Summer 2024

Reducing the Incidence of In-Hospital Cardiac Arrests (IHCA) by Utilizing Infographics

Alexis Morgan Pope
Jacksonville State University, aowens1@stu.jsu.edu

Follow this and additional works at: https://digitalcommons.jsu.edu/etds_nursing

Part of the Nursing Commons

Recommended Citation

Reducing the Incidence of In-Hospital Cardiac Arrests (IHCA) by Utilizing Infographics

A DNP Project Submitted to the

Graduate Faculty

of Jacksonville State University

in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Nursing Practice

By

Alexis M. Pope

Jacksonville, Alabama

August 2, 2024

Alexis M. Pope   August 2, 2024

Abstract

Background: In-hospital cardiac arrests (IHCA) have negative outcomes on patients and can prolong hospitalization or lead to death. The rate of IHCA has been increasing over the past few years in the United States. A medical intensive-care stepdown unit in a level three trauma center has an incidence of IHCA above the national average and a survival-to-discharge rate less than the national average.

Purpose: The project aimed to improve patient outcomes and reduce the rate of IHCA by placing infographics containing evidence-based practice in the unit with the highest incidence.

Methods: A pre-post implementation quality improvement design was used to compare the incidence of IHCA before and after the placement of infographics in common areas of the unit.

Results: The results of the two-proportion z-test yielded a z-value of -0.78 and a p-value of 0.435. These findings indicate that there was no significant change in the proportion of patients who coded before and after the introduction of the infographics. Despite the efforts to enhance awareness through the infographics, the incidence of code events increased from 19.6 per 1,000 to 37.7 per 1,000 admissions between the two periods.

Conclusion: The use of infographics did not reduce the rate of IHCA in the unit with the highest incidence. Factors such as lack of buy-in from staff, increased number of travel nurses on the unit, and increasing patient complexity negatively impacted the project. There was inconsistent use of the MEWS protocol by the nursing staff due to no automated alerts of critical MEWS scores. Re-education and automated activation of the RRT may be necessary to reduce the IHCA rate.

Keywords: In-hospital cardiac arrest, modified early warning system, rapid response team, infographics, advanced cardiac life support, basic life support

Acknowledgments

This project was guided by Dr. Laura Barrow, the DNP project Chair, and Dr. Ashlie Barnes, the DNP project preceptor. I am forever grateful for their encouragement and mentorship during this journey. I offer my sincere appreciation for the learning opportunities presented by Jacksonville State University throughout my entire collegiate career.

To my beloved husband, Justin, thank you for supporting me throughout my nursing career. Your unwavering love, understanding, and patience have been my rock during this journey. You have been through the ups and downs with me, and always empowered me to pursue my dreams wholeheartedly. This achievement would not be possible without you. I love you.

To my parents, April and Jamie, thank you for your support and encouragement over the years. Thank you for instilling in me the values of perseverance, hard work, and determination. I am who I am today because of you both.

Table of Contents

Reducing the Incidence of In-Hospital Cardiac Arrests (IHCA) by Utilizing Infographics

Approximately 290,000 adults experience in-hospital cardiac arrests (IHCA) each year. Healthcare facilities implemented strategies to reduce IHCA and improve patient outcomes by introducing systems such as the rapid response team (RRT) and modified early warning system (MEWS) to recognize patient decline promptly (Andersen et al., 2019). Despite being hospitalized, patients experiencing IHCA may still have poor outcomes. IHCA causes prolonged hospitalization, increased financial burden, and potentially death. The total cost of cardiac arrest in the United States was estimated to be $33 billion per year, with the cost consistently increasing yearly from 2003 to 2012 (Damluji et al., 2018). Though IHCA varies by demographics and geographic location, the rate has increased to nearly 300,000 between 2013 and 2018 from 200,000 annually between 2003 and 2007 in the United States (Sung et al., 2022). A local level three trauma center concerned with reducing the rate of IHCA in one unit specifically was the focus of the project.

