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14. ABSTRACT

Healthcare team performance is affected by the individual capabilities of each team member, as well as the contextual complexities of the patient care environment, itself set within a complex system. It is essential to characterize the individual and team factors that most impact healthcare team performance to inform the development of impactful team training resources. The primary aim of this study was to determine the relative impacts of individual and collective (team) factors on team performance in the provision of emergent, urgent clinical care, and use them to inform development of a team-training App solution. The study was completed using a purposive sample of Emergency Medicine personnel from four demographically distinct sites with varying institutional cultures. Variables were controlled through random assignment or directly measured. Individual data were captured using self-report and knowledge assessment instruments. Three raters captured team data during the provision of care in high-stress simulated emergency medicine contexts. Regression analyses were used to predict the value of continuous dependent (criterion) variables (Y1 = team performance, Y2 =team cohesiveness, Y3 =team morale) from the known values of individual and team predictor variables, with a statistical significance of $p < .05$.

15. SUBJECT TERMS

1. Emergency Medicine 2. Urgent Care 3. Casualty Management 4. Casualty Care 5. Trauma Care 6. Critical Care 7. Trauma Management 8. High Performing Teams 9. Team Characteristics 10. Team Composition 11. Team Effectiveness 12. Team Cohesiveness 13. Team Morale 14. Team Performance Factors 15. Clinical Performance 16. Team Behaviors 17. Team Communication 18. Team Composition 19. Team Training 20. Team Performance Objectives

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1. INTRODUCTION:

Healthcare team performance is affected by the individual capabilities of each team member, as well as the contextual complexities of the patient care environment, itself set within a complex system. It is essential to characterize the individual and team factors that most impact healthcare team performance to inform the development of impactful team training resources. The primary aim of this study was to determine the relative impacts of individual and collective (team) factors on team performance in the provision of emergent, urgent clinical care, and use them to inform development of a team-training App solution. The study was completed using a purposive sample of Emergency Medicine personnel from four demographically distinct sites with varying institutional cultures. Variables were controlled through random assignment or directly measured. Individual data were captured using self-report and knowledge assessment instruments. Three raters captured team data during the provision of care in high-stress simulated emergency medicine contexts. Regression analyses were used to predict the value of continuous dependent (criterion) variables (Y1 = team performance, Y2 =team cohesiveness, Y3 =team morale) from the known values of individual and team predictor variables, with a statistical significance of $p < .05$.

2. KEYWORDS: Provide a brief list of keywords (limit to 20 words).

1. Emergency Medicine	2. Urgent Care	3. Casualty Management
4. Casualty Care	5. Trauma Care	6. Critical Care
7. Trauma Management	8. High Performing Teams	9. Team Characteristics
10. Team Composition	11. Team Effectiveness	12. Team Cohesiveness
13. Team Morale	14. Team Performance Factors	15. Clinical Performance
16. Team Behaviors	17. Team Communication	18. Team Composition
19. Team Training	20. Team Performance Objectives	

3. ACCOMPLISHMENTS:

Major Goals

Task		Description	Status
1	Project Management	Administration, oversight and management of all program tasks, expenditures, project reporting, compliance, security assurances, data controls, program and grants office engagement.	Complete
2	Start-up	Establish institutional reporting charts, financial and project management protocols. Create, complete, and submit all documentation for program office and designated Institutional Review Boards. Hire and train program support personnel, including research and site coordinators, performance assessors, and administrative personnel.	Complete
3	IRB /Oversight	Submit, respond, and secure Institutional Review Board Approval: University of Central Florida, Brown University Rhode Island Hospital, NYU School of Medicine, Eastern Virginia Medical School, University of Arizona Banner Health, Human Research Protection Office (HRPO)	Complete
4	Procurement	Procure project equipment and supplies, warranties for mannequin simulators.	Complete
5	Site Scheduling	Schedule data collection events at each participating site, including travel and logistics arrangements for personnel and equipment.	Complete
6	Recruit Subjects	Recruit subjects at each participating site and schedule their participation at specified data collection events.	Complete
7	Program Scenarios	Document simulated Emergency Medicine event for all sites, including: 1) Simulator function and response progression; 2) Simulated patient scripts; 3) Sequencing of clinical presentations during events; 4) Flow/Timing of clinical occurrences during event; 5) Hand-off instructions; 6) Ancillary resources required per site.	Complete
8	Recruit Simulated Patients	Recruit simulated patients at each participating site, train them for their required role, and schedule their participation at specified data collection events.	Complete
9	Secure Data Management	Establish data management protocols and set up file management using encryption and a secure server.	Complete
10	Customize Data Collection App	Modify CareAssess App to provide customized, secure data collection (individual, team factors and team performance).	Complete
11	Set-up Individual and Team Factors Data Measurement	Verify the measurement systems for individual and team factors. Prepare data collection App to include assessment items for individual and team factors.	Complete
12	Verify Performance Data Measurement	Verify the measurement system for team performance. Prepare data collection App to include team performance assessment items.	Complete
13	Confirm/Test Data Collection System	Test data collection system to assure functionality, accuracy, and security.	Complete
14	Data Collection - Site 1	Eastern Virginia Medical School: Conduct data collection per protocol at the site.	Complete
15	Data Collection - Site 2	University of South Carolina Palmetto Health: Conduct data collection per protocol at the site.	Withdrawn, 11/30/2016
16	Data Collection - Site 3	Brown University Rhode Island Hospital: Conduct data collection per protocol at the site.	Complete
17	Data Collection - Site 4	Harvard University Brigham and Women's Hospital: Conduct data collection per protocol at the site.	Withdrawn 3/20/2017
18	Data Collection - Site 5	NYU-Langone Medical Center: Conduct data collection per protocol at the site.	Complete
19	Data Collection - Site 6	Banner Health System: Conduct data collection per protocol at the site.	Complete

Task		Description	Status
20	Data Analyses	Verify all data, conduct descriptive and inferential statistical analyses, and examine any resulting qualitative data for trends or connections to statistical outcomes.	Complete
21	Predictive Modeling	Conduct regression analyses to determine predictive models. Identify principle components and examine for statistical and practical significance.	Complete
22	Performance Specifications	Document standards of team performance measured for the emergency medicine context of the study. Identify the principle predictors related to these performance standards.	Complete
23	Training Specifications	Use the predictive data to identify objectives for training, or for facilitating performance improvement, to support the development of optimal team proficiencies. Identify best technology-based solution for distribution.	Complete
24	Technology Specifications	Specify the technology requirements that will facilitate the team performance improvement specified in task 23.	Complete
25	Publications / Presentations	Create, submit, and present the outcomes from the study at peer-reviewed conferences. Write, submit, and publish the outcomes from the study in peer-reviewed journals.	Submissions Ongoing
26	Project Reviews	Prepare documentation for and participate in scheduled project reviews.	Complete
27	Quarterly Reports	Prepare and submit quarterly reports to the program office.	Complete
28	Final Report	Prepare and submit final report to the program office.	Complete

What was accomplished under these goals?

ANALYTICAL OUTCOMES

The constituent components of the high-stress urgent, emergent simulation scenarios were designed, created, programmed, and implemented at four demographically diverse clinical sites. All project associated staff, standardized patients, and raters were trained to achieve reliable performances between the data collection sites. All assessment instruments were programmed into the CareAssess App to facilitate real-time performance assessment during the simulated emergency medicine events. Data were collected from the four sites, with a total sample size of 241 subjects randomly assigned to 34 different emergency medicine teams. The study achieved a post-hoc power of .99 with an effect size of .42 Analyses of the data and resulting outcomes are presented below.

Descriptive Analyses

A priori power analysis suggested a conservative sample size of 360 subjects divided between 60 teams. However, the effect size for the study data was much larger than anticipated and therefore we were able to reduce the number of subjects and teams, while increasing our actual study power. Total sample size was 241 subjects divided between 34 teams. Post hoc power analysis for the study is presented below.

F tests - Linear multiple regression: Fixed model, R^2 deviation from zero

Analysis:	Post hoc: Compute achieved power			
Input:	Effect size f^2	=	0.42	
	α err prob	=	0.05	
	Total sample size	=	241	
	Number of predictors	=	24	
Output:	Noncentrality parameter λ	=	101.22	
	Critical F	=	1.5679	
	Numerator df	=	24	
	Denominator df	=	216	

Power (1-β err prob) = 0.9999

Descriptive values for each of the predictor (independent) variables and criterion (dependent) variables are presented in Table 1. Additional information about the mean values for each variable is available in the measurement section of this report.

Table 1: Descriptive Statistics

Descriptive Statistics

	N	Mean	Std. Deviation
GENDER	240	.40	.490
EMERMEDICINE EXPERIENCE	240	7.220	6.7586
MILITARY EXPERIENCE	240	.10	.295
INDIVIDUAL FATIGUE	236	7.578	3.98631
ASSERTIVENESS INDIVIDUAL	241	40.17	6.561
INDIVIDUAL KNOWLEDGE	241	52.00	9.153
ENVIRONMENT FAMILIARITY	241	.90	.294
CASE FAMILIARITY	241	.90	.300
TEAM MILITARY EXPERIENCE	241	.41	.494
NUMBER OF PHYSICIANS ON TEAM	241	1.42	.896
NUMBER OF RESIDENTS	241	.90	.903
NUMBER OF ADV PRACTICE ON TEAM	241	.40	.539
NUMBER OF NURSES ON TEAM	241	3.22	1.584
NUMBER MALES ON TEAM	241	2.85	1.385
NUMBER FEMALES ON TEAM	241	4.33	1.402
TEAM SKILLS	240	78.95	21.292
MEAN TEAM FATIGUE	236	9.56	1.553
TEAM_TYPE_CODED	241	2.577	1.07399
TEAM AUTHORITY PROFILE	241	35.74	5.748
NUMBER OF TEAM MEMBERS	241	7.22	.877
TOTAL TEAM EXPERTISE	241	427.5	60.950
TEAM EMED EXPERIENCE	241	52.26	19.08981
TEAM KNOWLEDGE PROFILE	241	375.3	52.251
ALL CASES TOTAL SCORE	240	192.4	42.039
TEAM MORALE	241	51.39	14.929
TEAM COHESIVENESS	241	62.22	4.750

The total sample size of 241 individuals was from four sites, each geographically distinguished from the other to support the generalizability of the data. Data were collected from emergency medicine teams in Norfolk, VA; Providence RI; Phoenix, AZ; and New York, NY. There were no significant differences between the outcomes of the four sites (Table 2).

Table 2: Comparison of Team Outcomes by Site

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
TEAM MORALE * SITE	Between Groups	(Combined)	563.895	3	187.965	.842	.472
	Within Groups		52927.297	237	223.322		
	Total		53491.192	240			
TEAM COHESIVENESS * SITE	Between Groups	(Combined)	17.551	3	5.850	.257	.856
	Within Groups		5397.229	237	22.773		
	Total		5414.780	240			
ALL CASES TOTAL SCORE * SITE	Between Groups	(Combined)	8144.320	3	2714.773	1.547	.203
	Within Groups		414233.580	236	1755.227		
	Total		422377.900	239			

Correlation between Dependent Variables

Team performance literature suggested that the criterion (dependent) variables would share variance, and therefore have significant correlation. As anticipated, all dependent variables had significant correlation at the $p < 0.01$ level (2-tailed).

Table 3: Correlation between Criterion Variables

Proximity Matrix			
	Correlation between Vectors of Values		
	TEAM COHESIVENESS	TEAM MORALE	ALL CASES TOTAL SCORE
TEAM COHESIVENESS	1.000	-.351	.170
TEAM MORALE	-.351	1.000	-.252
ALL CASES TOTAL SCORE	.170	-.252	1.000

This is a similarity matrix

Reliability Analyses

The reliability of measurement (internal consistency) for each of the assessment instruments is presented in Table 4. Measurement of the criterion (dependent) variables for Team Performance and Team Morale had strong reliability. Measurement of the Team Cohesiveness criterion was slightly below the reported reliability for the instrument, however the outcomes significantly correlate with the other criterion variables and therefore we accept this as an artifact of the sample population of emergency medicine clinicians compared to the normed population of the instrument (other professional teams). Measurement for the predictor (independent) variable Individual Knowledge met reliability standards. Measurement of the predictor Individual Assertiveness was below the reported reliability for the instrument, but only slightly below the acceptable standard of Cronbach's Alpha > 0.70. This too, may have been an artifact of variation between the sample of emergency medicine clinicians compared to the general population normed for the instrument.

Table 4 – Reliability Analyses

Assessment Instrument	Cronbach's Alpha
Team Performance	.97
Individual Knowledge	.75
Team Morale	.97
Team Cohesiveness	.62
Individual Assertiveness	.64

Team Performance Multiple Linear Regression Analyses

Multiple linear regression analyses of the separate and collective effects of 24 predictor variables on the criterion variable Team Performance yielded a model of 7 predictors accounting for 63% of the variance (Table 5). The regression scatterplot is shown in Figure 1.

Table 5: Team Performance Multiple Linear Regression Model Summary

Model Summary[h]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin–Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.663[a]	.439	.437	31.480	.439	187.222	1	239	.000	
2	.722[b]	.522	.518	29.134	.082	41.042	1	238	.000	
3	.757[c]	.572	.567	27.606	.051	28.078	1	237	.000	
4	.787[d]	.619	.612	26.126	.046	28.611	1	236	.000	
5	.791[e]	.626	.618	25.931	.007	4.558	1	235	.034	
6	.796[f]	.634	.625	25.691	.008	5.406	1	234	.021	
7	.801[g]	.641	.630	25.517	.006	4.198	1	233	.042	.446

a. Predictors: (Constant), TEAM SKILLS

b. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE

c. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS

d. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM

e. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM, NUMBER MALES ON TEAM

f. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM, NUMBER MALES ON TEAM, TEAM_TYPE_CODED

g. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM, NUMBER MALES ON TEAM, TEAM_TYPE_CODED, TEAM EMED EXPERIENCE

h. Dependent Variable: ALL CASES TOTAL SCORE

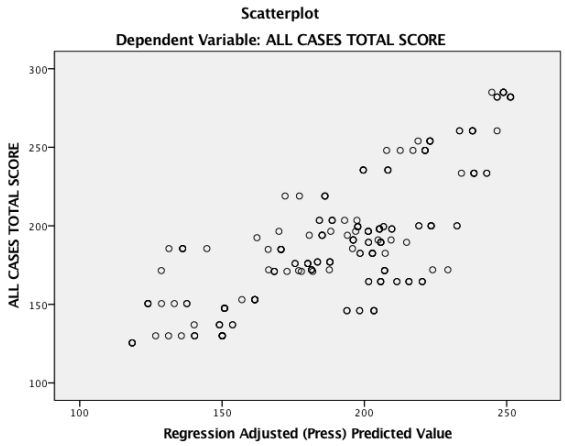


Figure 1: Team Performance, 7-Predictor Regression Scatterplot

Analysis of variance for the 7-predictor model is presented in Table 6. The level of significance for associated F-tests was set at $p<.05$. The 7-predictor model has a significance of $p< 0.001$.

Table 6: ANOVA Results for Team Performance Linear Regression

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	185533.680	1	185533.680	187.222	.000[b]
	Residual	236844.221	239	990.980		
	Total	422377.900	240			
2	Regression	220368.824	2	110184.412	129.815	.000[c]
	Residual	202009.076	238	848.778		
	Total	422377.900	240			
3	Regression	241766.029	3	80588.676	105.749	.000[d]
	Residual	180611.871	237	762.075		
	Total	422377.900	240			
4	Regression	261294.942	4	65323.735	95.705	.000[e]
	Residual	161082.958	236	682.555		
	Total	422377.900	240			
5	Regression	264359.908	5	52871.982	78.630	.000[f]
	Residual	158017.992	235	672.417		
	Total	422377.900	240			
6	Regression	267928.081	6	44654.680	67.654	.000[g]
	Residual	154449.819	234	660.042		
	Total	422377.900	240			
7	Regression	270661.807	7	38665.972	59.382	.000[h]
	Residual	151716.093	233	651.142		
	Total	422377.900	240			

a. Dependent Variable: ALL CASES TOTAL SCORE

b. Predictors: (Constant), TEAM SKILLS

c. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE

d. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS

e. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM

f. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM, NUMBER MALES ON TEAM

g. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM, NUMBER MALES ON TEAM, TEAM_TYPE_CODED

h. Predictors: (Constant), TEAM SKILLS, MEAN TEAM FATIGUE, NUMBER OF TEAM MEMBERS, NUMBER OF ADV PRACTICE ON TEAM, NUMBER MALES ON TEAM, TEAM_TYPE_CODED, TEAM EMED EXPERIENCE

The coefficients associated with the derived linear regression model for Team Performance are shown in Table 7. Four of significant predictors (Team Skills, Number of Team Members, Number of Advanced Practice Clinicians, and Number of Males) had a positive relationship to the Criterion such that a greater value for these predictors corresponds with better Team Performance. Three of the significant predictors (Mean Team Fatigue, Team Type, and Team Emergency Medicine Experience) had an inverse relationship to the Criterion, such that higher value for these predictors corresponds to weaker Team Performance. It makes intuitive sense that a fatigued team would perform less well when compared to one that was not fatigued. It also makes sense that a team type where individuals are not familiar with each other (higher coded team) would perform less well when compared to one where the team members were familiar with each other. The finding that more emergency medicine experience on a team corresponded with lower Team Performance could be indicative of several factors associated with habits of practice, silo-oriented independence, or lack of understanding about how to work optimally as a team. These are the very challenges this study was designed to address and it is reassuring that our data captured their occurrence. However, the inverse relationship may also be indicative of lower emergency medicine experience requiring greater teamwork, so that low team experience corresponds with

increased teamwork. This also suggests the importance of developing teamwork abilities to assure optimal care is provided within a team, even if the overall experience level is minimal.

