies in 5 areas (clinical nursing, quality management, inter-professional coordination, nursing management, & IT management).

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