Background

The national incidence of IHCA is 8.9 per 1,000 admissions (Rasmussen et al., 2022). The southern region of the United States has held the highest percentage of IHCA for nearly two decades. More recently, from 2014-2018, the percentage of IHCA was 41.44% (Wu et al., 2021). At the local level, the total number of admissions at the facility was 6,979 from January to August 2023. There were 118 hospital-wide cardiac arrests which equates to 16.9 IHCA per 1,000 admissions. Specifically, from February to March 2023 the facility recorded 1,692 admissions with 31 IHCA (18.3 per 1,000 admissions). On the hospital unit of interest, the medical intensive care step-down unit (MICU step-down), from February to March of 2023, there were 102 admissions and two cardiac arrests (19.6 per 1000 admissions). The average

survival-to-discharge rate post-cardiac arrest throughout the hospital from January to August of 2023 was 15.3%, which compares unfavorably to the national average of 25% (Andersen et al., 2019). Deviations from advanced cardiovascular life support (ACLS) guidelines averaged 36.3% hospital-wide. Increased protocol deviations are associated with the decreased probability of obtaining the return of spontaneous circulation (ROSC) (Crowley et al., 2020). The facility has attempted to reduce the rate of IHCA and improve survival to discharge percentages by implementing a formal RRT and MEWS protocol. The use of MEWS protocol in the inpatient setting was used for many years at the facility. The goal of the MEWS protocol is early recognition of patient deterioration to reduce in-hospital cardiac arrests and improve patient clinical outcomes. Early recognition and correction of cardiac arrest are critical to reduce mortality rates (Kim et al., 2020). The purpose of the RRT is to provide prompt, lifesaving patient care for patients in acute distress.

Problem Identification

The specified unit is a MICU step-down unit that had an incidence higher than other non-ICUs in the facility. The hospital was concerned about the lower survival-to-discharge rate compared to the national average. The purpose of this project was to decrease the activation time of the RRT by placing infographics on the unit with the highest overall IHCA incidence. Thus, the PICOT question for this project was, Does the application of infographics, compared to current agency practice, support RRT notification for decompensating medical-surgical patients to reduce in-hospital cardiac arrest over eight weeks?

Review of Literature

An extensive literature review was performed to research the effectiveness of infographics in decreasing RRT activation time and decreasing IHCA. Cumulative Index to

Nursing and Allied Health Literature (CINAHL) and Elton B. Stephens Company (EBSCO)

databases were accessed to search for relevant data. Phrases used in the literature search included

rapid response team implementation, MEWS implementation, the effectiveness of infographics

in healthcare, and IHCA. Boolean operators included "not pediatrics" or "outpatient". Many of

the articles identified had lower levels of evidence such as qualitative, observational cohort

studies, cross-sectional, and interventional studies. Three main themes were noted in the

literature review: the use of the MEWS protocol to decrease IHCA; decreasing the activation

time of the RRT; and the effectiveness of infographics in healthcare.

Use of MEWS Protocol

Increases in a patient's MEWS score were directly related to increased incidence of

mortality and initiation of ICU transfer (Miles et al., 2023). Na et al. (2021) and Silva et al.

(2021) found the automated activation of the MEWS protocol decreased the overall risk of a fatal

cardiac event by increasing the number of rapid response calls to assist decompensating patients.

Timely identification of patient deterioration and activation of the RRT decreased IHCA and

improved patient outcomes. The MEWS protocol helped reduce the length of stay and cost of

treatment. Increased nursing workload and nurse-to-patient ratios on the medical-surgical units

reduced the nurses' ability to assess each patient's needs and quickly recognize signs of patient

deterioration. The goal of the protocol was to detect changes in patient conditions that may not

be recognized by the nursing staff. Higher levels of staffing were associated with a lower rate of

missed vital sign observation (Miles et al., 2023; Redfern et al., 2019; Warren et al., 2021).

Eddahchouri et al. (2021) indicated compliance with the MEWS protocol was only 62%.

However, the use of infographics with the MEWS protocol improved nurses' confidence in their

knowledge of the protocol and improved patient outcomes, reduced the length of hospitalization, and increased compliance with the MEWS protocol.

Activation of RRT

The timely activation of the rapid response team when patient deterioration was noted reduced the overall rate of IHCA. Alerting the team without delay and automated activation of the RRT was linked to decreased length of stay, decreased ICU admissions, and a decrease in mortality. It was noted there was a decrease in RRT calls during nursing handover periods (Boniatti et al., 2023; Olsen et al., 2019; Olsen et al. 2022). Early recognition of patient deterioration and cardiopulmonary resuscitation within one minute, epinephrine administration within five minutes, and defibrillation within two minutes were linked to improved rates of survival post-cardiac arrest (Andersen et al., 2019; Guetterman et al., 2019). Bedside nurses were vital in improving IHCA outcomes as they were the first to note patient deterioration.