Table 7: Team Performance Regression Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations		
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	89.134	7.818		11.401	.000	73.732	104.535			
	TEAM SKILLS	1.309	.096	.663	13.683	.000	1.120	1.497	.663	.663	.663
2	(Constant)	160.618	13.299		12.077	.000	134.419	186.817			
	TEAM SKILLS	1.356	.089	.687	15.268	.000	1.181	1.531	.663	.703	.684
	MEAN TEAM FATIGUE	-7.867	1.228	-.288	-6.406	.000	-10.286	-5.448	-.231	-.384	-.287
3	(Constant)	74.695	20.536		3.637	.000	34.238	115.152			
	TEAM SKILLS	1.260	.086	.638	14.637	.000	1.090	1.430	.663	.689	.622
	MEAN TEAM FATIGUE	-6.547	1.190	-.240	-5.502	.000	-8.891	-4.203	-.231	-.337	-.234
	NUMBER OF TEAM MEMBERS	11.209	2.115	.234	5.299	.000	7.042	15.377	.401	.325	.225
4	(Constant)	76.158	19.437		3.918	.000	37.866	114.451			
	TEAM SKILLS	1.173	.083	.594	14.121	.000	1.009	1.337	.663	.677	.568
	MEAN TEAM FATIGUE	-8.440	1.180	-.309	-7.150	.000	-10.766	-6.115	-.231	-.422	-.287
	NUMBER OF TEAM MEMBERS	13.449	2.045	.281	6.576	.000	9.420	17.479	.401	.393	.264
	NUMBER OF ADV PRACTICE ON TEAM	18.435	3.447	.237	5.349	.000	11.646	25.225	.171	.329	.215
5	(Constant)	71.985	19.391		3.712	.000	33.782	110.187			
	TEAM SKILLS	1.162	.083	.588	14.062	.000	.999	1.325	.663	.676	.561
	MEAN TEAM FATIGUE	-7.800	1.209	-.286	-6.449	.000	-10.183	-5.417	-.231	-.388	-.257
	NUMBER OF TEAM MEMBERS	12.259	2.105	.256	5.823	.000	8.111	16.406	.401	.355	.232
	NUMBER OF ADV PRACTICE ON TEAM	17.285	3.463	.222	4.991	.000	10.463	24.108	.171	.310	.199
	NUMBER MALES ON TEAM	2.802	1.312	.093	2.135	.034	.216	5.387	.313	.138	.085
6	(Constant)	89.887	20.697		4.343	.000	49.110	130.664			
	TEAM SKILLS	1.149	.082	.582	13.996	.000	.987	1.310	.663	.675	.553
	MEAN TEAM FATIGUE	-8.120	1.206	-.297	-6.732	.000	-10.496	-5.744	-.231	-.403	-.266
	NUMBER OF TEAM MEMBERS	11.581	2.106	.242	5.499	.000	7.431	15.730	.401	.338	.217
	NUMBER OF ADV PRACTICE ON TEAM	16.394	3.452	.211	4.749	.000	9.592	23.196	.171	.296	.188
	NUMBER MALES ON TEAM	3.171	1.310	.105	2.421	.016	.591	5.751	.313	.156	.096
	TEAM_TYPE_CODED	-3.724	1.602	-.095	-2.325	.021	-6.879	-.568	-.147	-.150	-.092
7	(Constant)	98.325	20.966		4.690	.000	57.018	139.632			
	TEAM SKILLS	1.098	.085	.556	12.894	.000	.930	1.266	.663	.645	.506
	MEAN TEAM FATIGUE	-8.711	1.232	-.319	-7.070	.000	-11.138	-6.283	-.231	-.420	-.278
	NUMBER OF TEAM MEMBERS	13.696	2.333	.286	5.871	.000	9.100	18.292	.401	.359	.231
	NUMBER OF ADV PRACTICE ON TEAM	16.089	3.432	.207	4.687	.000	9.326	22.851	.171	.294	.184
	NUMBER MALES ON TEAM	2.782	1.315	.092	2.116	.035	.192	5.372	.313	.137	.083
	TEAM_TYPE_CODED	-4.318	1.617	-.111	-2.670	.008	-7.504	-1.132	-.147	-.172	-.105
	TEAM EMED EXPERIENCE	-.216	.106	-.098	-2.049	.042	-.424	-.008	-.032	-.133	-.080

a. Dependent Variable: ALL CASES TOTAL SCORE

The seven predictors were measured using different scales, and so transforming the coefficients into standardized regression coefficients assures that they are directly comparable to one another. The largest coefficient indicates the predictor that has the greatest influence on the criterion variable, Team Performance.

The standardized regression equation is:
Team Performance = (.56 Team Skills) – (.32 Mean Team Fatigue) + (.29 Number of Team Members) + (.21 Number of Advanced Practice Clinicians) + (.09 Number of Males on Team) – (.11 Team Type Coded) – (.10 Emergency Medicine Experience)

Team Morale Regression Analyses

Multiple linear regression analyses of the separate and collective effects of 24 predictor variables on the criterion variable Team Morale yielded a model of four predictors accounting for just 10% of the variance (Table 8). The regression scatterplot is shown in Figure 2.

Table 8: Team Morale Multiple Linear Regression Model Summary

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin–Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.192[a]	.037	.033	14.681	.037	9.174	1	239	.003	
2	.258[b]	.067	.059	14.484	.030	7.543	1	238	.006	
3	.307[c]	.094	.082	14.300	.027	7.168	1	237	.008	
4	.335[d]	.112	.097	14.185	.018	4.873	1	236	.028	2.008

a. Predictors: (Constant), TEAM SKILLS

b. Predictors: (Constant), TEAM SKILLS, ASSERTIVENESS INDIVIDUAL

c. Predictors: (Constant), TEAM SKILLS, ASSERTIVENESS INDIVIDUAL, TEAM_TYPE_CODED

d. Predictors: (Constant), TEAM SKILLS, ASSERTIVENESS INDIVIDUAL, TEAM_TYPE_CODED, TEAM AUTHORITY PROFILE

e. Dependent Variable: TEAM MORALE

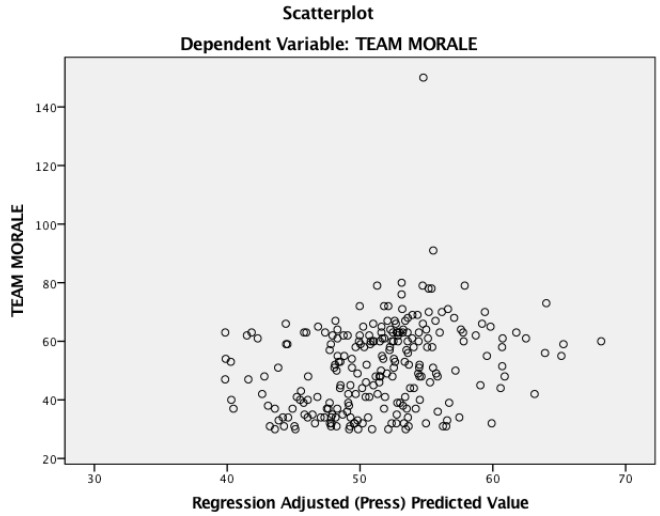


Figure 2: Team Morale, 4-Predictor Regression Scatterplot

Analysis of variance for the 4-predictor model is presented in Table 9. The level of significance for associated F-tests was set at $p<.05$. The 4-predictor model has a significance of $p< 0.001$.

Table 9: ANOVA Results for Team Morale Linear Regression

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1977.389	1	1977.389	9.174	.003[b]
	Residual	51513.803	239	215.539		
	Total	53491.192	240			
2	Regression	3559.778	2	1779.889	8.484	.000[c]
	Residual	49931.414	238	209.796		
	Total	53491.192	240			
3	Regression	5025.526	3	1675.175	8.192	.000[d]
	Residual	48465.667	237	204.496		
	Total	53491.192	240			
4	Regression	6006.105	4	1501.526	7.463	.000[e]
	Residual	47485.087	236	201.208		
	Total	53491.192	240			

a. Dependent Variable: TEAM MORALE

b. Predictors: (Constant), TEAM SKILLS

c. Predictors: (Constant), TEAM SKILLS, ASSERTIVENESS INDIVIDUAL

d. Predictors: (Constant), TEAM SKILLS, ASSERTIVENESS INDIVIDUAL, TEAM_TYPE_CODED

e. Predictors: (Constant), TEAM SKILLS, ASSERTIVENESS INDIVIDUAL, TEAM_TYPE_CODED, TEAM AUTHORITY PROFILE

The coefficients associated with the derived linear regression model for Team Morale are shown in Table 10. Two of significant predictors (Team Type, Team Authority Profile) had a positive relationship to the Criterion such that a greater value for these predictors corresponds with better Team Morale. A higher coded team type refers to a team where individuals are not familiar with each other, which is counter-intuitive to the hypothesis that teams who are more familiar with each other have greater morale. However, it could be that the excitement of working with new people, in an exciting context (the study environment) influenced the outcomes for this variable. A team with a high authority profile may have higher morale as a result of assuredness in their respective roles contributions that can results from having well-defined responsibilities and authority.

Two of the significant predictors (Team Skills, Individual Assertiveness) had an inverse relationship to the Criterion, such that higher value for these predictors corresponds to weaker Team Morale. The finding that greater Team Skills on a team corresponded with lower Team Morale could be indicative of frustrations with team members who are less skilled, silo-oriented independence, or lack of understanding about how to work optimally as a team. However, the inverse relationship may also be indicative of lower skilled team members perceiving the benefits of having others on the team to support them in areas where their skills are not as well developed. The inverse relationship between Individual Assertiveness may also be related to perceptions and habits of autonomy that can develop in assertive individuals, such that they may feel more frustrated when teamwork requires processes or behaviors that don't align with their perspective on how to complete shared work. Assertive individuals may also feel lower morale if their contributions are not acknowledged or diminished by other team members. On the other hand, individuals with low assertiveness may appreciate the contributions of other team members, especially one with a high authority profile, because it reduces stresses associated with decision-making, delegating, and other work associated choices and behaviors requiring assertiveness. In that situation, an individual with low assertiveness would likely have greater team morale.

Similar to the challenges described for Team Performance, it is reassuring that our data captured their occurrence and underscores the importance of developing teamwork abilities to assure optimal care is provided within a team.

Table 10: Team Morale Regression Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations		
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	62.058	3.646		17.020	.000	54.875	69.241			
	TEAM SKILLS	-.135	.045	-.192	-3.029	.003	-.223	-.047	-.192	-.192	-.192
2	(Constant)	77.947	6.813		11.442	.000	64.526	91.368			
	TEAM SKILLS	-.137	.044	-.195	-3.117	.002	-.224	-.050	-.192	-.198	-.195
	ASSERTIVENESS INDIVIDUAL	-.391	.143	-.172	-2.746	.006	-.672	-.111	-.169	-.175	-.172
3	(Constant)	70.711	7.249		9.755	.000	56.431	84.991			
	TEAM SKILLS	-.124	.044	-.176	-2.829	.005	-.210	-.038	-.192	-.181	-.175
	ASSERTIVENESS INDIVIDUAL	-.386	.141	-.170	-2.745	.007	-.664	-.109	-.169	-.176	-.170
	TEAM_TYPE_CODED	2.317	.865	.167	2.677	.008	.612	4.021	.189	.171	.166
4	(Constant)	58.980	8.941		6.597	.000	41.367	76.594			
	TEAM SKILLS	-.155	.046	-.220	-3.394	.001	-.245	-.065	-.192	-.216	-.208
	ASSERTIVENESS INDIVIDUAL	-.362	.140	-.159	-2.583	.010	-.638	-.086	-.169	-.166	-.158
	TEAM_TYPE_CODED	2.291	.858	.165	2.670	.008	.600	3.982	.189	.171	.164
	TEAM AUTHORITY PROFILE	.371	.168	.143	2.208	.028	.040	.702	.084	.142	.135

a. Dependent Variable: TEAM MORALE

The four predictors were measured using different scales, and so transforming the coefficients into standardized regression coefficients assures that they are directly comparable to one another. The largest coefficient indicates the predictor that has the greatest influence on the criterion variable, Team Morale.

The standardized regression equation is:
Team Morale = (-.22 Team Skills) + (.17 Team Type Coded) – (.16 Individual Assertiveness) + (.14 Team Authority Profile)

Team Cohesiveness Regression Analyses

Multiple linear regression analyses of the separate and collective effects of 24 predictor variables on the criterion variable Team Cohesiveness yielded a model of two predictors accounting for just 6% of the variance (Table 11). The regression scatterplot is shown in Figure 3.

Table 11: Team Cohesiveness Multiple Linear Regression Model Summary

Model Summary[c]

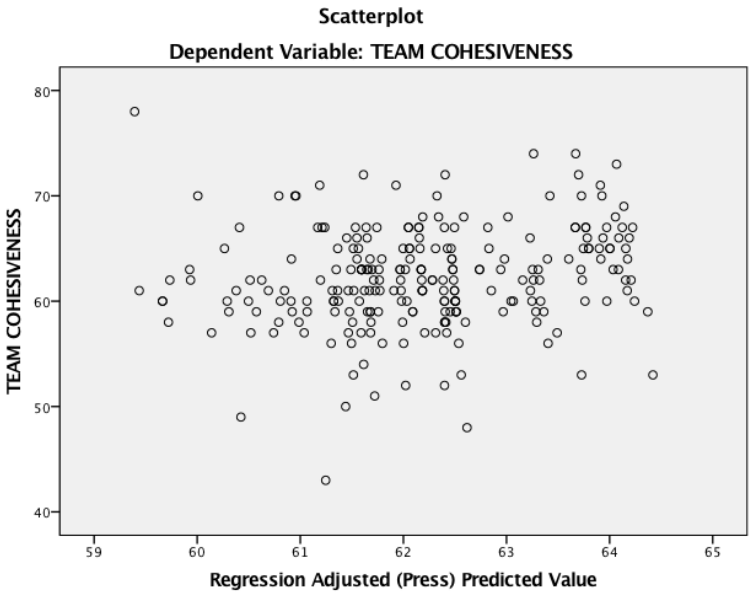
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.189[a]	.036	.032	4.674	.036	8.821	1	239	.003	
2	.238[b]	.057	.049	4.633	.021	5.290	1	238	.022	2.038

a. Predictors: (Constant), TEAM_TYPE_CODED

b. Predictors: (Constant), TEAM_TYPE_CODED, EMERMEDICINE EXPERIENCE

c. Dependent Variable: TEAM COHESIVENESS

Figure 3: Team Cohesiveness, 2-Predictor Regression Scatterplot



Analysis of variance for the 2-predictor model is presented in Table 12. The level of significance for associated F-tests was set at $p<.05$. The 2-predictor model has a significance of $p< 0.01$.

Table 12: ANOVA Results for Team Performance Linear Regression

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	192.744	1	192.744	8.821	.003[b]
	Residual	5222.037	239	21.850		
	Total	5414.780	240			
2	Regression	306.286	2	153.143	7.135	.001[c]
	Residual	5108.494	238	21.464		
	Total	5414.780	240			

a. Dependent Variable: TEAM COHESIVENESS

b. Predictors: (Constant), TEAM_TYPE_CODED

c. Predictors: (Constant), TEAM_TYPE_CODED, EMERMEDICINE EXPERIENCE

The coefficients associated with the derived linear regression model for Team Cohesiveness are shown in Table 13. Both of significant predictors (Team Type, and Team Emergency Medicine Experience) had an inverse relationship to the Criterion, such that higher value for these predictors corresponds to weaker Team Cohesiveness. It makes intuitive sense that a team type where individuals are not familiar with each other (higher coded team) would have less Team Cohesion when compared to one where the team members were familiar with each other. The finding that more emergency medicine experience on a team corresponded with lower Team Cohesion could be indicative of the same factors associated with Team Performance: habits of practice, silo-oriented independence, or lack of understanding about how to work optimally as a team. Likewise, the inverse relationship may also be indicative of lower emergency medicine experience appreciating the support teamwork offers, so that low team experience corresponds with a perception of increased team cohesiveness. It may also suggest that more experienced emergency medicine personnel have a better idea of what team cohesiveness looks like, and so they were more discriminating in their assessment than those with less experience were.

Table 13: Team Cohesiveness Regression Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations		
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	64.366	.784		82.095	.000	62.821	65.910			
	TEAM_TYPE_CODED	-.834	.281	-.189	-2.970	.003	-1.388	-.281	-.189	-.189	-.189
2	(Constant)	65.194	.856		76.126	.000	63.507	66.881			
	TEAM_TYPE_CODED	-.869	.279	-.197	-3.118	.002	-1.419	-.320	-.189	-.198	-.196
	EMERMEDICINE EXPERIENCE	-.102	.044	-.145	-2.300	.022	-.190	-.015	-.134	-.147	-.145

a. Dependent Variable: TEAM COHESIVENESS

The two predictors were measured using different scales, and so transforming the coefficients into standardized regression coefficients assures that they are directly comparable to one another. The largest coefficient indicates the predictor that has the greatest influence on the criterion variable, Team Cohesiveness.

The standardized regression equation is:
Team Cohesiveness = (-.20 Team Type Coded) – (.15 Emergency Medicine Experience)

Summary of Analyses

The multiple linear regression analyses for the three criterion variables yielded three standardized regression equations, each with statistical significance of $p < .01$. The equation for Team Performance, ostensibly the most relevant of the three criterion variables, accounts for a large percentage of the total variance (63%), which is a strong outcome. The equations for Team Morale and Team Cohesiveness, although statistically significant, accounted for only 10% and 6% less of the total variance, respectively. This may be because the instrumentation implemented was normed with general populations and not specifically for emergency medicine clinicians. As such, the instrumentation may not have captured sufficient variance between the subjects in the study, who by virtue of their chosen profession may be more similar to each other than dissimilar. The instrumentation for Team Performance was developed explicitly for emergency medicine clinicians, specifically with the intention of capturing as much variance in team performance as possible. To that end, the study outcomes align with the overall goals of the study, with strong evidence of the separate and collective effects of individual and team characteristics (predictors) on the three criterion variables (Team Performance, Team Morale, Team Cohesiveness). The predictors for each of the criterion variables are shown in Table 14.

Table 14: Predictors for Team Performance, Team Morale, Team Cohesiveness

Team Performance	Team Morale	Team Cohesiveness
Team Type Coded	Team Type Coded	Team Type Coded
Team Skills	Team Skills	Emergency Medicine Experience
Emergency Medicine Experience	Individual Assertiveness	
Team Fatigue Level	Team Authority Profile	
Number of Team Members		
Number of Advanced Practice Clinicians		
Number of Males		

The data outcomes were considered for development of performance objectives and instructional design for emergency medical team training. Team Fatigue Level, Number of Team Members, Number of Advanced

Practice Clinicians, and Number of Males are not amenable to training. However Team Skills, Emergency Medicine Experience, and Team Type may all be improved through training, especially App facilitated training.

Team skills include the type of physical patient engagement abilities that mannequin and task-trainer facilitated simulation training and practice target well, with demonstrated improvements in emergency medicine skills well documented in the literature. App supported training would be less optimal than the type of hands-on training simulated mannequins and task trainers provide. However, an App to develop emergency medicine experience and reduce the challenges associated with being unfamiliar with the abilities of fellow team members and teamwork processes overall, could serve to reduce any adverse impacts of these influential contributors to team performance, morale, and cohesiveness.

Emergency Medicine Experience refers to the number of years practicing in emergency medicine. Time spent mastering a subject is critical, however learning curves may be amplified with targeted training that is engaging, focused, and relevant to the learner. The Team Type Coded variable refers to the type of team the clinicians worked with, and specifically whether or not they were familiar with the individuals on the team and their role within the team. Notably, this variable was a significant predictor across all criterions, such teams where individuals were less familiar with their teammates and roles had lower team performance and cohesiveness, but greater team morale.

An App that serves to build relationships around the management of emergency medicine cases over time, could stimulate the development of emergency medicine experience, familiarization with other team members, and provide an exciting, morale boosting form of engagement with other clinicians serving in similar contexts. These analyses form the foundations for the training recommendations provided in this report.

PRACTICAL OUTCOMES

Simulation Supported Training Objectives

The aim of simulation-supported training is to facilitate the acquisition and maintenance of skills, especially related to the provision of urgent, emergent care by a multi-disciplinary team. Emergency medicine skills accounted for the largest component (44%) of the variance in team performance. Although clinical skills are not particularly amenable to App-based training, emergency medicine teams would benefit from maintaining high proficiency in the technical and clinical skills associated with urgent, emergent patient care. Simulation-based methods that include patient actors, task trainers, and mannequin simulators for infant, child, and adult male and female patients could serve this training need, especially if training is conducted in the context of team-based clinical management of multiple patients (similar to the way data collection activities were implemented for this study). Learning objectives for the acquisition and maintenance of skills needed for comprehensive management of urgent emergent care patients are presented herein. The care team members must be able to independently perform or assist in the performance of the following skills:

- Complete Patient Interview
- Perform Physical Examination
- Obtain Patient History
- Implement Treatment Protocols:
    - Basic Life Support (BLS)
    - Advanced Cardiac Life Support (ACLS)

    - Pediatric Advanced Life Support (PALS)
    - Advanced Trauma Life Support
    - Defibrillation
    - Cardioversion
    - Stroke
    - Labor/Delivery
    - Assault
    - Burn

- Capture/Monitor Vital Signs:
    - Blood Pressure
    - Heart Rate
    - Heart Rhythm
    - Respiratory Rate
    - Oxygen Saturation
    - Temperature

- Manage Airway:
    - Bag-Valve-Mask
    - LMA
    - Intubation
    - Cricothyrotomy
    - Tracheostomy

- Secure Vascular Access:
    - Intraosseus Access
    - Intravenous Access
    - Peripheral Venous Access
    - Arterial Line Placement
    - Arterial Puncture
    - Subclavian Vein Central Catheter Placement
    - Femoral Vein Central Catheter Placement
    - Internal Jugular Vein Central Catheter Placement
    - Peripherally Inserted Central Catheter Placement
    - Venous Cutdown

- Perform Injections/Draws:
    - Intramuscular Injection
    - Subcutaneous Injection
    - Intradermal Injection
    - Lumbar Puncture
    - Spinal Tap
    - Intraosseus Injection
    - Catheter/Line Injection
    - Catheter/Line Draw
    - Urine Draw/Capture
    - Blood Draw

- Manage Lines/Catheters:
    - Confirm Line Function
    - Port Utilization

- Connect/Remove Infusions/Fluids
- Drip, Administration/Rate
- Bolus, Administration/Timing
- Flush Ports/Lines

- Perform Other Clinical Skills:
  - Apply Sterile Technique
  - Move/Transfer Patient Safely
  - Process Samples for Laboratory
  - Foley/Urinary Catheter Placement
  - Suction Oral/Nasal Mucus/Secretions
  - Nasal/Oral Swab
  - Chest Tube
  - Diagnostic Peritoneal Lavage
  - FAST Ultrasound
  - Electrocardiogram, 12-lead
  - Thoracotomy
  - Apply Cervical Collar
  - Apply Fracture Splints
  - Administer Oxygen (nasal cannula, mask, LMA, ETT)
  - Patient Positioning, Security
  - Complete/Retrieve Patient Record
  - Secure Specialist Consults
  - Maintain Regulatory Compliance
  - Secure Informed Consent

- Order/Interpret Tests/Investigations:
  - Radiography
  - MRI
  - CAT
  - Ultrasound
  - Laboratory (Blood, Urine, Swabs, Tissue, etc.)
  - Electrocardiogram
  - EEG
  - Echocardiogram
  - Fetal Monitoring

- Medication Administration:
  - Correct Medication for Treatment
  - Correct Medication Dose for Treatment
  - Correct Medication Route for Treatment
  - Correct Medication for Patient (No Allergy)
  - Correct Medication for Patient (OK with Other Patient Meds)

App Supported Training

The aim of App supported training is to facilitate the development and maintenance of Emergency Medicine experience, and to gain familiarity with other team members.

The E-Teamwork App

The goal is to create an App-distributed virtual learning environment to prepare emergency medicine

clinicians for team-based clinical practice by augmenting their typical clinical training with a mobile platform that supports the development of patient care management abilities through collaboration. The App will allow team members to co-manage virtual patients using mobile devices. Users will register for an account and select their settings, including professional role (Physician, Nurse, Health Professional), specialty (Trauma Surgeon, Emergency Medicine Nurse, Paramedic, etc.), contact information, and photo for their profile pages within the App. Users may be able to select a team to participate with, or an instructor may choose to designate which participants work together.

An instructor portal will facilitate the creation of cases and allow clinical information to be selectively delivered to the team including lab results, multimedia imaging studies or video encounters, ancillary data, etc. The instructor portal will also allow team creation, assignment of clinicians to one or more teams, and targeted direct communication to provide feedback on team performance including action plans, diagnosis, treatment, communication, situational awareness, and time management. Data analytics will be captured to enable instructors to further synthesize individual and group performance reports for their records. High-risk usage patterns (non-response, incorrect information, etc.) may then be detected and performance issues addressed directly.

The E-Teamwork App is designed for emergency medicine clinicians to move from traditional team-based training to an interactive and real world case-based approach where clinicians engage remotely to manage virtual patients in real-time. The App is designed to provide a team-based virtual clinical learning environment that engages and immerses participants in activities related to managing multiple patients with emergent urgent care needs. These include patient assessment, analyses, decision-making, coordination of care, communication, and transfers within the care team, all of which are directly relevant to the participants' professional roles and facilitates the transfer of abilities to the real workplace setting. The E-Teamwork App facilitates mobile access to patient data and allows sharing coordinating and tracking of care issues to simulate real-time, team-based clinical management. Instructors will be able to communicate with the teams and inject information as needed to accommodate their learning goals.

Through simulated virtual practice, the E-Teamwork App allows participants to test their knowledge and decision-making abilities in a "safe" environment where team engagement is essential for successful patient management. The App captures metrics that provide performance feedback and allows teams to monitor competency and preparedness for actual patient care. The App relies on the development of simulated urgent and emergent patient cases to provide a realistic, authentic experience relative to that which participants likely to encounter in their clinical practices. All cases will be designed to be managed over time to leverage the need for patient monitoring, as well as handoff, transfer, and potentially transport activities. The cases may be developed by instructors or team members and will be activated asynchronously. The E-teamwork App could be designed to interface to an EMR/ EHR for real patient data and management to increase its authenticity and expand the case library, including videos (patient interviews), imaging studies and laboratory reports.

E-Teamwork App Training Objectives

- Understand Team's Capacity and Capabilities
    - Individual and collective clinical practice areas
    - Individual and collective performance scope(s)
    - Individual and collective patient management capabilities
    - Individual and collective experience
    - Individual and collective expertise

- Acquire and Maintain Clinical Knowledge and Skills
    - Patient Presentation
    - Patient Symptoms
    - Diagnostic and Imaging Tests
    - Differential Diagnoses
    - Treatments and Interventions

- Implement Strategies and Actions
    - Developed Strategic Plan
    - Tactical Distribution of Tasks
    - Action Implementation, Confirmation
    - Deliberate Patient Assessment/Re-Assessment
    - Maintain Situational Awareness

- Manage Roles and Responsibilities
    - Leader Designated
    - Team Role(s) Delegation
    - Inform Team of Role Limitation(s)
    - Perform Role Designated Actions/Tasks
    - Intra-Team Mutual Support
    - Request Additional Support, as needed
    - Identify Team Role(s) to Newcomers
    - Demonstrate Role Accountability

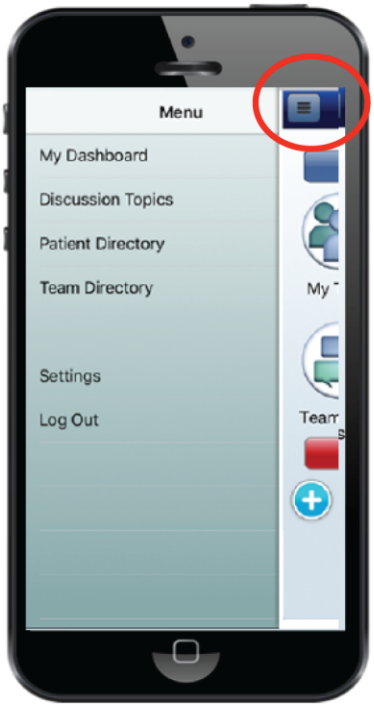
- Optimize Intra-Team Communication
    - Participation
    - Attitude (convey your mood through expressions (e.g. ☺)
    - Opinion
    - Read/Listen
    - Respond/Understanding
    - Conflict Resolution
    - Ability to verbalize
    - Clarity
    - Do/Not respond
    - Debriefing/ Feedback

APP SPECIFICATIONS BY USER SCREEN

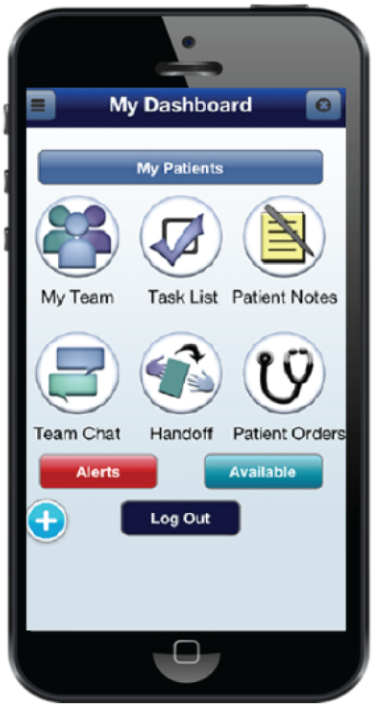
Users open the App and login to begin using E-Teamwork. Users may select their own login and password combinations when they register for the first time. After logging in, the user will see their dashboard "My Dashboard." The upper left icon opens a side menu to provide options for setting the users preferences in the Settings, short cuts to other features in the App described herein (Discussion Topics, Patient Directory, Team Directory), and a return link to the main MyDashboard screen.

Select E-Teamwork Icon to open the App.

Log In to E-Teamwork App with username/ password.



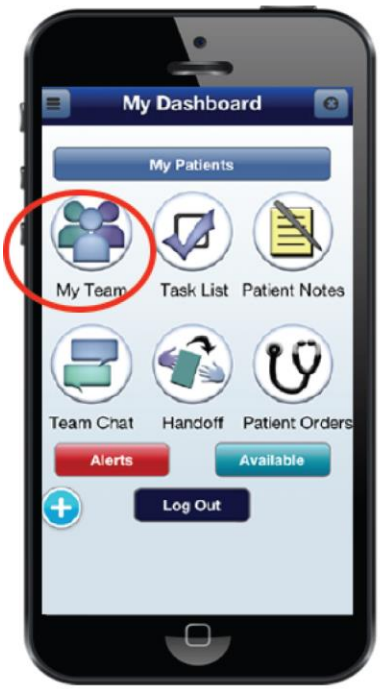
Icon opens Menu to Edit Settings, Log out of the App, access short cuts to patient / team directories, discussions.



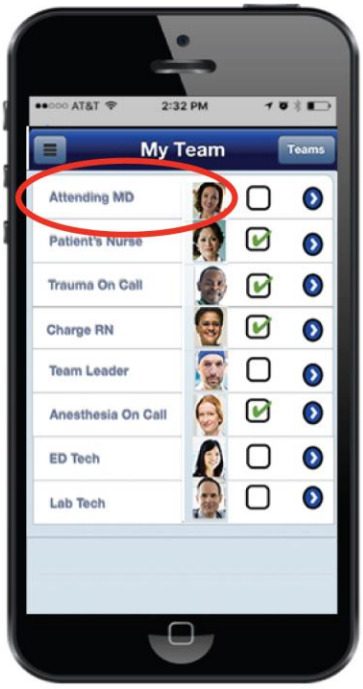
My Dashboard: My Dashboard provides integrated navigation for all aspects of team management of patients requiring emergency care.

- The My Patients button links the user to the patients requiring care.
- My Dashboard also displays easy navigational links to access the user's Task List, Patient Notes, and Patient Orders.
- The My Team link displays the members of the user's team, as well as a link to contact each of them.
- The Team Chat link facilitates communication between all team members.
- The Handoff link facilitates the transfer of patients or patient responsibilities between team members.
- The Alerts button displays any urgent alerts that require immediate attention.
- The Available button lets other team members know the user is available for teamwork, and changes to Unavailable if the user requires a break from care management activities.
- The Log Out button logs the user out of the E-Teamwork App.

My Team: All team members are able to directly access information about each other and directly communicate via text message or phone all using the options in the team directory. These direct access options provide additional communication channels to supplement Team Chat and patient specific notes, tasks, orders, etc. that are described in more detail in the App specifications herein. Team members are able to switch teams at any time by selecting the Teams icon. If a member switches teams, the team they are leaving is immediately alerted and any tasks/responsibilities are automatically assigned to the team member with the least responsibilities at the time the team member leaves. That team member must then either accept the transferred responsibilities or transfer them to another team member.

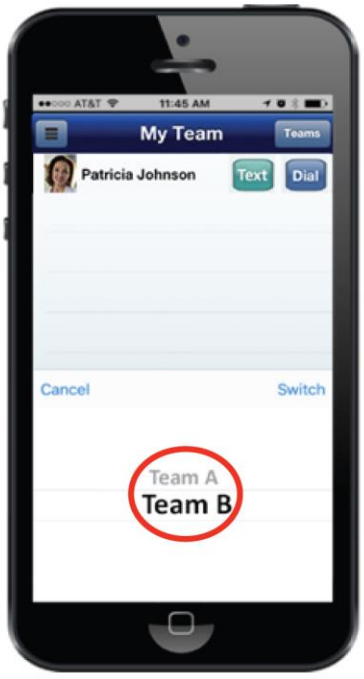


Icon opens My Team, list of team members. My Team facilitate team introductions, service status, and contact / communication access.



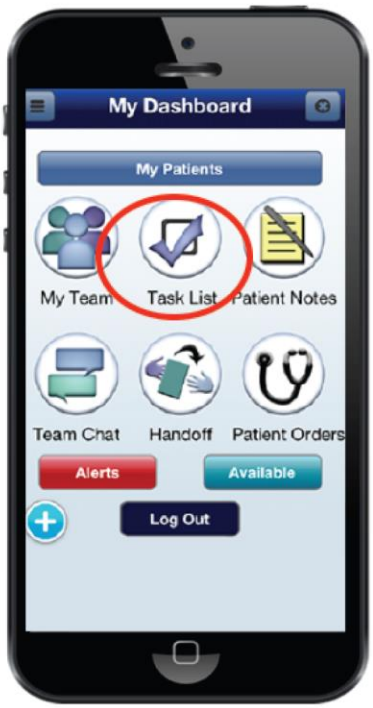
Users can view their team members by name or by functional role by swiping right/left from the list page. Service status is indicated, and direct functionality for text/call is supported. Touch each team member in the list to open their respective profile pages.

Team profile pages provide an overview of the team member's expertise, experience, role on team, and other professional background information. The profile page indicates the service status and location of the team member, as well as direct contact. An accordian menu opens detailed information about the team member's background.



Touch the Teams icon in upper right to open the option selector to switch teams.

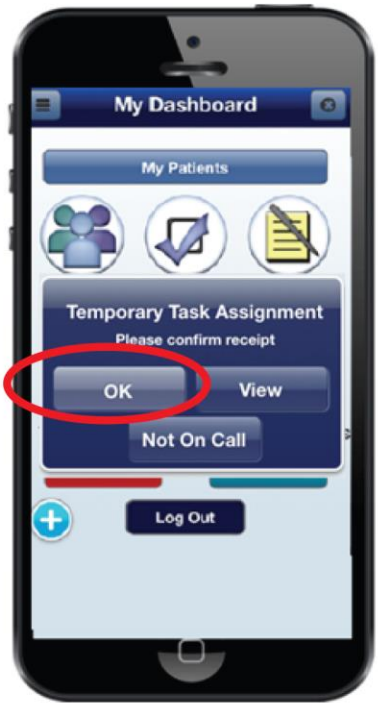
Task List: Task lists are available to all team members and can be accessed for all patients or individual patients, depending on the team members responsibilities. For example, a senior clinician may be responsible for monitoring the task work of junior clinicians working under his/her direction. The App makes it convenient to view all tasks By Patient or By Task from My Dashboard. Task Transfer icon facilitates easy transfer of task responsibilities between the team, so that optimal efficiencies are leveraged when any team member is overloaded. Patient specific Task Lists are also available and are described in the Patient Portal specifications below.



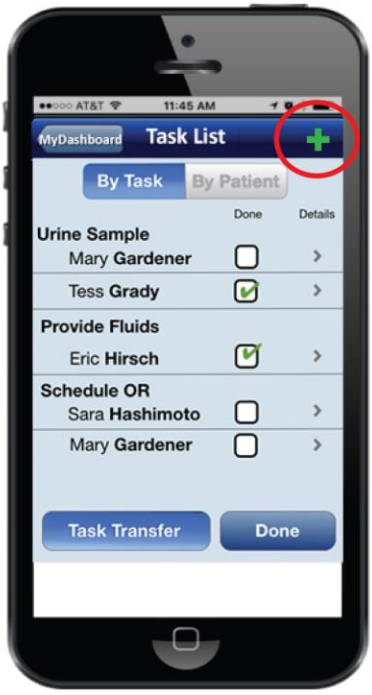
Icon opens Task List to facilitate distribution of patient care tasks within the team.

Display list by Task/Patient. Touch task/name from the list to view details. Transfer tasks to others Task Transfer icon.

The task transfer window allows users to select the team member and set the time frame for the transfer. It allows tasks to be transferred for multiple patients.



The designated team member receives an alert request for task transfer. Team member must accept or decline transfer.



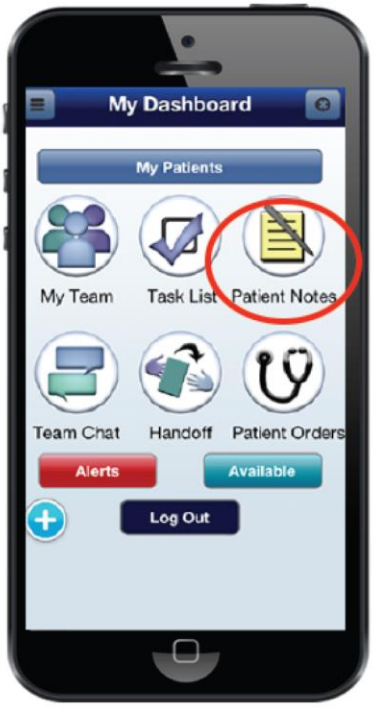
To compose a task for a patient, select the "+" icon.

Select the fields in the Compose window. Select the patient from the patient menu. Select the team member from the team list page.

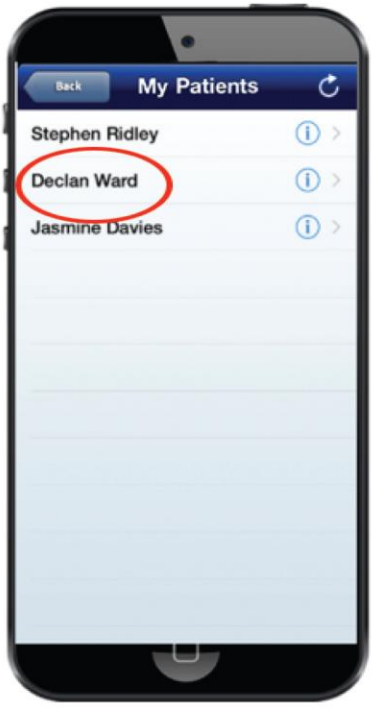
Select from the menu to attach media, type, or use microphone to add text from speech.

The designated team member receives an alert that a task has been assigned. The team member may view an overview of the task immediately, or, if necessary, access the details later.

Patient Notes: Patient Notes are available for each patient from My Dashboard. Patient Notes may also be accessed from each patient's portal (see below). The option to access Patient Notes from My Dashboard facilitates quick-look access to information real time, as needed to respond to alerts/urgent requests.