Effectiveness of Infographics

Infographics were an effective method of using visual representations to relay large volumes of complex information in a simple, easy-to-read format. Visual data was more easily understandable than text-only content (Balkac & Ergun, 2018). Infographics were useful for those in the nursing profession with limited time to read an entire document (Patel et al., 2020; Taye et al., 2022). The ease of readability increased the likelihood of capturing the staff's attention (Chicca & Chunta, 2020; Zadro et al., 2022). McSween-Cadieux et al. (2021) endorsed infographics as a knowledge translation tool to reach multiple healthcare entities. One identified weakness in the articles was the low level of evidence. Most studies assessing the effectiveness of infographics were qualitative because they were evaluated using a subjective approach from the individual.

In summary, researchers supported using MEWS as an effective tool for reducing the rate of IHCA. Nurse response time was important in ensuring positive outcomes post-cardiac arrest. Also, infographics were an effective method to relay information and reinforce the MEWS protocol, RRT policy, ACLS, and basic life support (BLS) algorithms.

Theoretical Framework

The theoretical framework selected for the DNP project was Ronald Lippitt's seven phases of change theory. Lippitt focused on an individual change agent rather than a community-oriented process and used a change agent to implement a change (Asirifi et al., 2022). His theory is an expansion of Lewin's change theory (Barrow et al., 2022).

Ronald Lippitt's change theory was selected because it is used to facilitate change, which was the objective of the DNP project. The need for change in the institution was evidenced by an increased incidence of IHCA. Transformation within a facility requires altering the change agent's current process, hence the reason support by stakeholders is vital (Dubose & Mayo, 2020). Convincing stakeholders was equally as important as they were the ones adapting to the intervention to positively impact patients. After the project, the education nurse and preceptor were recognized as the new change agents.

Quality Improvement Methodology

The Plan-Do-Study-Act (PDSA) was used as the quality improvement model. The goal of the model was to accelerate an improvement in the standard of care by challenging small changes to allow for a greater change over time (Bradshaw & Vitale, 2021). The *plan* for the project was completed by researching national and local data and preparing a plan to reinforce the MEWS, BLS, and ACLS protocols to reduce the incidence of IHCA. The *do* phase of the model was the phase in which infographics were placed in common areas of the unit. The *study*

phase of the PDSA model consisted of interpreting and studying the project's results. The *act* phase consisted of continuing the change in the facility after the project (Agency for Healthcare Research and Quality, 2024).

Project Design

The need for intervention was introduced to the leadership of the facility, preceptor, and stakeholder. The setting for the project was a level three trauma center with 311 beds. Data regarding IHCA was collected from the clinical outcomes manager and compared to national data. After determining which unit in the facility had the greatest need for an intervention, a MICU step-down unit was selected. Patients who experienced IHCA were included in the project. Those who did not experience a cardiac arrest were excluded. There are 18 beds in the step-down unit. The most common diagnosis within the unit was sepsis.

Before implementation, Institutional Review Board (IRB) approval was attained from the university (see Appendix A), the Collaborative Institutional Training Initiative (CITI) was completed (see Appendix B), and support was gained from the facility. Infographics of the MEWS and RRT protocols were produced using an online tool and printed. The author assumed financial responsibility for the printing process. The cost was less than fifty dollars. There was no cost to the facility or participants related to the project.

Implementation of the project began in February 2024 and was conducted over eight weeks. The informative flyers were placed throughout the unit in common areas such as the breakroom, medication room, restroom, and nurses' station. The nursing staff was educated as a group on the importance of the intervention and expressed interest when shown data comparing their rate of IHCA with the national average. ACLS and BLS algorithm flyers were present in the unit but were placed in more accessible locations such as near the crash cart and at the nurses'

station. After eight weeks, de-identified data collected from the clinical outcomes manager was analyzed via a statistician regarding the total number of IHCA on the specified unit and compared to the previous data from 2023. Descriptive statistics were used to describe the demographics of the study participants and changes in outcomes for this study. A test of two proportions was conducted to compare the proportions of patient codes. The statistical software Minitab® 19 was used to perform all analyses.