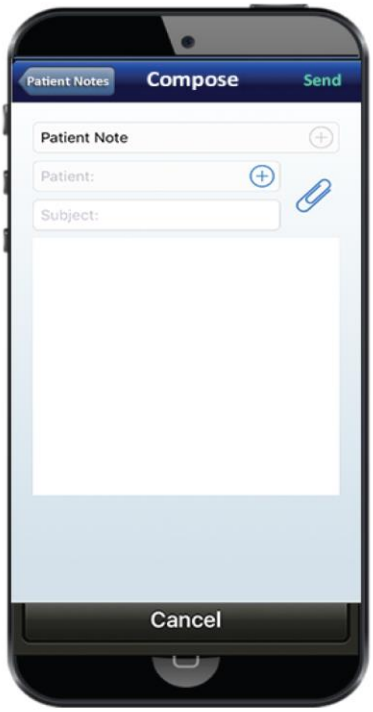


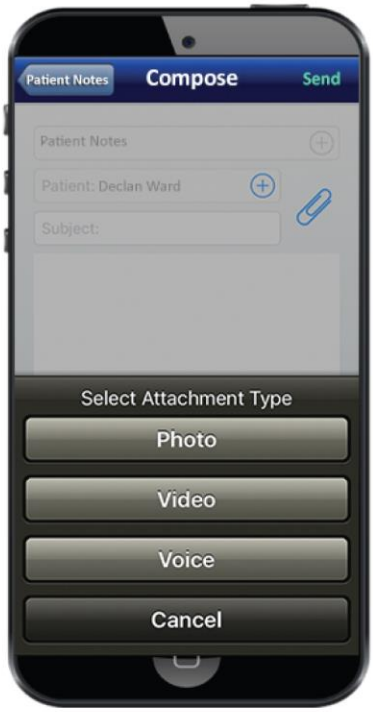
Icon opens Patient Notes.



Touch the patient's name from the list to open a navigable patient summary .

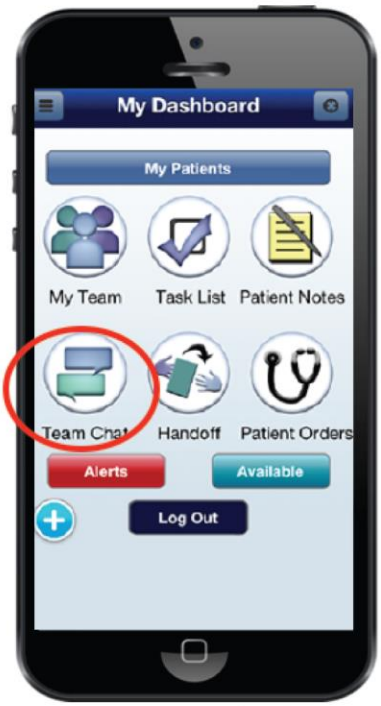
An overview of the patient's notes opens. Touch entry item to open the complete patient record. Includes the clinician whoadded to the note, patient status, history, lab/study reports, media files, and other relevant information. An accordian style menu facilitates uncluttered access to content, file viewing. Notes may be edited from within the content window. The Add icon opens screento compose a note. Patient notes may also be created and edited from within the patient's individual portal (see below).



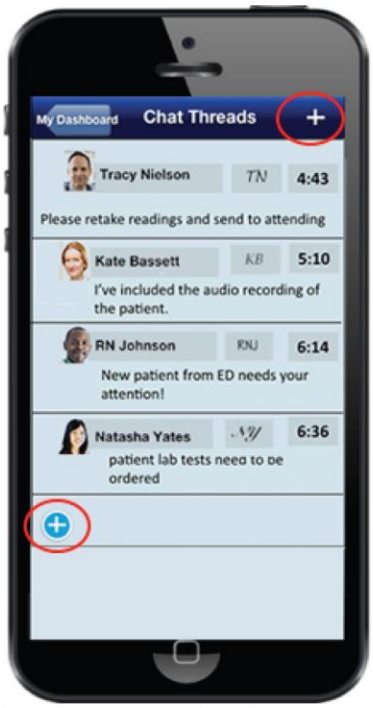


To compose a note for a patient, confirm the patient's name and select from the menu to attach media, typeor use microphone to add text from speech.

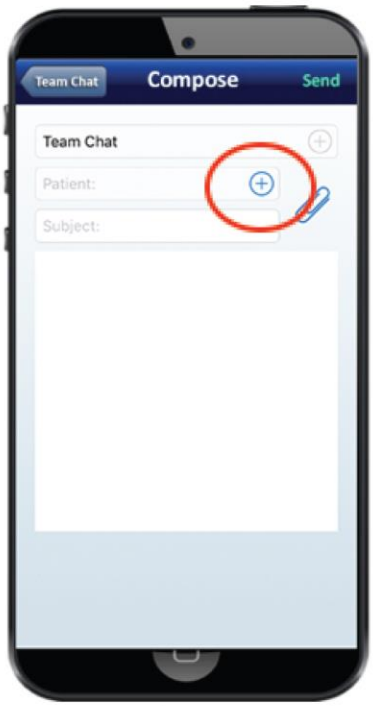
Team Chat: Team Chat facilitates easy communication from clinicians to the entire patient care team from My Dashboard. All team members have access to the chat feature and may add and modify messages in the threads. Threads are linked to specific patients when the initial message is composed. Media files may be attached to chat messages.



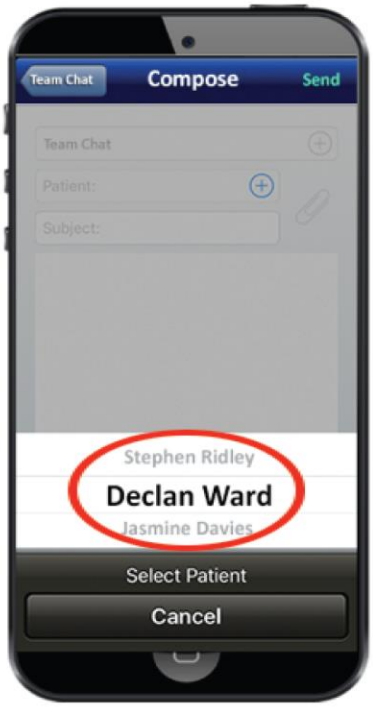
Icon opens Team Chat feature to facilitate single-message team communication.



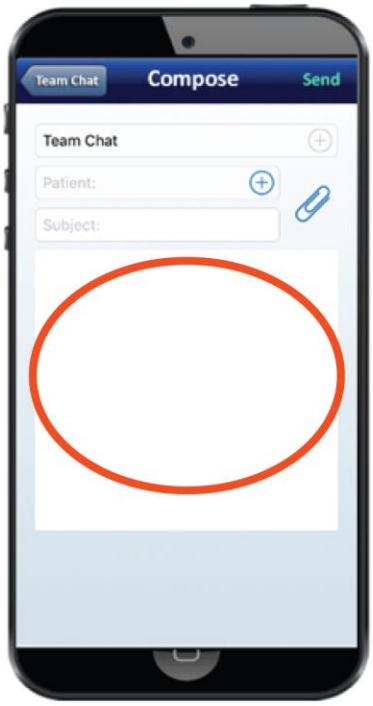
Chat threads are listed sequentially, with poster & time. Touch message to open. "+" starts new thread.



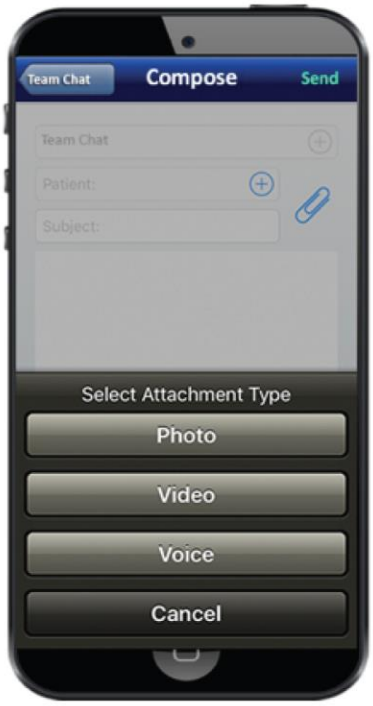
To compose a chat message about a patient, select the name from patient menu.



Compose a chat message about a patient by selecting the name from patient menu.

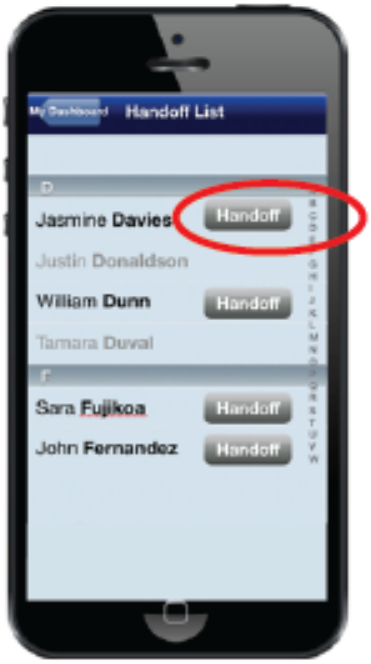


Chat text fields are editable. Other buttons attach files/send/navigate.



Select icon to attach media. Use microphone to add text from speech.

Handoff: The Handoff icon facilitates easy transfer of patient responsibilities from one clinician or team of clinicians to another after a specified period of time, similar to a shift change or transfer from one care areato another. The Handoff List will include the names of all patients being managed by the clinician(s) and a button to select the patient for handoff. The handoff function will capture patient data enterred in by the previous team(s) and format it with the convention Situation, Background, Assessment, Recommendations (SBAR). The clinician who is initiating the handoff will select the clinician who will recieve the handoff in a similar method to transferring tasks. The receiving clinician will see a Patient Handoff Alert to notify that responsiblity for the patient is being transferred. The clinician(s) may refuse the handoff is they are not available to receive the patient.



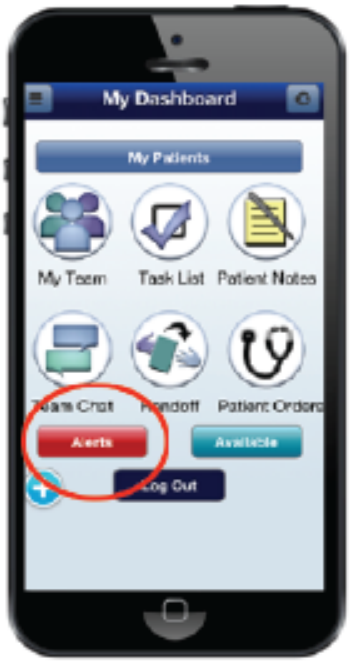
Patients are listed alphabetically with a Handoff button used to add them for handoff.

The Handoff button opens the record for the selected patient, formatted as SBAR. Fields are editable for additional notes and files may also be attached to the Handoff record. Handoff edits will write to the patient record.

An alert will be sent to the designated recipient of the Handoff. The receiving clinician(s) must respond to the alert.

Patient Orders: The Patient Order icon facilitates easy access to the status of all patient orders that are being managed by the entire patient care team from My Dashboard. All team members have access to patient orders for each patient. Patient orders are grouped by patient, with the status of each order indicated (Open, In Process, Delayed, Done). Clinicians can select an option to see of list of Overdue orders, also grouped by patients. The results of completed orders can be viewed by selecting the Done status icon for the patient.

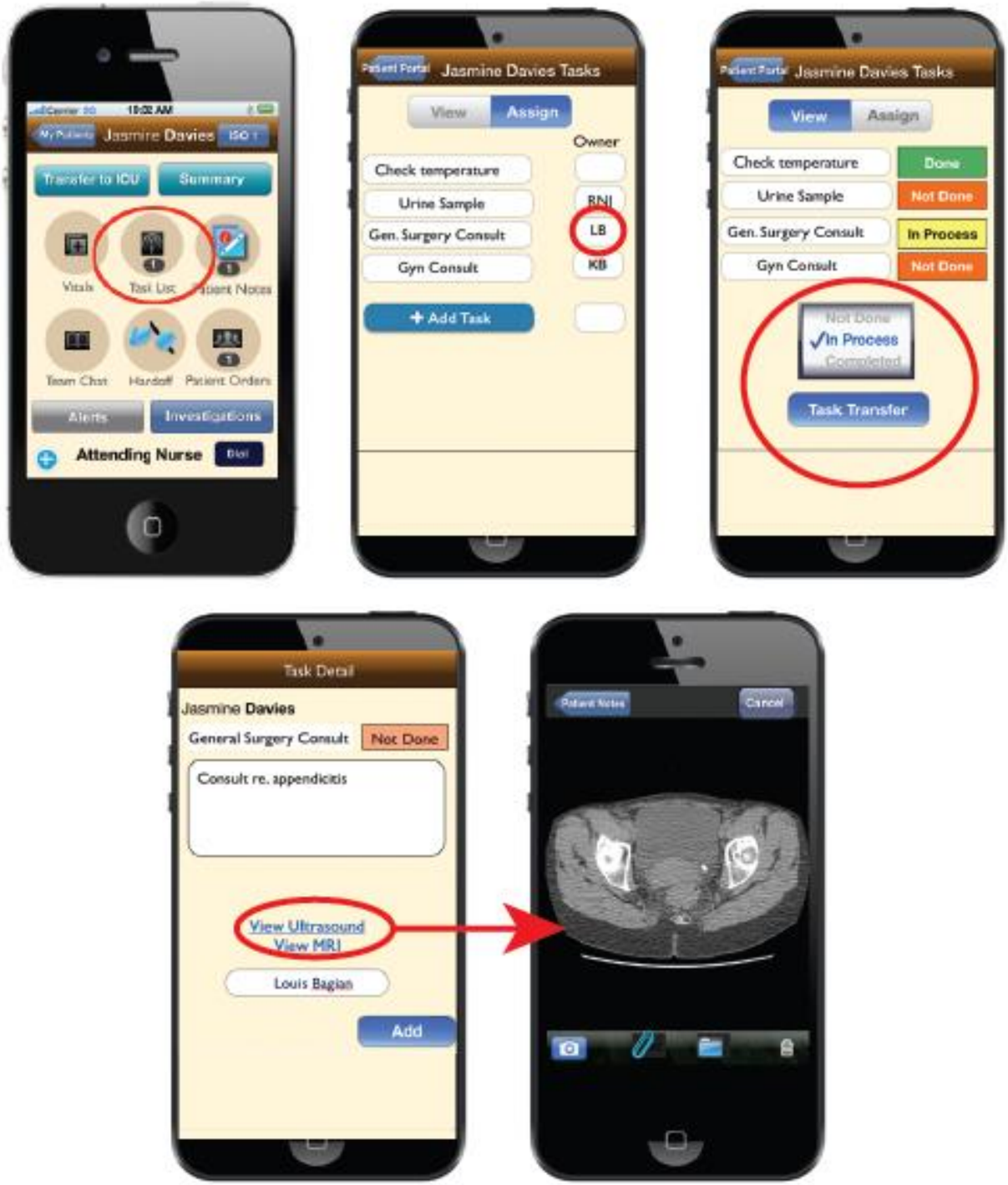
Alerts: The Alerts feature facilitates easy access to prioritized actions required by clinicians from My Dashboard. A list of patient names with associated color-coded prioritized alerts allows clinicians to select the patient(s) with the most critical needs first. Selecting the patient opens the alerts record, which is also color-coded by priority with the most critical action at the top of the list. Completed actions remain accessible as grey fields with the original priority code as an indicator for easy reference to critical actions history. Opening the alert provides specific information and the ability to reply or forward to alert to another clinician or team. The All Alerts button takes the user back to the list of the patient's alerts. Clinicians can create an alert using the "+" and follow a similar process as creating other communications (task, patient notes, etc.). The designated selected clinicians will recieve a Patient Alert message on their mobile device, including the priority level. Recipients will respond in a similar way to Patient Handoff and Task Transfer alerts.



Patient Portal: The MyPatients icon opens the complete alphabetized list of patients the team is responsible for managing. A color-coded dot next to the patient's name provides a fast visual orientation to the prioritization status of the patient (red = critical; yellow = unstable; green = stable). There location is also indicated. Selecting the patient from the list opens the patient's individual portal. The Patient Portal has Team Chat, Handoff, and Alerts icons that function as they do in MyDashboard. The Patient Notes and Patient Summary icons open the patient's records directly. The Transfer icon initiates patient Handoff to another location or care team. The location icon in the upper right opens a facilities map with the patient starred.

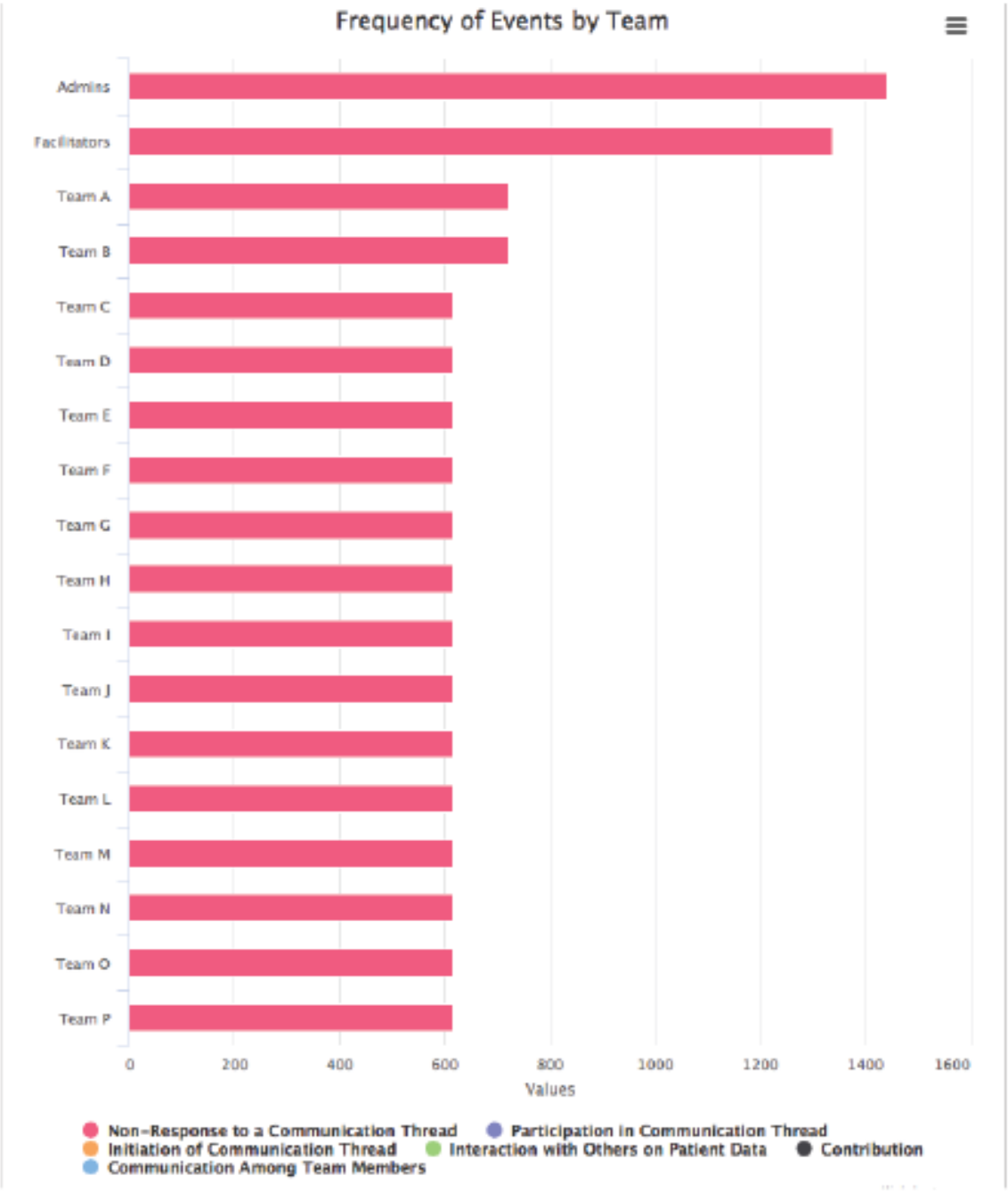
The Vitals icon on the Patient Portal opens the current vital signs for the patient. Selecting the specific vital record opens the trending data for that indicator.

The Task List icon opens the task list for the specific patient, with an option to view the tasks by status or by the resposible team member. The user can click on the responsible clinician's initials to open the team member's profile, described above. The user can also add a task for the patient by selecting the Add Task button, which initiates the same process described above. To change the status of a task, the user selects from the menu (Not Done, In Process, Delayed, Complete). To transfer the task, the user selects the task transfer button to initiate the task transfer process described above. To open the details associated with the task, the user selects the task button. The task detail screen provides details about the task, the responsible team member, and links to any reports associated with tests and investigations.



The Patient Orders icon opens a list of all orders for the specific patient, including tests, treatments, monitoring, disposition, etc. Like tasks, the status of each patient order is indicated as Done, In-Process, Not Done, or Delayed. Selecting the specific order will open the results. If the order is for an investigation the results may also be accessed directly from the Investigations button on the Patient Portal. The results of investigations are priotized with color coding for abnormal and critical outcomes. The detailed report for any investigation is accessed by selecting the test.

Performance Metrics: Performance metrics for each team will be tracked and reported by metric. At minimum, performance metrics include: Non-response to communication threads; Participation in communication threads; Initiation of communication threads; Interaction with team regarding patient data/satus; Contributions to patient records; Accurate decision-making; Communication among team members; Review of team members profiles; Complete and accurate patient hand-off; Complete and timely task transfers.



What opportunities for training and professional development has the project provided?
All subjects participated in simulated emergency medicine events that included concurrent management of three patients with urgent, critical care needs. The scenarios were designed to elicit a high-stress context that required a high level of team performance, as well as clinical expertise. Although not an explicit objective for the project, the majority of subjects remarked about the level of realism in the simulated events and that it provided them with an opportunity to learn and implement both team-based behaviors and clinical knowledge they either had forgotten or never acquired. As such, it is clear that participating in these activities was a form of professional development and training for many of the subjects, and the simulation scenarios as documented are recommended as part of ongoing team-based training activities (as noted above).

How were the results disseminated to communities of interest?
Manuscripts are being written that describe the findings from the study. These manuscripts will be submitted for review by the following peer review journals:

- *Journal of Emergency Medicine Services*
- *Journal of Emergency Medicine*
- *Emergency Medicine – Open Access*
- *Translational Behavioral Medicine*
- *Science Translational Medicine*
- *Organization Science*
- *Industrial and Organizational Psychology*
- *Management Science*
- *Simulation in Healthcare*

Presentations will be submitted for consideration to the following annual professional meetings:

- *Society of Academic Emergency Medicine*
- *Trauma Innovation*
- *Connecting Communities in Emergency Medicine: Sharing Innovations*
- *International Emergency Care Conference National Association of Emergency Medical Services Physicians*
- *Emergency Medicine Conference*
- *Pediatric Emergency Medicine*
- *Controversies and Consensus in Emergency Medicine*
- *Science of Team Science*
- *Interdisciplinary Network for Group Research*
- *Association for Interdisciplinary Studies*
- *International Meeting of Society for Simulation in Healthcare*
- *European Society for Simulation Applied to Medicine*
- *Simulation Australia SimHealth*

What do you plan to do during the next reporting period to accomplish the goals?
Nothing to Report.

4. **IMPACT:** Describe distinctive contributions, major accomplishments, innovations, successes, or any change in practice or behavior that has come about as a result of the project relative to:

What was the impact on the development of the principal discipline(s) of the project?

Typical healthcare team training takes a broad approach that includes concepts and associated content that may or may not be valued by team members, or relevant to their specific team type. The result may be cost expenditures for software or other training mechanisms that do not necessarily get to the core issues of any given team. Rather, through attempting to improve the performance of all healthcare teams, developers have often relied on the all-encompassing, universal concepts such leadership, communication, situational awareness, etc. These concepts are difficult to operationalize with any measurable degree of specificity and their generality neglects to consider the individual and team factors that influence a team's performance at any point in time. As a result, these team-training programs may have limited success even if they are pedagogically well designed and extensively implemented.

Healthcare team performance is essential for patient safety and quality of care, yet it remains a challenging construct to define towards effecting substantial and impactful improvements. Team training programs designed to reduce errors, increase patient safety, and improve quality of care in clinical settings have been enacted in both military and civilian contexts. Although costly to develop and implement, the relative and sustained effectiveness of these programs remains limited. The inherent variability in both military and civilian healthcare teams makes developing effective, broadly transferrable team training programs challenging largely because the focus of training and associated materials do not account for team variability. Training that does not address the perceived needs of a team is unlikely to be integrated into practice or sustained over time. Therefore, cost effective and impactful solutions must target the specific needs of any given team.

The information gained through this study elucidates the most influential individual and team factors to inform the development of technology centered training solutions for healthcare team performance in emergency medicine contexts. We identified the separate and collective effects of individual and team factors on the team performance (clinical accuracy, skills, information exchanges), team cohesiveness, and team morale in the management of emergency medicine patients. We derived a predictive model to target the most influential contributors to team performance, as well as the extent to which team clinical performance correlates with team cohesiveness and team morale. These empirically derived predictive models establish a foundation for advancing the effectiveness of healthcare teams by targeting, relevant, on-demand training solutions to the needs of the team.

The study data produced an evidence-based model for determining the relative importance of both individual and team factors on team performance. Precise and focused team performance specifications lead to technology-based solutions with fewer unnecessary content features and redundancies. The App designed as a result of this study, and the specified simulation-supported training requirements, target the specific needs of the targeted urgent, emergent healthcare team. The results of this work informed the design of a smart-technology centered, portable training solutions (App) that provides real-time performance feedback and may be tailored for applicability across variable civilian and military healthcare teams.

The outcomes from this study will aid in the reduction of redundancies and extraneous content from training and performance support tools, and likely motivate team members to engage with the content and apply its foundations to their behaviors because the content has meaning to them. Additionally, the outcomes of this study demonstrate that although cognitive diversity within an interdisciplinary team may be advantageous for decision-making, the collective expertise and experience within the team must be sufficient to adequately consider the significant clinical details and potential alternatives for treatment. As team members see improvements in their collective performance by engaging in and applying their learning in tclinical contexts, they will begin to identify areas where they derive novel techniques and methods to further perfect their performance. In this way, innovation will perpetuate because the specific needs of the team are paramount to generalities, and ultimately will improve the provision of clinical care.

What was the impact on other disciplines?
Other Clinical Disciplines

The study implemented a process for identifying the individual and team factors that significantly impact team performance so that the development of team training is be based on data derived targets for urgent, emergent care teams. The factors influencing performance of these teams may be quite different from clinical teams who work together in non-urgent, non-emergent care contexts. Optimal team training for other specialty contexts will require a different foundation because the factors that impact team performance will likely be different.

The study compared the relative impact of factors on different team types in Emergency Medicine and demonstrated the significance of team type as an impactful factor to team performance. Value can be gained through empirically deriving the most impactful factors for other types of healthcare teams, and using those factors to target team development activities where they will have best likelihood of achieving sustainable improvement. Identification of empirically derived individual and team factors that predict team performance will also lead to more robust performance assessment by defining the factors most likely to adversely impact team performance. This will minimize the uses of over assessment that are often implemented to compensate where performance is described by loosely defined constructs, such as communication.

The unique approach taken through the study led to the design of a targeted training application for emergency medicine teams. Likewise, this approach may lead a new generation of team training platforms that are more aligned with the needs of other healthcare teams. These may include the development of additional Smart technologies or hybrid training platforms that also include more traditional instructional methods (simulation).

The predictive model provides a strong framework for the development of smart-technology facilitated team training applications that are broadly transferable to both military and civilian clinical contexts. The methodological approach of using multiple regression analyses of contextually relevant empirical data will uncover the most important factors associated with team performance in any given clinical context, regardless of the type of team or member composition.

Establishing the influencing contributors to the performance of any team type is essential for cost-effective development of technology solutions for training and evaluation systems, especially for on-demand computer-based resources that target specific performance requirements. It's costly to develop solutions that only address broadly defined team performance dimensions, especially if these broad constructs are not defined to the extent where specific performance aspects can be adequately measured. The process of defining the most influential factors in the performance of a specific type of team narrows the training focus to precisely what is needed for that team and disregards that which does not significantly impact its performance. Predictive models for team performance have the potential to support collaborations between military and civilian healthcare providers and industry partners to develop team performance solutions that result in quality and safety improvements across the spectrum of healthcare services.

The specification of impactful team performance factors will also establish a relevant foundation for performance standards that lead to the specification of supporting technology standards. This outcome will support the design and development of cost-effective technological innovations targeting important human performance variables that directly impact clinical care.

What was the impact on technology transfer?
The design specifications for the App and the birthing simulator have the potential to become products to support training and assessment applications for urgent, emergent care teams. Strategies for developing the App

are being considered by Metrics Medicus, the company that created the assessment app used for the study. Strategies for producing the birthing simulator are being evaluated, with the aim to produce them in developing regions of the world to support economic development while also reducing maternal mortality in a cost effective way. The team performance assessment instruments are already available as products on the CareAssess assessment platform through Metrics Medicus.

What was the impact on society beyond science and technology?

Maternal Mortality
The birthing simulator designed for the pregnant patient in distress has the potential to be used for training in labor and delivery in both domestic and global health markets. It is a low cost design that is easily produced using materials and sewing resources that are available in even rural and remote regions of the world, where maternal mortality rates remain unacceptably high. The birthing suit is designed to be worn by a patient actor, requires no power to use, and can be easily adapted to accommodate any obstetric situation (breech presentation, shoulder dystocia, post-partum hemorrhage, etc.) or family planning procedure (diaphragm fitting, IUD placement, etc.). Given the validation data associated with this project, there may be interest by global health agencies and non-profit organizations in producing and distributing the simulator in support of training efforts in regions with high maternal death.

5. CHANGES/PROBLEMS:

Changes in approach and reasons for change
Due to delays in securing contracts and IRB approvals with several of the collaborating sites, we were only able to collect data from four sites. The sites were geographically and demographically distinct from each other and we were able to secure sufficient numbers of subjects from each to achieve sufficient statistical power with the sample.

Actual or anticipated problems or delays and actions or plans to resolve them
Nothing to Report.

Changes that had a significant impact on expenditures
We were able to achieve statistically significant results with a smaller sample than anticipated, largely because the actual effect size was substantially greater than the conservative estimate. As a result, we did not require data collection activities at two planned sites. Additionally, we were more efficient in securing participation from site-based personnel (including collaborating site-PIs), which allowed us to trim back the primary project staff to the PI and Research Coordinator. We were also judicious in monitoring project-based expenses to assure sufficient reserves in the event that we were not able to achieve statistical power and needed to collect more data without requesting additional funds. As a result, we did not expend the full budget of the project.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents.

Institutional Review Board approval dates:

University of Central Florida	*02/17/2016; 1/20/2017*
NYU Langone Medical Center	*05/26/2016*
Brown University Rhode Island Medical Center	*09/21/2016*
University of Arizona Banner Health	*09/15/2016*
Eastern Virginia Medical School	*06/07/2016*

Significant changes in use or care of human subjects

Nothing to Report.

Significant changes in use or care of vertebrate animals.
N/A

Significant changes in use of biohazards and/or select agents
N/A

6. PRODUCTS: List any products resulting from the project during the reporting period. If there is nothing to report under a particular item, state "Nothing to Report."

- **Publications, conference papers, and presentations**

Journal publications.
Manuscripts are in process and will be submitted to peer-review journals:

- *Journal of Emergency Medicine Services*
- *Journal of Emergency Medicine*
- *Emergency Medicine – Open Access*
- *Translational Behavioral Medicine*
- *Science Translational Medicine*
- *Organization Science*
- *Industrial and Organizational Psychology*
- *Management Science*
- *Simulation in Healthcare*

Books or other non-periodical, one-time publications.
Nothing to Report.

Other publications, conference papers, and presentations.
Presentations will be submitted for consideration to the following annual professional meetings:

- *Society of Academic Emergency Medicine*
- *Trauma Innovation*
- *Connecting Communities in Emergency Medicine: Sharing Innovations*
- *International Emergency Care Conference National Association of Emergency Medical Services Physicians*
- *Emergency Medicine Conference*
- *Pediatric Emeregency Medicine*
- *Controversies and Consensus in Emergency Medicine*
- *Science of Team Science*
- *Interdisciplinary Network for Group Research*
- *Association for Interdisciplinary Studies*
- *International Meeting of Society for Simulation in Healthcare*
- *European Society for Simulation Applied to Medicine*
- *Simulation Australia SimHealth*

- **Website(s) or other Internet site(s)**
  The results from the study will be posted on the Metrics Medicus website as an example of how to use its CareAssess App for team development and training activities.
  http://metricsmedicus.com

- **Technologies or techniques**
  Two significant technologies were designed as part of this study, and a team performance assessment technique for urgent, emergent care teams was designed and verified for psychometric characteristics. The App design is described above and will be presented at relevant conferences and through targeted professional journals and trade magazines. The birthing simulator is described in the Appendices and will be presented at relevant conferences, through targeted professional journals, and directly to non-profit organizations with an interest in maternal mortality outcomes (JHPIEGO, ACNM, WHO, etc.). The team performance assessment instruments are presented in the Appendix and will be presented at relevant conferences and through targeted professional journals.

- **Inventions, patent applications, and/or licenses**
  Patent applications for the designs of both the App and birthing simulator are being considered. Copyright applications for the team performance assessment instruments are also being considered.

- **Other Products**
  The simulation-based assessment protocols that were implemented for data collection purposes have strong potential for training utilization in both military and civilian contexts. The team performance assessment instruments could support formative and summative assessment protocols during simulation-based training and in applied patient care settings. Both the training materials and the assessment tools have the potential to aid in the development, implementation, and maintenance of the team abilities that are most essential to team performance in urgent, emergency care contexts (Team Skills, Emergency Medicine Experience, Team Type-Team Member Familiarization).

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Name:	***Pamela Andreatta***
Project Role:	*PI*
Researcher Identifier (e.g. ORCID ID):	*0000-0002-7403-812X*
Nearest person month worked:	*24*
Contribution to Project:	*Dr. Andreatta is responsible for project conception, data collection, data analysis, coordination with site CoPIs, project decision making related to implementation and determination of outcomes impact(s), report reviews, development of data driven resources for training products, and communication with administrative, legal and financial entities within the institution of record (UCF) and the six collaborating sites.*
Funding Support:	*N/A*

Name:	***Lisa Hernandez***

Project Role:	*Program Coordinator*
Researcher Identifier	*0000-0002-9736-8957*
Nearest person month worked:	*20*
Contribution to Project:	*Ms. Hernandez has worked as the research coordinator for the entire project and is responsible for recruitment, coordinating site personnel, and reporting.*
Funding Support:	*N/A*

Name:	***Kirsty Freeman***
Project Role:	*Research Coordinator*
Researcher Identifier	*0000-0002-2241-2933*
Nearest person month worked:	*4*
Contribution to Project:	*Ms. Freeman prepared simulation scenario documentation, standardized patient recruitment and training, and contributed to site scheduling and IRB preparation.*
Funding Support:	*N/A*

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?
Nothing to Report.

What other organizations were involved as partners?

Organization Name: ***Eastern Virginia Medical Center***
Location of Organization: *651 Colley Avenue, Lester Hall. Norfolk, VA 23510*
Partner's contribution to the project:

- *Co-PI, Robert Armstrong*
- *Facilities*
- *Project Staff*
- *Collaboration*
- *Recruitment Support*
- *Standardized Patients*

Organization Name: ***New York University School of Medicine***
Location of Organization: *550 1st Avenue, New York, NY 10016*
Partner's contribution to the project:

- *Co-PI, Demian Szyld*
- *Facilities*
- *Project Staff*
- *Collaboration*
- *Recruitment Support*

Organization Name: ***University of Arizona Banner Health***
Location of Organization: *1111 East McDowell Rd, Phoenix, AZ 85006*
Partner's contribution to the project:

- *Co-PI, Karen Josey*
- *Facilities*
- *Project Staff*
- *Collaboration*
- *Recruitment Support*
- *Standardized Patients*

Organization Name: ***Brown University Lifespan Rhode Island Hospital***
Location of Organization: *1 Hoppin Street, Providence, RI 02903*
Partner's contribution to the project:

- *Co-PI, David Linquist*
- *Facilities*
- *Project Staff*
- *Collaboration*
- *Recruitment Support*
- *Standardized Patients*

Organization Name: ***University of South Carolina Palmetto Health***
Location of Organization: *555 Harden Street Lower Level, Columbia, SC 29203*
Partner's contribution to the project:

- *Co-PI, Eric Brown*
- *Collaboration*

8. SPECIAL REPORTING REQUIREMENTS

Collaborative Awards: *N/A*
Quad Charts: *Submitted with attachments.*

9. APPENDICES: Attach all appendices that contain information that supplements, clarifies or supports the text.

Appendix 1: Site Email Recruitment
Appendix 2: Online Database Registration
Appendix 3: Screen Call Checklist
Appendix 4: Welcome Email
Appendix 5: Assessment Instruments
Appendix 6: CareAssess App
Appendix 7: Birthing Simulator (Suit)
Appendix 8: Simulation Protocols
Appendix 9: Simulation Scenarios
Appendix 10: Data Collection Activities at Sites
Appendix 11: Budget
Appendix 12: Quad Chart

Appendix 1: Site Email Recruitment

Appendix 1: Site Email Recruitment

SUBJECT: Recruiting for participation in a Research Study at [SITE NAME]

[PI NAME] and [SITE NAME] Brown are collaborating with The University of Central Florida to assist with the recruitment of potential participants in a study: *Targeted On-Demand Team Performance--App Development Study* at the [SITE NAME] on [DAYS & DATES].

The purpose of this research study is to define which individual and team factors that best inform the development of impactful team training in Emergency Medicine.

You may be eligible for this study if you are a health care practitioner who works as part of a clinical Team (MD, RN, LPN, PA, NP, RT, Ed Tech, EMS, etc.) in Emergency Medicine contexts. You must be 18 years of age or older to participate.

If you are interested in learning about this, study or to register, please click on the link below.

Opt-In Request for Target On-Demand Study

Your participation is voluntary and you will be paid for your time. You do not have to respond if you are not interested in this study. If you do not respond, no one will contact you, but you may receive another email, which you can simply disregard.

Please feel free to call or email any questions to the Research Coordinator (Lisa Hernandez 407-882-1398/lhernand@ist.ucf.edu).

Thank you for your time and consideration. We look forward to hearing from you.

Sincerely,

[PI SIGNATURE AND NAME]

Appendix 2: Online Database Registration

Appendix 2: Opt In Online Request Form

Opt-In Request for Target On-Demand Study

We are looking for study participants to define which individual and team factors that best inform the development of impactful team training in Emergency Medicine.

You will be asked to participate in a clinical simulation scenario as part of an inter-professional healthcare team. The scenarios will include clinical activities that are similar to those experienced as part of your typical work as an emergency medicine clinician and you will be compensated for your time.

Please complete the following form to indicate your interest in participating. For additional information, please contact the study PI (Pamela Andreatta, PhD; Pamela.Andreatta@ucf.edu) or Research Coordinator (Lisa Hernandez; lhernand@ist.ucf.edu).

Location: *
The medical facility that you are volunteering to participate at:

Brown University (Co-I) David Lindquist, MD ▼

Optional Time Slots (This is NOT confirmed until you receive a Welcome email) *
April 25
April 26
April 27

▼

ED Role (MD, RN, PA, LPN, EMS, RA, NP, etc) *

Name: *
The name of the individual volunteering for the study.

Telephone(s): *
The best number to contact and reach you to complete the screen process.