Project Results and Evaluation

The use of infographics to decrease the activation time of the RRT and reduce the rate of IHCA was not effective. During the eight-week intervention from February to March 2024, there were 106 admissions to the ICU step-down with 4 IHCA representing 37.7 per 1000 admissions. This was an increase of 1.81% compared to the same time frame in 2023. The non-ICU unit held the highest number of cardiac arrests hospital-wide. A two-proportion z-test was conducted to assess the impact of informative infographics placed around the unit on the proportion of patients who coded between February and March 2023 compared to the same period in 2024. In 2023, out of 102 admissions, two patients experienced a code event, which is approximately 19.6 per 1,000 admissions. After the implementation of the infographics in 2024, among 106 admissions, four patients had a code event, representing approximately 37.7 per 1,000 admissions. The results of the two-proportion z-test yielded a z-value of -0.78 and a p-value of 0.435. These findings indicate that there was no significant change in the proportion of patients who coded before and after the introduction of the flyers. Despite the efforts to enhance awareness through the flyers, the percentage of code events increased from 19.6 per 1,000 to 37.7 per 1,000 between the two periods.

Conclusion

The rate of IHCA has been steadily increasing over the past decade, with the highest percentage of cardiac arrests occurring in the southern region of the United States. The national incidence of IHCA is 8.9 per 1,000 admissions (Rasmussen et al., 2022). The facility had an IHCA rate of 18.3 per 1,000 admissions hospital-wide. On the hospital unit of interest, the MICU stepdown, from February to March of 2023, there were 102 admissions and two cardiac arrests (19.6 per 1000 admissions). The use of infographics based on current evidence-based practice did not reduce the rate of IHCA in the unit with the highest incidence. The rate of IHCA increased from 19.6 per 1,000 admissions from February to March 2023 to 37.7 per 1,000 admissions from February to March 2024. The p-value was 0.435, indicating the results were not statistically significant.

There were many factors potentially impacting the effectiveness of infographics. There was limited buy-in from the unit manager and the nursing staff. There was no automated activation of the RRT triggered by increased MEWS scores at the facility, therefore the time to activate the RRT was not recorded. There was also inconsistent use of the MEWS protocol by the nursing staff due to a lack of policy enforcement by management. The facility has limited financial resources and an inadequate number of nursing staff. Re-education may be necessary to enforce the policy as a large portion of the staff were travel nurses who only spent eight to 13 weeks on the unit. The short timeframe the travel nurses were employed on the unit limited the opportunity for education and policy adherence. The increasing complexity of healthcare was also a factor in the increase of code events.

Although the DNP project was unsuccessful in reducing the rate of IHCA in the unit with the highest incidence, areas for improvement were discovered and could potentially improve

practice and patient outcomes at the facility in the future. Stakeholders suggest implementing

new training protocols and simulation events to further train staff.

References

Andersen, L. W., Holmberg, M. J., Berg, K. M., Donnino, M. W., & Granfeldt, A. (2019). In-hospital cardiac arrest: A review. *Journal of the American Medical Association, 321*(12), 1200-1210. https://www.doi.org/10.1001/jama.2019.1696

Agency for Healthcare Research and Quality. (2024, March). *Health literacy universal precautions toolkit, 2nd edition.* The Department of Health and Human Sciences. https://www.ahrq.gov/health-literacy/improve/precautions/tool2b.html

Asirifi, M. A., Ogilvie, L., Barton, S., Bilash, O., Stobart, K., Aniteye, P., Kwashie, A., Ansong, G., Eliason, & C., Aziato, L. (2022). Reflections on change theory and community-based participatory action research: Congruent, similar, or different? *Journal of Nursing Education and Practice, 12*(3), 11-21. https://doi.org/10.5430/jnep.v12n3p11

Balkac, M., & Ergun, E. (2018). Role of infographics in healthcare. *Chinese Medical Journal, 131*(20), 2514-2517. https://doi.org/10.4103/0366-6999.24356

Barrow, J. M., Annamaraju, P., & Toney-Butler, T. J. (2022). Change management. *Statpearls*. Retrieved January 24, 2024, from https://www.statpearls.com/point-of-care/89

Boniatti, M. M., de Loreto, M. S., Mazzutti, G., Benedetto, I. G., Josiane F. J., Zorzi, L. A., Conceição Prestes, M., Viana, M. V., MCalcagnotto dos Santos, M., Buttelli, T. C. D., Nedel, W., Nunes, D. S. L., Barcellos, G. B., Neyeloff, J. L., Dora, J. M., & Lisboa, T. C. (2023). Association between time of day for rapid response team activation and mortality. *Journal of Critical Care, 77,* Article 154353. https://doi.org/10.1016/j.jcrc.2023.154353

Bradshaw, M. J., & Vitale, T. R. (2021). *The DNP project workbook: A step-by-step process for success.* Springer Publishing Company.