Preferred Study Day: *
April 25th, 26th or 27th

Email: *

Please contact me if you have problems with this form.
Lisa Hernandez 407-882-1398 or send an email:
lhernand@ist.ucf.edu

Send me a copy of my responses

Appendix 3: Screen Call Checklist

Appendix 3: Call Screening for Participant checklist

Done	Checklist Screening Participants	Complete
	All potential participants will receive a phone call and screened for qualifications with the check list below.	☐
	Call/Screen/Confirm PARTICIPANTS	
🟡	**- Call/Screen/Confirm PARTICIPANTS**	
🟡	Call/Screen/Confirm PARTICIPANTS -Confirm Reviewed Informed Consent	☑
🟢	Call/Screen/Confirm PARTICIPANTS - Confirm 18 years of age/older with a valid ID	☑
🟢	Call/Screen/Confirm PARTICIPANTS - Read English Proficiency Passage	☑
🟢	Call/Screen/Confirm PARTICIPANTS - Confirm Professional Specialty with valid ID	☑
🟢	Call/Screen/Confirm PARTICIPANTS - Confirm time slot, Date- Day - Time	☑
🟢	Call/Screen/Confirm PARTICIPANTS - Assign Participant ID # (Site-Day-Group)	-
🟢	Call/Screen/Confirm PARTICIPANTS - Send WELCOME Email with Reporting Information	-
🟢	Call/Screen/Confirm PARTICIPANTS - Update Database with ID information	-
🟢	Call/Screen/Confirm PARTICIPANTS - Print Consent form with ID #	☑
🟢	Call/Screen/Confirm PARTICIPANTS - 2 Hole Folder for Site- Day - Group	☑

Appendix 4: Welcome Email

Appendix 4: Welcome Email

From:
To:
Subject: TEMPLATE Welcome – Target On- Demand Study
Date:
Attachments:

Please report to:

Eastern Virginia Medical School (EVMS)
651 Colley Avenue
Lester Hall, 2nd Floor
Norfolk, VA 23510

Study Date: Day and Date
Study Time: 11:30AM
Participant ID: Site-Group-#

Be advised we are running multiple studies and we ask that you arrive on time.

Bring with you on the day of the study:

1. Current Valid ID (proof you are 18 years of age)
2. Field ID (Hospital badge, proof of specialty)
3. Stethoscope (if you use one currently in your field)
4. Feel free to wear whatever you are comfortable wearing
5. Bring Parking Garage Ticket for Validation

Please feel free to email or call me with any questions,
Thank you for your support!

Appendix 5: Assessment Instruments

Appendix 5: Assessment Instruments

Pre Assessment ID#:

Item	(Circle, Check, or Write Response)
D1: What is your self-identified Gender?	Male Female Other
D2: Select the best descriptor of your CLINICAL ROLE:	Executive Administration Physicians Residents Advanced Practice Nurse Physician Assistants Allied Health Professionals General Care Nurses General Care Technicians Orderlies/Administrative Support
D3: CLINICAL PRACTICE: How many years have you worked in OTHER CLINICAL ROLES?	_____Years
D4: CLINICAL PRACTICE: How many years have you worked in EMERGENCY MEDICINE clinical practice?	_____Years
D5: Have you served in the MILITARY?	Yes No
D5A: If so, which MILITARY BRANCH?	N/A Army Navy Air Force Marines Coast Guard National Guard, Other
D5B: If so, what was your highest MILITARY RANK?	N/A Enlisted Non-Leadership Enlisted Leadership Junior Officer Senior Officer
D5C: If so, did you serve in a MILITARY MEDICAL CORPS?	N/A Yes No
D5D: If so, what is your current MILITARY STATUS?	N/A Former Current Reserve
SLEEPINESS: How would you rate your sleepiness level at the commencement of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
LETHARGY: How would you rate your lethargy level at the commencement of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
EXHAUSTION: How would you rate your exhaustion level at the commencement of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)

ID#:

EMOTIONAL DISTRESS: How would you rate your emotional distress level at the commencement of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
FATIGUE: How would you rate your fatigue level at the commencement of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
PHYSICAL STRESS: How would you rate your physical stress level at the commencement of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
A1. When a person is highly unfair, do you call it to attention?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A2. Do you find it difficult to make decisions?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A3. Are you openly critical of others' ideas, opinions, behavior?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A4. Do you speak out in protest when someone takes your place in line?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A5. Do you often avoid people or situations for fear of embarrassment?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A6. Do you usually have confidence in your own judgment?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A7. Do you insist that your spouse or roommate take on a fair share of household chores?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A8. Are you prone to "fly off the handle"?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A9. When a salesperson makes an effort, do you find it hard to say "No" even though the merchandise is not really what you want?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely

ID#:

A10. When a latecomer is waited on before you are, do you call attention to the situation?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A11. Are you reluctant to speak up in a discussion or debate?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A12. If a person has borrowed money (or a book,garment, thing of value) and is overdue in returning it, do you mention it?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A13. Do you continue to pursue an argument after the other person has had enough?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A14. Do you generally express what you feel?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A15. Are you disturbed if someone watches you work?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A16. If someone keeps kicking or bumping your chair in a movie or a lecture, do you ask the person to stop?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A17. Do you find it difficult to keep eye contact when talking to another person?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A18. In a good restaurant, when your meal is improperly prepared or served, do you ask the waiter/waitress to correct the situation?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A19. When you discover merchandise is faulty, do you return it for an adjustment?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A20. Do you show your anger by name-calling or obscenities?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely

ID#:

A21. Do you try to be a wallflower or a piece of the furniture in social situations?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A22. Do you insist that your service providers (e.g. repairman) make repairs, adjustments or replacements which are his/her responsibility?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A23. Do you often step in and make decisions for others?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A24. Are you able to express love and affection openly?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A25. Are you able to ask your friends for small favors or help?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A26. Do you think you always have the right answer?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A27. When you differ with a person you respect, are you able to speak up for your own viewpoint?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A28. Are you able to refuse unreasonable requests made by friends?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A29. Do you have difficulty complimenting or praising others?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A30. If you are disturbed by someone smoking near you, can you say so?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A31. Do you shout or use bullying tactics to get others to do as you wish?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely

ID#:

A32. Do you finish other people's sentences for them?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A33. Do you get into physical fights with others, especially with strangers?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A34. At family meals, do you control the conversation?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely
A35. When you meet a stranger, are you the first to introduce yourself and begin a conversation?	No/Never Somewhat/Sometimes Usually/A good deal Practically always/Entirely

Post Assessment ID#:

Item	(Circle, Check, or Write Response)
CLINICAL ENVIRONMENT: Have you worked in this environment before today?	Yes No
CLINICAL CASES: Have you managed these types of clinical cases before today?	Yes No
TEAM ROLE: During today's activities, did you perform work that you don't typically do in your normal work role?	Yes No
TEAM FAMILIARITY: Before today, how many of the people on your team had you worked with in other contexts?	None 1 2 3 4 5 6 7
TEAM CERTAINTY: How certain were you of your team mates clinical capabilities during today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
FATIGUE: How would you rate your fatigue level at the end of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
SLEEPINESS: How would you rate your sleepiness level at the end of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
EXHAUSTION: How would you rate your exhaustion level at the end of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
EMOTIONAL DISTRESS: How would you rate your emotional distress level at the end of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
LETHARGY: How would you rate your lethargy level at the end of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
PHYSICAL STRESS: How would you rate your physical stress level at the end of today's activities?	(Not at all) 1 2 3 4 5 6 (Very Much)
K1: Common causes of Sepsis include (*check all that apply*):	Staphylococcus aureus Meningococcus Listeria monocytogenes Candida Fungi Streptococcus pneumonia Enterococcus Peptostreptococcus anaerobius Bacteroides fragilis Proteus Escherichia coli Klebsiella pneumonia Enterobacter

ID#:

K2: What is the **primary** aim for the clinical management of shock?	Reduce blood pressure Resolve cardiac arrhythmia Increase vasodilation Restore tissue perfusion
K3: What labor stage is illustrated in the attached image? 	Stage 1 Stage 2 Stage 3 Stage 4
K4: Which of the following may have similar symptoms to labor and delivery (*check all that apply*)?	Acute Cholecystitis and Biliary Colic Appendicitis Diverticulitis Eclampsia Emergent Ectopic Pregnancy Irritable Bowel Syndrome
K5: Blood pH of > 7.45 with low HCO_3 and $PaCO_2$ indicates:	Metabolic Acidosis Metabolic Alkalosis Respiratory Acidosis Respiratory Alkalosis
K6: Which of the following is the definition of shock: (check all that apply)	Blood pressure too low to maintain normal metabolic functions Cardiac index too low to maintain normal metabolic functions Shock index greater than 0.9 Inadequate perfusion to maintain normal metabolic functions Abnormal vascular resistance

ID#:

K7: Which of the following are diagnostic criteria for Septic Shock (*check all that apply*)?

- Fever
- Chills
- Diaphoresis
- Nausea
- Vomiting
- Diarrhea
- Altered Mental Status
- Documented Infection
- Organ Dysfunction
- Inadequate Tissue Perfusion
- Change in Respiratory Function
- Shortness of Breath
- Change in Heart Rate
- Decreased Cardiac Output

K8: What do these lab results suggest?

Arterial Blood Gas	Value	Normal Range
pH	7.10	7.35 – 7.45
PaCO2	52	36 – 46 mm Hg
HCO3	15.6	22 – 26 mEq /L
O2 saturation	85	85 – 100%
PaO2	75	88 – 105 mm Hg
BE	-12.3	-2 to +2 mmol /L

Lab Results Suggest:

K9: Cardiovascular failure is typically manifested by:

- Hypotension
- Hypertension
- Oliguria
- Coagulopathy
- Hypoxemia

K10: For pediatric patients < 4years, which beta2-agonist has established safety and efficacy for treating bronchospasm (*check all that apply*)?

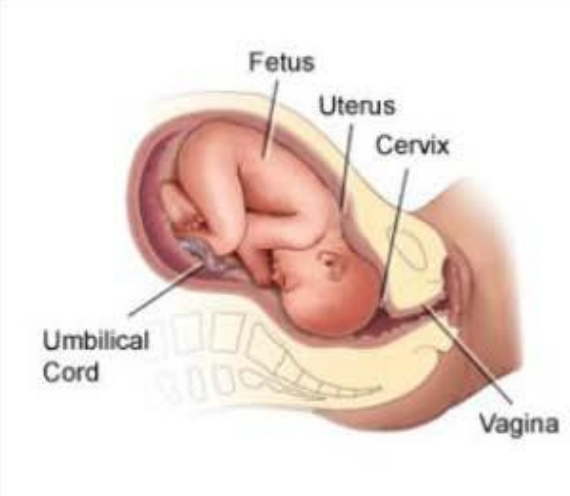
- Aerosol metered-dose inhaler
- Powder metered-dose inhaler
- Nebulizer solution
- Tablet
- Extended release tablet

ID#:

	Syrup
K11: Respiratory failure is typically manifested by:	Hypotension Hypertension Oliguria Coagulopathy Hypoxemia
K12: Respiratory distress, salivation, rhinorrhea, lacrimation, miosis, incontinence, and diaphoresis are clinical symptoms of which of the following:	Sepsis Viral Meningitis Anaphylaxis Chemical Exposure Viral Infection (GI) Pneumonia Upper Respiratory Infection Asthma
K13: Predisposing factors for sepsis include which of the following (*check all that apply*)?	Diabetes Mellitus Cirrhosis Leukopenia Pernicious Anemia Indwelling catheters, tubes, devices Systemic lupus erthematosus Prior antibiotic treatment Prior corticosteroid treatment Prior coagulotherapy
K14: Normalization of blood glucose improves outcomes for septic patients with AND without diabetes mellitus (True or False).	TRUE FALSE
K15: Renal failure is typically manifested by:	Hypotension Hypertension Oliguria Coagulopathy Hypoxemia

ID#:

K16: What labor stage is illustrated in the attached image? Stage 1 Stage 2 Stage 3 Stage 4



K17: During second stage of labor, fetal heart rate should be monitored or auscultated at least every 15 minutes (True or False): TRUE FALSE

K18: What do these lab results suggest?

COMPLETE BLOOD COUNT	VALUE	NORMAL RANGE
White Blood Cell (WBC)	19	4.8 - 10.8 K / mcL
Red Blood Cell (RBC)	5.2	4.7 - 6.1 M / mcL
Hemoglobin (HB/Hbg)	16.4	14.0 - 18.0 g / dL
Hematocrit (HCT)	46	42 - 52 %
Mean Cell Volume (MCV)	80	80 - 100 fl.
Mean Cell Hemoglobin (MCH)	29.6	27.0 - 32.0 pg
Mean Cell Hb Conc (MCHC)	13.3	11.5 14.5 %
Platelet count	115	150 - 450 K / mcL
Mean Platelet Volume	5.6	7.5 - 11.0 fL
WBC DIFFERENTIAL		
Neutrophil (Neut)	91	33 - 73 %
Lymphocyte (Lymph)	3	13 – 52 %
Monocyte (Mono)	1	0 10 %
Eosinophil (Eos)	2	0 5 %
Basophil (Baso)	4	0 – 2 %
Neutrophil, Absolute	8.1	1.8 – 7.8 K / mcL
Lymphocyte, Absolute	5.9	1.0 – 4.8 K / mcl.
Monocyte, Absolute	1.3	0 – 0.8 K / mcl.
Eosinophil, Absolute	.72	0 – 0.45 K / mcl.
Basophil, Absolute	.4	0 – 0.2 K / mcL

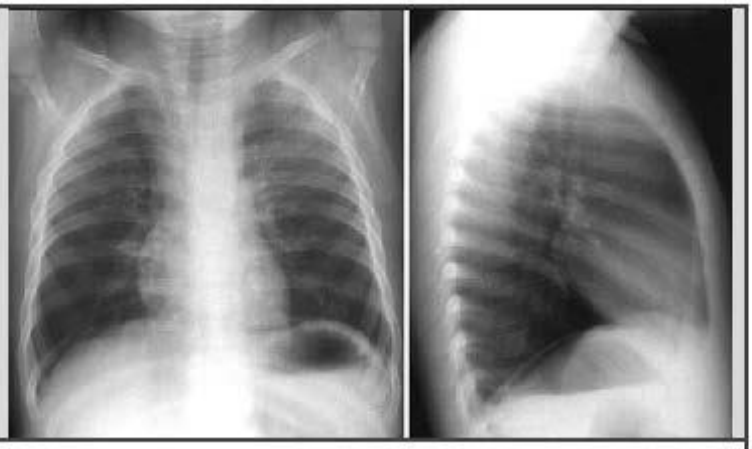
ID#:

Lab Results Suggest:	
K19: Septic shock is caused by (check all that apply):	Gram-negative bacilli Gram-negative cocci Gram-positive bacilli Gram-positive cocci
K20: Physical examination of a laboring patient should include which of the following (check all that apply):	Maternal Vital Signs Fetal Presentation Assessment of Fetal Wellbeing Frequency, Duration, Intensity of Uterine Contractions Abdominal Examination with Leopold's maneuvers Pelvic Examination with Sterile Gloves Degree of Cervix Dilation Cervix Effacement Fetal Position relative to Cervix Consistency of Cervix
K21: The mechanisms of labor include which of the following (check all that apply):	Expulsion Extension Dilation Internal Rotation Restitution and External Rotation Contraction Flexion Descent Placental Separation Engagement

ID#:

K22: What does this CXR suggest?

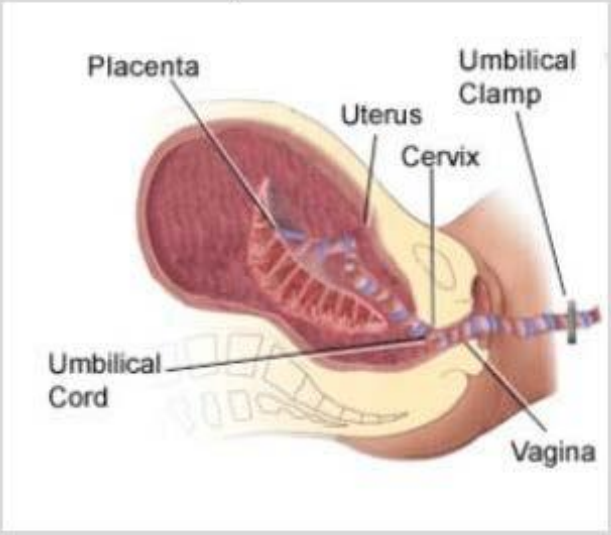
- Pneumonia
- Acute bronchiolitis
- Tuberculosis
- Respiratory Acidosis
- Pertussis



K23: Ultrasonography may be used to determine which of the following (check all that apply):

- Fetal Position
- Fetal Malformation
- Number of Fetuses
- Age of Fetus
- Fetal Weight
- Fetal Length
- Presence of Cardiac Activity
- Rate of Descent
- Cervical Dilation
- Cord Quality
- Quantity of Amniotic Fluid
- Eclampsia
- Hydatiform Mole
- Rh Isoimmunization

K24: What labor stage is illustrated in the attached image? Stage 1 Stage 2 Stage 3 Stage 4



ID#:

K25: What do these lab results suggest?

Comprehensive METABOLIC PANEL	VALUE	NORMAL RANGE
Glucose	385	65 – 99 mg / dL
Calcium (total)	10	8 – 11 mg / dL
Albumin	5.4	3.5 – 5.0 gm / dL
Total protein	9.8	5 – 9 gm / dL
Sodium	140	135 – 148 mEq / L
Potassium	5.5	3.5 – 5.5 mEq / L
Carbon dioxide	30	21 – 34 mEq / L
Chloride	112	96 – 112 mEq / L
BUN	25	6 – 23 mg / dL
Creatine (Male)	.83	0.2 – 0.6 mg / dL
Alkaline phosphatase	100	32 – 110 U / L
SGPT	28	8 – 32 U / L
AST,SGOT (Male)	16	7 – 21 U / L
Bilirubin, direct	0.3	0.0 – 0.4 mg / dL
Bilirubin, indirect	0.9	total minus direct
Bilirubin, total	1.2	0.2 – 1.4 mg / dL

Lab Results Suggest:

K26: Blood pH of < 7.35 with high HCO_3 and $PaCO_2$ indicates?

- Metabolic Acidosis
- Metabolic Alkalosis
- Respiratory Acidosis
- Respiratory Alkalosis

K27: The MOST likely consequence of administering a vasopressor infusion to a patient in septic shock is:

- Arterial Vasoconstriction
- Increased Cardiac Contractility
- Venodilation
- Decreased Urine Output

K28: A common physiological characteristic of septic shock is:

- Elevated right atrial pressure
- High systemic vascular resistance
- Low cardiac index
- Systemic vasodilation

ID#:

K25: What do these lab results suggest?

Comprehensive METABOLIC PANEL	VALUE	NORMAL RANGE
Glucose	385	65 – 99 mg / dL
Calcium (total)	10	8 – 11 mg / dL
Albumin	5.4	3.5 – 5.0 gm / dL
Total protein	9.8	5 – 9 gm / dL
Sodium	140	135 – 148 mEq / L
Potassium	5.5	3.5 – 5.5 mEq / L
Carbon dioxide	30	21 – 34 mEq / L
Chloride	112	96 – 112 mEq / L
BUN	25	6 – 23 mg / dL
Creatine (Male)	.83	0.2 – 0.6 mg / dL
Alkaline phosphatase	100	32 – 110 U / L
SGPT	28	8 – 32 U / L
AST,SGOT (Male)	16	7 – 21 U / L
Bilirubin, direct	0.3	0.0 – 0.4 mg / dL
Bilirubin, indirect	0.9	total minus direct
Bilirubin, total	1.2	0.2 – 1.4 mg / dL

Lab Results Suggest:

K26: Blood pH of < 7.35 with high HCO_3 and $PaCO_2$ indicates?

- Metabolic Acidosis
- Metabolic Alkalosis
- Respiratory Acidosis
- Respiratory Alkalosis

K27: The MOST likely consequence of administering a vasopressor infusion to a patient in septic shock is:

- Arterial Vasoconstriction
- Increased Cardiac Contractility
- Venodilation
- Decreased Urine Output

K28: A common physiological characteristic of septic shock is:

- Elevated right atrial pressure
- High systemic vascular resistance
- Low cardiac index
- Systemic vasodilation

ID#:

K29: What labor stage is illustrated in the attached image? 	Stage 1	Stage 2	Stage 3	Stage 4
K30: Which of the following are true about the third stage of labor (check all that apply)?	Time between delivery of fetus and of placenta It may last as long as 30 minute Expectant management involves spontaneous placenta delivery Active management involves prophylactic uterotonics Active management involves cord clamping/cutting Active management involves controlled traction of cord			
K31: Which of the following should be done for a patient with suspected ammonia ingestion?	Administer activated charcoal Neutralize with weak acid Induce emesis Dilute with water/milk Perform gastric lavage			
TC1: Team members were accepting of variation in each other's culture, customs, habits, and traditions.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC2: There were positive relationships among the team members.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC3: There was a feeling of unity and togetherness among team members.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC4: Team members felt comfortable expressing disagreements in the team.	Strongly Disagree	Disagree	Agree	Strongly Agree

ID#:

TC5: Problem solving processes would be disrupted if one or two members were absent.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC6: Problem solving in this team was truly a team effort.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC7: Team members influenced one another.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC8: I disliked working with this team.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC9: The team members seemed to be aware of the team's unspoken rules.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC10: Discussion appeared to be unrelated to the concerns of the team members.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC11: Most team members contributed to decision making in this team.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC12: Team members were receptive to feedback an criticism.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC13: Despite team tensions, members tended to stick together.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC14: It appeared that individual and team goals were inconsistent.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC15: An unhealthy competitive attitude appeared t be present among team members.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC16: Team members seemed to feel free to share their opinions.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC17: Minimal attempts were made to include quieter members of this team.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC18: Team members respected the agreement of confidentiality.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC19: People would be concerned if a team member was absent from the team.	Strongly Disagree	Disagree	Agree	Strongly Agree
TC20: Members engaged in "back-stabbing" in this team.	Strongly Disagree	Disagree	Agree	Strongly Agree

ID#:

TC21: Team members seemed to feel free to share their feelings.	Strongly Disagree	Disagree	Agree	Strongly Agree	
TC22: If a team with the same goals was formed, I would prefer to shift to that team.	Strongly Disagree	Disagree	Agree	Strongly Agree	
TC23: I felt vulnerable in this team.	Strongly Disagree	Disagree	Agree	Strongly Agree	
TM1: Other team members treated me as a partner.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM2: Information was openly shared between team members.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM3: Team members provided all of the information I needed to perform my job.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM4: I felt our team did our best to achieve excellence.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM5: My team members recognized the extra effort and actions I did to perform well.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM6: I felt that my opinions were listened to by the team when making decisions.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM7: I felt like a contributor to our teams success.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM8: The team was highly motivated to perform well.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM9: I felt a sense of personal accomplishment as a result of our team's efforts.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM10: I felt empowered to perform the work tasks I was assigned.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM11: I trusted the decisions made by the other team members.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM12: My team always listens to my suggestions.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM13: I felt empowered to take an active role as a team leader where needed.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM14: My teammates encouraged teamwork and cooperation to achieve targeted goals.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

ID#:

TM15: I felt comfortable bringing up any problems I was concerned about.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM16: Quality of care was a top priority for my team.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM17: My teammates treated me like a person, not a role.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM18: I experienced a spirit of cooperation with my teammates.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM19: I felt valued by my teammates.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM20: I like the type of work that I do.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM21: I felt like part of a team working toward shared goals.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM22: I was given enough authority to make decisions I needed to make.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM23: I got the information I needed to coordinate my work with others.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM24: My team members listened and responded to my concerns.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM25: I had the opportunity to provide feedback and input for key decisions.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM26: I received adequate recognition for good work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM27: I understand how my efforts contributed to the team's mission.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM28: I received adequate feedback on performance.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM29: My team members were focused on solutions, rather than blame.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TM30: My team members had a strong sense of personal responsibility for the performance of the team.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Appendix 6: CareAssess App

Appendix 6: CareAssess App

CareAssess Mobile App Steps for Data Collection

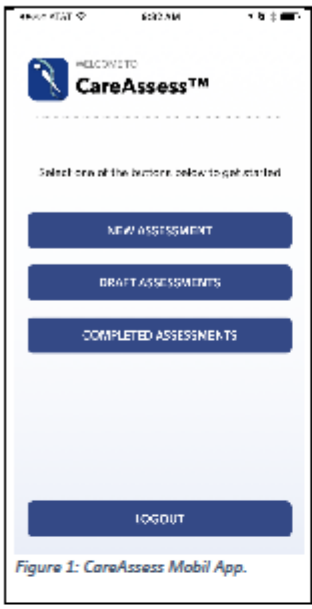


Figure 1: CareAssess Mobil App.

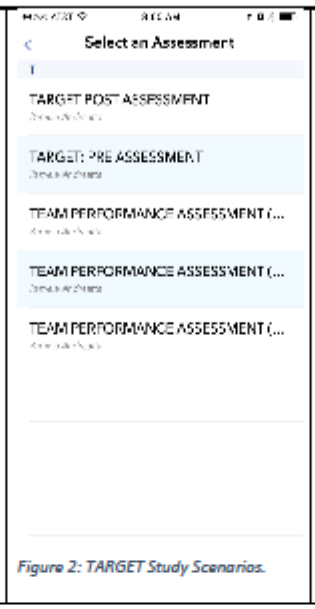


Figure 2: TARGET Study Scenarios.

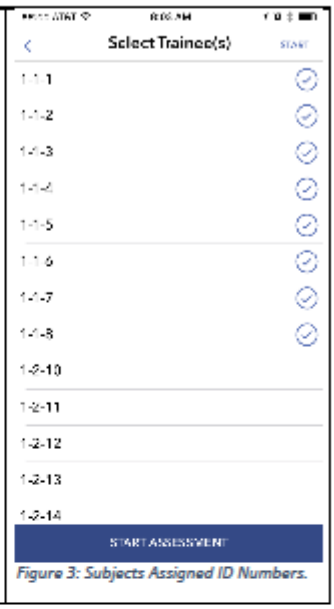


Figure 3: Subjects Assigned ID Numbers.

Figure 4: Scenario Overview.

Figure 5: PRE/POST all participants completed assessments.

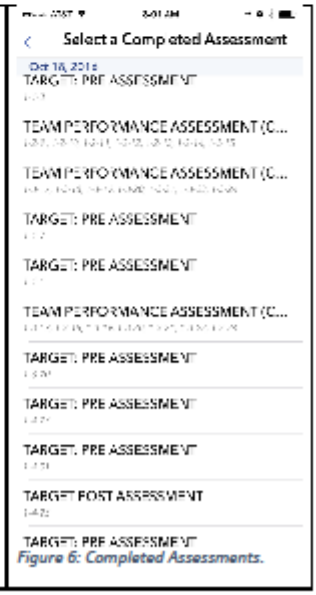


Figure 6: Completed Assessments.

Appendix 7: Birthing Simulator (Suit)

Appendix 7: Birthing Suit Development

DEVELOPMENT- BIRTHING SUIT SIMULATOR

For use with standardized patient

1. NEED
2. DESCRIPTION/PROCESS
3. DEVELOPMENT/PROTOTYPE
4. APPROVAL/TESTING
5. FOLLOWUP

INITIAL/NEED

Birthing Suit for Target On-Demand Project: In order to deliver a consistent study among all (6) sites a birthing suit simulator.

- The birthing suit need is to simulate a case scenario with abdominal pain/undiagnosed pregnancy.
- Design will allow for a simulated pelvic exam.
- Birthing baby doll is needed for the birthing
- Design should be in a flesh tone stretchable material to allow doll to pass through canal.
- Multiple female Standardized Patient actors will wear and test the suit.
- Suit will be used minimum 42 times

The need is an open body suit that attaches at the shoulders from front to back to allow adjustment for different body heights and sizes. (Standardized Patients)

DEVELOPMENT- BIRTHING SUIT SIMULATOR

For use with standardized patient

DESIGN PROCESS

Materials purchased:

- Chair pad foam
- Unbleached Muslin material
- Camel Shao Roma material
- All-purpose zippers (3)
- Flex shape elastic
- Flex shape snaps
- Self-adhere vinyl
- Material thread
- Fasteners

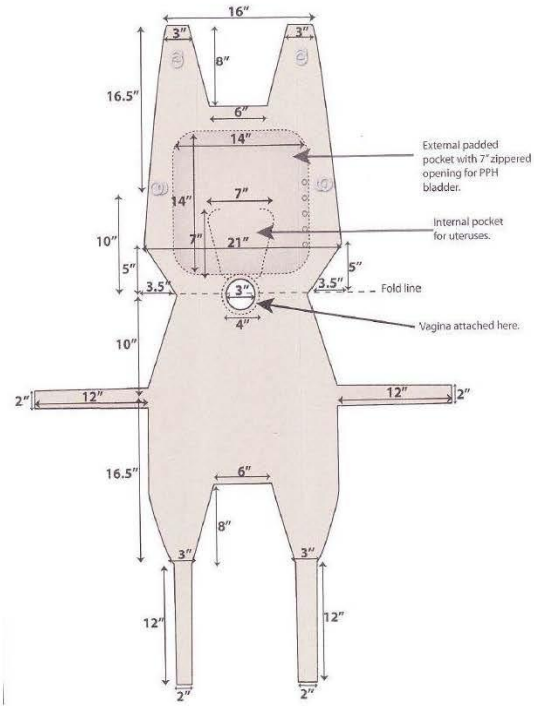


Figure 1. Draft layout for birthing suit

DEVELOPMENT- BIRTHING SUIT SIMULATOR

For use with standardized patient

DEVELOPMENT- V3 Baby

- Medical grade silicone liquid material
- Silicone design for flexibility
- Silicone design for repeated use of liquids/secretions
- Flexible material to withstand the birthing process/ Fetal position when inserted into Uterus
- 15 inches tall
- 1900g or 5.lbs

Figure 2. Silicone material allows for fetal position in Uterus.

DEVELOPMENT- BIRTHING SUIT SIMULATOR

For use with standardized patient

PROTOTYPE- V4 Test Birthing

- Uterus material changed to Lycra/Spandex material, cannot be attached to foam pocket, needs to be adjustable
- Lycra material used for uterus pocket, need to test a STAIN GARD spray for waterproofing
- Silicone baby fits inside of uterus pocket
- Waterproofing on inside piece needs to be determined
- Wrapped in a cellophane material to allow easy movement during testing

Figure 7. Testing "pushing" will release the pull string and pass the baby to the cervix.

DEVELOPMENT- BIRTHING SUIT SIMULATOR

For use with standardized patient

PROTOTYPE- V4

- Material changed to Lycra/Spandex material for flexibility and strength
- Velcro added to straps for accommodate size adjustments
- Foam trimmed at pelvic area to give a more fitted look
- Pocket for foam doubled material to add strength
- Uterus material changed to Lycra/Spandex material, cannot be attached to foam pocket, needs to be adjustable
- Lycra material used for uterus pocket, need to test a STAIN GARD spray for waterproofing
- Silicone baby fits inside of uterus

Figure 3. Front and back with straps.

Figure 4. Inside front, shows: Belly pocket, Uterus pocket.

Figure 5. Belly pocket with 1in foam, zippered swappable Uterus pocket.

Figure 6. Uterus pocket with baby, pull string to release when "pushing during birth".

DEVELOPMENT- BIRTHING SUIT SIMULATOR

For use with standardized patient

FINAL VERSION - [tested- 53 births]

Figure 8. Release buckles and Shoulder Straps.

Figure 9. Outside Vagina view.

Figure 10. Material Lined leg area for comfort

Figure 11. Simulated Placenta with Umbilical Cord.

Appendix 8: Simulation Protocols

Appendix 8: Simulation Protocols

Data Collection Protocol

The aim of this document is to describe the data collection process for the ***Targeted On-demand Team Performance App Development*** research study.

Project Information

Principle Investigator – Pamela Andreatta
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Research Assistant - Lisa Hernandez
Office: 407-882-1398 Email: lhernand@ist.ucf.edu

UCF IRB Approval Number - SBE-16-11993

Sites for Data Collection

- New York University – Dr Szyld
- Brigham & Women's – Dr Pozner [Withdrawn]
- Rhode Island Hospital – Dr Lindquist
- Banner Health – Dr Josey
- Palmetto – Dr. Brown [Withdrawn]
- EVMS – Dr. Armstrong

Data Collection Schedule

The UCF Team will arrive the day before the study and need to assess the reserved space.

This will allow the UCF team the opportunity to meet with the site clinical consultant and any other site-specific faculty to confirm logistics such as the flow of activities through the simulation spaces, simulation scenarios, and equipment and faculty requirements. Site team and UCF team will test run all scenarios, Dr. Andreatta will analyze, comment and train as needed before participant.

TEAM UCF: (PI) Dr. Andreatta, (Coordinator) Lisa Hernandez, SP1, SP2, SP3, SP4 (Standardized Patients), Assessor TBA.

SITE TEAM: (Co-Pi from site) Armstrong, Lindquist, Josey, Pozner, Armstrong, Szyld, or Gainey, (Site Simulation Technicians) each site will provide the necessary number of techs to fulfill your site requirements.

TEAM DESCRIPTIONS:

PI and Co-Pi will be the assessors collecting data real-time during every group run.

Coordinator will prepare arrival intake of participants, form collection and signing, assist in resetting room, exit paperwork, and distribute gift cards and dismissal.

SP's, (3) will be used each group run. (Case 1, voice of patient on 3G manikin. Case 2, mother of 13 month patient, Case 3, Female unknown pregnancy) SP's and Assessors are trained by UCF team

Site Simulation Techs, will run the manikins (3G and SimBaby), give the Simulation Room overview to the participants and assist with resetting the space before the next group begins.

Site Co-PI's to succeed in running (60) participants in (2) days the schedule below will give an estimate of time and activity each team member will be participating throughout the day and will help all team members to coordinate any breaks or lunch. We do not anticipate the scenario run-time per group to be 1 ½ hours, however the simulation will be stopped if it should exceed this time.

Orientation to the environment includes:

- Workings of the mannequins – SimMan 3G, SimBaby, IV cannulation, voice etc…
- How to use the monitoring – how to attach, initiate NIBP, check Temp etc…
- What equipment is in the room – options if require equipment not present
- Process for ordering, sending and reviewing labs
- Use of phone to call for consultations etc… (I propose that the phone goes to a switch board who will take and pass on any messages)
- Access to policy/procedures/guidelines

Team Briefing:

After participants have been orientated to the environment by the site simulation tech the participants will exit the room (this will allow sim staff time to begin simulations of first patient).

Once the space is set and all parties are ready to proceed, the team will receive the following briefing:

> *"You are a team of healthcare professionals working in the emergency department. There are no other staff available to work in the department today, it is just the [X] of you. As per your usual shift the team will need to manage the patients that present. Use all available resources, and leverage the teams knowledge, experience and expertise. The PI will be available should you have any questions during the simulation. Does anyone have any questions before we start? Please enter the department through this door to start your shift"*

Simulation Scenarios

Three concurrent simulation activities will unfold in the emergency departments demonstrated in figure 2 below. The simulation scenario overview for each case will accompany this document, outlining the learning outcomes, patient history, equipment list and clinical storyboard.

Figure 1 Timeline of Simulation Activities

Patient 1 - Howard Walsh (SimMan 3G) (SP voice of manikin)

The mannequin will be in the room when the participants enter.

Patient 2 - Daniel Montgomery (SimBaby) & Mom, Susan Montgomery (SP)

When the team reach the point of diagnosing patient 1 with sepsis (or at the 10min mark, whichever comes first) the mother Susan will enter with the EMT transporting Daniel because Mom did not want to put him in the car seat.

The team will divide to manage the care of both patients.

Patient 3 – Michelle Peters (SP)

When the team reach the point of diagnosing patient 2 with cholinergic crisis (or at the 30min mark, whichever comes first) patient 3 entered the department distressed in pain.

The team will divide to manage the care of all three patients.

Simulation endpoint

The simulation session will end approximately 5 minutes after the delivery of baby or at the hour mark.

Research team member will enter the room and say:

> *"That ends the simulation. Thank you for your care of the patients. Please leave all the equipment where it is and return to the lecture room"*

Day 1 Study				
Time	**GROUP 1**	**GROUP 2**	**GROUP 3**	**GROUP 4**
7:00	**UCF Team Arrives**			
730	**Group 1** arrival Consent/intake Coordinator			
800	**Group 1** Pre-assessments Coordinator			
830	**Group 1** briefed on Simulation Space Site Simulation Techs			
900	**Group 1** commence simulation scenarios Simulation spaces: *Case 1*. Adult Diabetic, Sepsis +10 minutes *Case 2*. Pediatric Chemical Exposure +20 minutes *Case 3*. Unexpected Labor & Delivery.			

	PI, Assessor, Co-PI, Site Sim Techs, SP1, SP2,SP3			
930		**Group 2** arrival Consent/intake Coordinator		
1000		**Group 2** Pre-assessments Coordinator		
1030	**Group 1** scenario ends Post assess survey Coordinator	**Group 2** briefed on Simulation area and reset space. Site Simulation Techs Coordinator		
1100	**Conclude Group 1** (gift cards issued) Coordinator	**Group 2** commence simulation scenarios Simulation spaces: *Case 1*. Adult Diabetic, Sepsis +10 minutes *Case 2*. Pediatric Chemical Exposure +20 minutes *Case 3*. Unexpected Labor & Delivery. PI, Assessor, Co-PI, Site Sim Techs, SP1, SP2,SP3		
1130			**Group 3** arrival Consent/intake Coordinator	
1200			**Group 3** Pre-assessments Coordinator	
1230		**Group 2** scenario ends Post assess survey Coordinator	**Group 3** briefed on Simulation area and reset space. Site Simulation Techs Coordinator	
1:00		**Conclude Group 2** (gift cards issued) Coordinator	**Group 3** commence simulation scenarios Simulation spaces: *Case 1*. Adult Diabetic, Sepsis +10 minutes	

			Case 2. Pediatric Chemical Exposure +20 minutes *Case 3*. Unexpected Labor & Delivery. PI, Assessor, Co-PI, Site Sim Techs, SP1, SP2,SP3	
1:30				**Group 4** arrival Consent/intake Coordinator
2:00				**Group 4** Pre-assessment Coordinator
2:30			**Group 3** scenario ends Post assess survey Coordinator	**Group 4** briefed on Simulation area and reset space. Site Simulation Techs Coordinator
3:00			**Conclude Group 3** (gift cards issued) Coordinator	**Group 4** commence simulation scenarios Simulation spaces: *Case 1*. Adult Diabetic, Sepsis +10 minutes *Case 2*. Pediatric Chemical Exposure +20 minutes *Case 3*. Unexpected Labor & Delivery. PI, Assessor, Co-PI, Site Sim Techs, SP1, SP2,SP3
3:30				
4:00				
4:30				**Group 4** scenario ends Post assess survey Coordinator
5:00				**Conclude Group 4** (gift cards issued) Coordinator
5:30				
6:00				
End of Day One/Repeat Schedule above for Day 2				

Appendix 9: Simulation Scenarios

This scenario has been developed as part of the TARGETED ON-DEMAND TEAM PERFORMANCE APP DEVELOPMENT STUDY

Scenario Name: ***Case1*** Septic Shock in a Diabetic Patient

Patient Name: Howard Walsh

Brief Presenting History:

Howard Walsh is a 52-year old male, with type 2 diabetes managed through diet and insulin. Has occasional peripheral neuropathy, sometimes can't feel toes and experiences periodic lower extremity swelling. Has been feeling ill for two days with what he believes is the flu. Has not been able to keep food or water down in past 24 hours.