Chicca, J. & Chunta, K. (2020). Engaging students with visual stories: Using infographics in nursing education. *Teaching and Learning in Nursing, 15*(1), 32-36. https://doi.org/10.1016/j.teln.2019.09.003

Crowley, C. P., Salciccioli, J. D., & Kim, E. Y. (2020). The association between ACLS guideline deviations and outcomes from in-hospital cardiac arrest. *Resuscitation, 153*, 65-70. https://doi.org/10.1016/j.resuscitation.2020.05.042

Damluji, A. A., Al-Damluji, M. S., Pomenti, S., Zhang, T. J., Cohen, M. G., Mitrani, R. D., Moscucci, M., & Myerburg, R. J. (2018). Health care costs after cardiac arrest in the United States. *Circulation: Arrhythmia and Electrophysiology, 11*(4), Article e005689. https://doi.org/10.1161/CIRCEP.117.005689

Dubose, B. M. & Mayo, A. M. (2020). Resistance to change: A concept analysis. *Nursing Forum, 55*(4), 631-636. https://doi.org/10.1111/nuf.12479

Eddahchouri, Y., Koeneman, M., Plokker, M., Brouwer, E., Van de Belt, T. H., Van Goor, H., & Bredie, S. J. H. (2021). Low compliance to a vital sign safety protocol on general hospital wards: A retrospective cohort study. *International Journal of Nursing Studies, 115,* Article 103849. https://doi.org/10.1016/j.ijnurstu.2020.103849

Guetterman, T. C., Kellenberg, J. E., Krein, S. L., Harrod, M., Lehrich, J. L., Iwashyna, T. J., Kronick, S. L., Giorta, S., Chan, P. S., & Nallamothu, B. K. (2019). Nursing roles for in-hospital cardiac arrest response: Higher versus lower performing hospitals. *Boston Medical Journal Quality and Safety, 28*(11), 916-924. https://doi.org/10.1136/bmjqs-2019-009487

Kim, J., Park, Y. R., Lee, J. H., Lee, J. H., Kim, Y. H., & Huh, J. W. (2020). Development of a real-time risk prediction model for in-hospital cardiac arrest in critically ill patients using

deep learning: Retrospective study. *Journal of Medical Internet Research Medical Informatics, 8*(3), Article e16349. https://doi.org/10.2196/16349

McSween-Cadieux, E., Chabot, C., Fillol, A., Saha, T., & Dagenais, C. (2021). Use of infographics as a health-related knowledge transition tool: Protocol for a scoping review. *Boston Medical Journal Open, 11*(6), Article e046117. https://doi.org/10.1136/bmjopen-2020-046117

Miles, I., Anderson, M., Ren, D., R., Coker, T., & Fennimore, L. (2023). Use of the modified early warning score by medical-surgical nurses to initiate the rapid response team: Impact on patient outcomes. *Journal of Nursing Care Quality*, *38*(2), 171-176. https://doi.org/10.1097/NCQ.0000000000000680

Na, S. J., Ko, R. E., Ko, M. G., & Jeon, K. (2021). Automated alert and activation of medical emergency team using early warning score. *Journal of Intensive Care, 9*, Article e73. https://doi.org/10.1186/s40560-021-00588-y

Olsen, S. L., Soreide, E., Hillman, K., & Hansen, B. S. (2019). Succeeding with rapid response systems – a never-ending process: A systematic review of how health-care professionals perceive facilitators and barriers within the limbs of the RRS. *Resuscitation, 144*, 75-90. https://doi.org/10.1016/j.resuscitation.2019.08.034

Olsen, S. L., Soreide, E., & Hansen, B. S. (2022). We are not there yet: A qualitative system probing study of a hospital rapid response system. *Journal for Patient Safety, 18*(7), 722-729. https://doi.org/10.1097/PTS.0000000000001000