Patient Reported Symptoms

Chills
Fatigue
Headache
Abdominal pain
Nausea, vomiting

Patient Unreported, Observable Symptoms

Anxiety
Confusion, mental fog
Difficulty breathing, cough
Infected abscess on toe with surrounding cellulitis on foot tracking up the calf (not tender)
Pale skin tone, Diaphoresis

Patient Initial Vital Signs					
T: 39.5C	RR: 30	HR: 150	BP: 82/45	SPO2: 96%	BGL: 385mg/dl
Age: 52years	Gender: Male		Weight: 84kg (185lb)		Height: 183cm (6.0ft)

Initial Physical Exam	Gen: Pale, diaphoretic, anxious, in mild distress. HEENT: Atraumatic, PERRL, oropharynx benign, dry mucous membranes. Neck: Supple, no lymphadenopathy. Lungs: CTAB. Heart: Tachycardia, regular. No murmurs. Abdomen: +BS. Soft, mild tenderness to palpation diffusely, but no rebound or guarding. No HSM. Extremities: 1+ LE edema b/l, left foot with erythematous, purulent with pungent odor. Neurological: A+O x3, no focal sensory or motor deficits.
Social History	Divorced for six years, with three adult children. Works as a software development director for a Fortune 500 company. Lives alone in his own home. Not currently in a relationship, but casually dates one woman. Has never smoked or used drugs. He is a recovering alcoholic; six years sober. He revised his lifestyle after his divorce and lost 65lbs through diet and exercise. He exercises 4x/week: running; tennis. Restores cars as a hobby. Prior to 6 years ago he drank 5 beers most nights.
Medical History	Meds: Glargine Insulin, 12 units daily, Lisinopril 5mg daily, Gabapentin 500mg qhs, Tylenol 375-650mg prn pain. Allergies: PCN -> rash as a child.

Resources

a) General

Setting/Environment	Emergency Department setting per (6) sites
Patient Attire	Manikin will be dressed in casual clothes
Monitoring	Standard ED monitoring as per site
Supporting Documentation required	ED Triage pack as per site

b) Equipment

Equipment	Comments	Sourced from
SimMan 3G	Confirm running LLEAP not Legacy platform	Site to provide (1) Site running Legacy
Patients clothes		HPH team to provide
Foot wound moulage	Wound to be adhered to sole of left foot, little toe.	HPH team to provide
ED Triage/Admission Paperwork		Site to provide
Emergency Department Monitoring		Set up 3G patient monitor
Glucometer		Site to provide
Resuscitation Trolley	Including: 1. Emergency medications 2. IV equipment etc...	Site to provide
ECG	Showing Sinus Tachy	HPH team to provide
Pathology Results	Use local path results forms	HPH team to provide results and transcribe onto site forms

Story Board

Patient Initial Vital Signs

Age: 52 years

Weight: 84 kg (185 lbs)

Height: 183 cm (6 ft)

Fever (Temp: 39.5°C)

Rapid breathing (RR: 30)

Rapid heart rate (HR: 150)

Blood Pressure (BP: 82/45)

SPO2: 96%

BGL: 385 mg/dl

Order Labs:

Venous Blood Gases
Blood Culture X2
Urine Culture
Urinalysis
Procalcitonin (unlikely)
Complete Blood Count (CBC)
Comprehensive Metabolic Panel (CMP)
Lactate (frequently included in VBG)
C-reactive protein (CRP)
CSF Analysis (Protein, Glucose, Cell count with differential)
Prothrombin Time/Partial Thromboplastin Time (PT/PTT)
Gram Stain (bacteria type)

Non-Laboratory Tests

ECG – to evaluate heart rhythm or injury
CXR
Head CT prior to LP if unable to perform full neurologic exam)

Team Aims

1. Secure Patient Information (from patient or family or EMS?)
2. Physical Examination (ABCDE)
3. Secure Monitors
4. Early, Correct Diagnosis
5. Order Labs/Imaging
6. Identify Bacterial Cause and septic shock
7. Begin Treatment
    a. Resolve Infection
    b. Stabilize Blood Pressure
    c. Stabilize Oxygen Supply (if saturations drop)
    d. Stabilize Blood Glucose
    e. Restore Acid-base Balance
    f. Support Organ Function
8. Monitor Patient Carefully
9. Call for Consults
10. Disposition to ICU

    a. Restore Acid-base Balance
    b. Support Organ Function
11. Monitor Patient Carefully
12. Call for Consults
13. Disposition to ICU

Treatment

Draw Labs
IV Broad Spectrum Antibiotic
IV Fluids 30 mL/kg
IV crystalloid, 30 mL/kg
Insulin Infusion
Meds to constrict blood vessels/increase BP
Supplemental Oxygen (if saturations drop)
Drain Abscessed Toe
Debridement Damaged Toe Tissue
Surgery Consult
Urology/Nephrology Consult
Disposition to ICU
MD to MD handoff
RN to RN Handoff

Targeted Drug Therapy once bacterium identified:

- Antiobiotics: cephalexin, dicloxacillin, amoxicillin-clavulanate, clindamycin, trimethoprim-sulfamethoxazole, minocycline, or linezolid.
- Dual Antibiotics: trimethoprim-sulfamethoxazole plus amoxicillin-clavulanate; or clindamycin plus a fluoroquinolone such as levofloxacin or moxifloxacin.

Scenario Advancement

Progression

+30 min No Treatment Progression 1: to septic shock, adds shortness of breath (abnormal function of the heart leading to pulmonary edema) plus a severe drop in blood pressure. Mechanical Ventilation Required.

+40 min No Treatment Progression 2 convulsions.

Tests and Labs

Non-Laboratory Tests

ECG – to evaluate heart rhythm or injury

CXR

Head CT prior to LP (if unable to perform full neurologic exam)

When labs/Imaging are ordered:

LabResults_Case1.pdf

Lab Results Show: Dehydration, Severe bacterial infection (group A streptococci and Staphylococcus aureus), high blood glucose levels, serum glucose, glycohemoglobin, creatinine, procalcitonin, CRP, WBC, Urine (glucose, protein, ketones present)

Imaging Results:

LeftFoot_AP_Case1.jpg
LeftFoot_Lateral_Case1.jpg
LeftFoot_Oblique_Case1.jpg

Notes:

This scenario has been developed as part of the TARGETED ON-DEMAND TEAM PERFORMANCE APP DEVELOPMENT STUDY

Scenario Name: **Case 2** Cholinergic in a 13 month old

Patient Name: Daniel Montgomery

Patient Reported History

Daniel Montgomery is a 13-month old male, brought to the Emergency Department by EMS and accompanied by his mother. He has copious secretions, lacrimation, rhinnorhea, salivation, and diaphoresis, with obvious difficulty breathing and agitation. EMS has been supporting his breathing with supplemental Oxygen and suctioning oral and nasal secretions.

Child lives with his married mother (25 years old) and father (27 years old), and elder male sibling (3 years old). He does not attend day-care or school. His immunizations are up to date and he sees his paediatrician for routine well checks. There were no pregnancy or birth complications (full term spontaneous vaginal delivery).

Mother reports that the elder sibling came down with a fever and flu-like symptoms last evening and vomited his breakfast this morning. Daniel's symptoms began shortly after breakfast and steadily increased to the point where his mother was extremely concerned about his breathing. When she observed muscle fasciculation's, she became alarmed and called 911 because she didn't want to drive with him in his car seat unattended. No emesis.

Patient Unreported, Observable Symptoms

Agitated
Cyanosis
Difficulty breathing, accessory muscles used
Nasal Flaring
Diaphoresis
Intermittent muscle fasciculation's

Patient Initial Vital Signs					
T: 36.8°C (98.2°F)	RR: 60	HR: 110	BP: 80/40	SPO2: 85%	
Age: 13 Months	Gender: Male		Weight: 9 kg (20 lbs)	Height: 74 cm (29 inches)	
Initial Physical Examination	Gen: Pale, diaphoretic, anxious, agitated in distress. Broselow tape approximation 29 inches long; weight 9 kg. Tachypnea with obvious effort. HEENT: Copious secretions, eye irritation, lacrimation, rhinnorhea, salivation, cyanosis, nasal flaring. Pupils constricted 1mm, equal, round and reactive to light. Neck: Supple, no lymphadenopathy Lungs: Course rales, stridor, rhonchi, accessory muscle use. Heart: Tachycardic, regular. No murmurs. Abdomen: +BS. Soft, nontender, no rebound or guarding, no hepatosplenomegaly. Extremities: No obvious deformities of extremities. Neurological: Intermittent muscle fasciculation's.				
Social History	Child lives with his married mother (25 years old) and father (27 years old), and elder male sibling (3 years old). He does not attend day-care or school. His immunizations are up to date and he sees his paediatrician for routine well checks. There were no pregnancy or birth complications (full term spontaneous vaginal delivery).				
Medical History	Meds: None. Allergies: No known drug allergies.				

Resources

a) General

Setting/Environment	Emergency Department setting per (6) sites
Patient Attire	Laerdal SimBaby will be dressed in casual clothes
Monitoring	Standard ED monitoring as per site
Supporting Documentation required	ED Triage pack as per site

b) Equipment

Equipment	**Comments**	**Sourced from**
Laerdal SimBaby	Confirm running LLEAP not Legacy platform	Site to provide (1) Site running Legacy
Patients clothes		UCF team to provide
ED Triage/Admission Paperwork		Site to provide
Emergency Department Monitoring		Set up patient monitor
		Site to provide
Resuscitation Trolley	Including: 1. Emergency medications 2. IV equipment etc…	Site to provide
CXR		UCF team to provide
Pathology Results	Use local path results forms	UCF team to provide results and transcribe onto site forms

Story Board

Patient Initial Vital Signs

Age: 13 months

Weight: 9 kg (20 lbs)

Height: 74 cm (29 inches)

Temp: 36.8°C (98.2°F)

RR: 60

HR: 110

BP: 80/40

SPO2: 85%

Order Labs:

Serial Arterial Blood Gases
Urinalysis
Complete Blood Count (CBC)
Basic Metabolic Panel (BMP): Electrolytes, BUN, Creatinine

Non-Laboratory Tests

ECG
CXR
Pulse Oximetry
Pulmonary Capillary Wedge Pressure monitoring
Tonometry

Team Aims

1. Secure Patient Information
2. Physical Examination (ABCDE)
3. Secure Monitors
4. Establish IV Access (if not already done)
5. Early, Correct Diagnosis
6. Order Labs/Imaging
7. Identify Cause
8. Begin Treatment
    a. Secure Airway / respiration with ETI Intubation
    b. Humidified Oxygen
    c. Bronchodilators
    d. Remove contaminated clothing
    e. Wash skin / hair with soap/water
    f. Irrigate eyes
    g. Dilute potentially ingested poison with milk or water
    h. Reduce mother-child separation anxiety
9. Monitor Patient Carefully
10. Call for Consults
11. Disposition to ICU

Treatment

Procedural sedation to prepare for Endotracheal intubation

Endotracheal Intubation, use large-size tube to prevent plugging from sloughed mucosa

Positive end respiratory pressure (5cm water minimum)
Supplemental Oxygen (humidified)

Draw Labs

Provide IV Fluids

Meds for Bronchospasm (Aerosolized bronchodilator)

- Nebulizer solution < 2 years (off label) 0.2-0.6 mg/kg/day divided q4-6hr
- Racemic epinephrine aerosol, 0.25-0.75 mL of 2.25% racemic epinephrine solution in water, every 20 minutes.

Remove clothing, wash skin and hair with soap/water
Irrigate eyes until conjunctal pH is 6.8-7.4 (pH paper)
Monitor Fluid/Electrolyte balance; restore as needed (how?)
Provide 250 mL water or milk to drink
Opthalmology Consult
Gastroenterology Consult

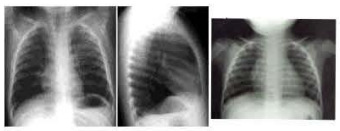
Neurological Consult

Scenario Advancement Progression

+15 min No Treatment Progression 1: severe drop in blood pressure, seizures.
+20 min No Treatment Progression 2: cardiopulmonary arrest.

Patient Initial Vital Signs at +15					
T: 36.8°C	RR: 60	HR: 115	BP: 60/40	SPO2: 85%	

Patient Initial Vital Signs at +20					
T: 36.8°C	RR: 60	HR: 85	BP: 60/40	SPO2: 80%	

Scenario Advancement.
When labs/Imaging are ordered: **LabResults_Case2_UCF.pdf** **Lab Results Show:** Respiratory acidosis **Imaging Results:** **Chest_Side_DanielMontgomery_Case2_UCF.jpg** **Chest_Side_DanielMontgomery_Case2_UCF.jpg**   

Notes:

This scenario has been developed as part of the TARGETED ON-DEMAND TEAM PERFORMANCE APP DEVELOPMENT STUDY

Scenario Name: ***Case 3*** Undiagnosed pregnancy (Standardized Patient Actor)

Patient Name: Michelle Peters

Brief Presenting History:

Michelle Peters chief complaint is pain in stomach, with cramps and feels really bloated. Seems to think it maybe from eating Mexican food last night. It started in stomach but now back hurts and states having discharge on her underwear this morning.

Patient Reported Symptoms

Abdominal pain
Back pain

Resources

Equipment	Comments	Sourced from
SimMon	Possible for the Ultrasound?	Site to provide (1) Site running Legacy
ED Triage/Admission Paperwork		Site to provide
Emergency Department Monitoring	Set up SimMom monitor	Site to provide
Resuscitation Trolley	Including: 1. Emergency medications 2. IV equipment etc...	Site to provide
Pathology Results		UCF team to provide results and transcribe onto site forms

Story Board

Patient Initial Vital Signs

Age: 22 years
Gender: Female
Weight: 80kg (176lbs)
Height: 180cm (5.9)

Order Labs:

Blood Culture X2
Urine Culture
Urinalysis
Complete Blood Count (CBC)
Comprehensive Metabolic Panel (CMP)
Lactate (frequently included in VBG)
C-reactive protein (CRP)

Non-Laboratory Tests

Sonogram

Team Aims

1. Secure Patient Information (from patient or family or EMS)
2. Physical Examination (ABCDE)
3. Secure Monitors
4. Early, Correct Diagnosis
5. Order Labs/Imaging
6. Delivery Baby
7. Monitor Patient Carefully
8. Call for Consults
9. Disposition to Labor/Delivery

Treatment

Draw Labs
Disposition to Labor/Delivery
MD to MD handoff
RN to RN Handoff

Scenario Advancement

Progression
+15 min No Treatment Progression: Scenario ended.

Tests and Labs

When labs/Imaging are ordered:

LabResults_Case3_MichellePeters.pdf

Lab Results Show: Positive, Pregnancy

Imaging Results:

Sonogram_Case3_MichellePeters_UCF.jpg and Sonogram video available

(Audio available for baby's heartbeat and cry)

Notes:

Appendix 10: Data Collection Activities

Appendix 10: Data Collection Activities

Figure 1. Simulated ER Setup

Figure 2. Moulage and dressing for Case 1

Figure 3. Case 1 Howard Walsh using the Laerdal SimMan 3G Manikin

Figure 4. Case 2 Daniel Montgomery using the Laerdal SimBaby.

Figure 5. Control Room, Video Recording and Assessors synchronizing iPads for data input.

Figure 6. Banner Site, team of Assessors.

Figure 7. Rhode Island Site Co-I giving a simulation overview to the participants.

Figure 8. Case 1 Begins with full team assessing Howard Walsh

Figure 9. Case 1 Howard Walsh, team participants doing a spinal tap.

Figure 10. Case 1 team re-assessing Howard Walsh.

Figure 11. EVMS Site Co-I assessing the team.

Figure 12. Case 2 Standarized patient actor as Daniel Montgomery's mother.

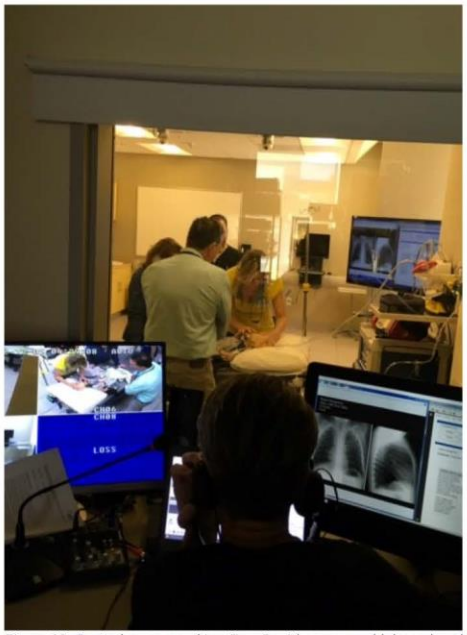


Figure 13. Control room, working Case 2 with x-rays and labs ordered.

Figure 14. Participant Team moving around ER rooms.

Figure 15. Dr. Andreatta assessing Case 2 team.

Figure 16. Case 3 Standarized patient actor rehearsing the birthing suit.

Figure 17. Case 3 Standarized patient actor rehearsing the birthing suit.

Figure 18. Case 3 Unknown pregnancy.

Figure 19. Case 3 Standarized patient giving birth.

Figure 20. Case 3 Team deliver baby.

Figure 21. Case 3 Baby delivered and the simulation is over.

Appendix 11: Budget

US Army Medical Research and Material Command 64-01-6375
Organized Research: Applied Research

Targeted On-Demand Team Performance App Development

COST REPORT FOR MONTH ENDING: 29 October 2017 Andreatta

	AWARDED BUDGET	FUNDED BUDGET	CUMULATIVE COST	CURRENT COST	BALANCE
LABOR	$ 456,447.62	$ 456,447.62	$ 405,620.49	$ 23,429.28	$ 50,827.13
TRAVEL	$ 33,727.46	$ 33,727.46	$ 33,727.46	$ -	$ -
EXPENSE	$ 197,625.77	$ 197,625.77	$ 197,625.77	$ -	$ -
CONSULTANTS	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ -	$ -
SUBCONTRACTOR	$ 94,522.00	$ 94,522.00	$ 94,522.00	$ -	$ -
INDIRECT COSTS (46%)	$ 361,379.15	$ 361,379.15	$ 308,536.76	$ 10,777.47	$ 52,842.39
TOTAL EXPENDITURES	$ 1,149,702.00	$ 1,149,702.00	$ 1,046,032.48	$ 34,206.75	$ 103,669.52

Period of Performance: 9/1/15-11/29/17

% SPENT: 90.98%

Invoiced to Date : $ 1,149,702.00
Revenue Rec'd to Date : $ 1,149,702.00

Labor Hours Through PPE: 10/19/2017

	CURRENT HOURS	CUMULATIVE HOURS
Amador	0.00	40.00
Andreatta	160.00	2,521.00
Coyle	0.00	39.75
Eppes	0.00	81.50
Hernandez	160.00	3,259.00
Lechin	0.00	13.00
Lowry	0.00	99.50
Stubbs	0.00	0.00
Schoolmeester	0.00	40.00
Szember	0.00	43.00
	320.00	6,136.75

Appendix 12: Quad Chart (Attached)