Patel, Z., Patel, C., Oreper, J., Patel, H., & Sajedeen, A. (2020). Healthcare professionals' perceptions of infographics within medical information response letters. *Therapeutic*

Innovation & Regulatory Science, 54, 1382–1387. https://doi.org/10.1007/s43441-020-00164-w

Rasmussen, T. P., Riley, D. J., Sarazin, M. V., Chan, P. S., & Girotra, S. (2022). Variation across hospitals in in-hospital cardiac arrest incidence among Medicare beneficiaries. *Journal of the American Medical Association Network Open, 5*(2), Article e2148485. https://doi.org/10.1001/jamanetworkopen.2021.48485

Redfern, O. C., Griffiths, P., Maruotti, A., Saucedo, A. R., & Smith, G. B. (2019). The association between nurse staffing levels and the timeliness of vital signs monitoring: A retrospective observational study in the UK. *Boston Medical Journal Open, 9*, Article e032157. https://doi.org/10.1136/bmjopen-2019-032157

Silva, L. M. A., Moroco, D. M., Pintya, J. P., & Miranda, C. H. (2021). Clinical impact of implementing a rapid-response team based on the modified early warning score in wards that offer emergency department support. *Public Library of Science One, 16*(11), Article e0259577. https://doi.org/10.1371/journal.pone.0259577

Sung, C. W., Lu, T. C., Wang, C. H., Chou, E. H., Ko, C. H., Huang, C. H., Chen, W. J., & Tsai, C. L. (2022). In-hospital cardiac arrest in United States emergency departments, 2010–2018. *Cardiovascular Medicine, 11*(9). https://doi.org/10.3389/fcvm.2022.874461

Taye, R., Archana, A. J., & Singh, D. D. (2022). A qualitative evaluation of infographics and its uses in healthcare communication. *Ulster Medical Society Journal, 91*(1), 59-60. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8835413/

Warren, T., Moore, L. C., Roberts, S., & Darby, L. (2021). Impact of a modified early warning score on nurses' recognition and response to clinical deterioration. *Journal of Nursing Management, 29*(5), 1141-1148. https://www.doi.org/10.1111/jonm.13252

Wu, L., Narasimhan, B., Bhatia, K., Ho, K. S., Krittanawong, C., Aronow, W. S., Lam, P.,

    Virani, S. S., & Pamboukian, S. V. (2021). Temporal trends in characteristics and

    outcomes associated with in-hospital cardiac arrest: A 20-year analysis (1999-2018).

    Journal of the American Heart Association, 10(23), Article e021572.

    https://doi.org/10.1161/JAHA.121.021572

Zadro, J. R., Ferreira, G. E., O'Keeffe, M., Stahl-Timmins, W., Elkins, M. R., & Maher, C. G.

    (2022). How do people use and view infographics that summarize health and medical

    research? A cross-sectional survey. *BioMed Central Medical Education, 22*(1), Article

    677. https://doi.org/10.1186/s12909-022-03744-6

Appendix A

JSU IRB Approval Letter

Institutional Review Board for the Protection of Human Subjects in Research
203 Angle Hall
700 Pelham Road North
Jacksonville, AL 36265-1602

November 7, 2023

Alexis Pope
Jacksonville State University
Jacksonville, AL 36265

Dear Alexis:

Your protocol for the project titled "Reducing the Incidence of In-Hospital Cardiac Arrests (IHCA) by Utilizing Infographics" protocol number 11072023-01, has been approved by the JSU Institutional Review Board for the Protection of Human Subjects in Research (IRB).

If your research deviates from that listed in the protocol, please notify me immediately. One year from the date of this approval letter, please send me a progress report of your research project.

Best wishes for a successful research project.

Sincerely,

Sarah Donley
Human Protections Administrator, Institutional Review Board

Appendix B

CITI Training

Completion Date 29-Jul-2023
Expiration Date 29-Jul-2026
Record ID 57238811

This is to certify that:

Alexis Pope

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Social and Behavioral Responsible Conduct of Research
(Curriculum Group)
Social and Behavioral Responsible Conduct of Research
(Course Learner Group)
1 - RCR
(Stage)

Under requirements set by:

Jacksonville State University

Collaborative Institutional Training Initiative

101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

Verify at www.citiprogram.org/verify/?wcf174c14-46c2-4b97-9dac-15f8ab113f8a-57238811