

Introduction

Background

- Cardiac arrest is a sudden loss of heart function resulting in death.
- About 40,000 cardiac arrests happen in Canada (one every 13 minutes)
- Effective chest compressions provide circulation to the body and brain, and increase patient survival
- The Misericordia Community Hospital (MCH) and Royal Alexandra Hospital (RAH) Emergency Departments (ED) are trying to increase patient survival by improving chest compression effectiveness

Objectives

- Evaluating the effectiveness of ED staff chest compressions with and without feedback using the Laerdal CPR Meter2.
- Compare nurse experience/training to their ability to accurately self-monitor chest compression quality.

Methods

1. Do two minutes of chest compressions without feedback from device.
2. Fill out QI tracking form.
3. Do two minutes of chest compressions with feedback from device.
4. Record Data on Excel.

In the experiment, we have clinical staff perform two separate trials of chest compressions on a CPR mannequin for two minutes.



1. Do two minutes of chest compressions without feedback from device.



2. Fill out QI tracking form.



3. Do two minutes of chest compressions with feedback from device.



4. Record Data on Excel.

Figure 1: Clinical setup for nurses

Results

Data Collected at Hospital Sites

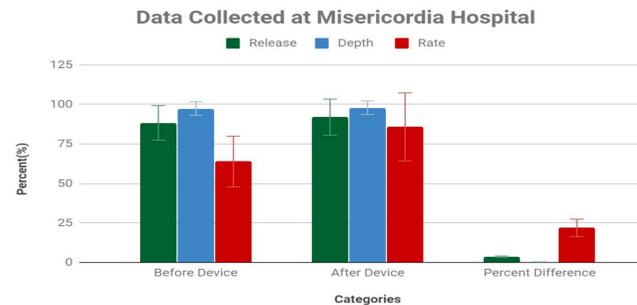


Figure 2: The data collected from the Misericordia Based on the results every category improved and overtime there was a lower standard deviation score.

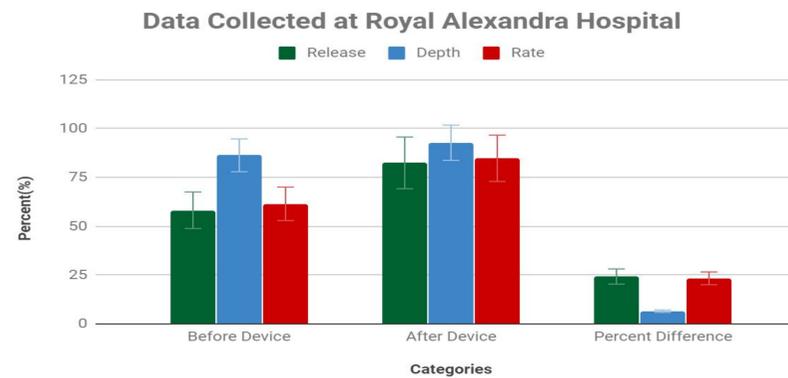


Figure 3: The data collected from the Royal Alexandra. Based on the results every category improved and overtime there was a lower standard deviation score.

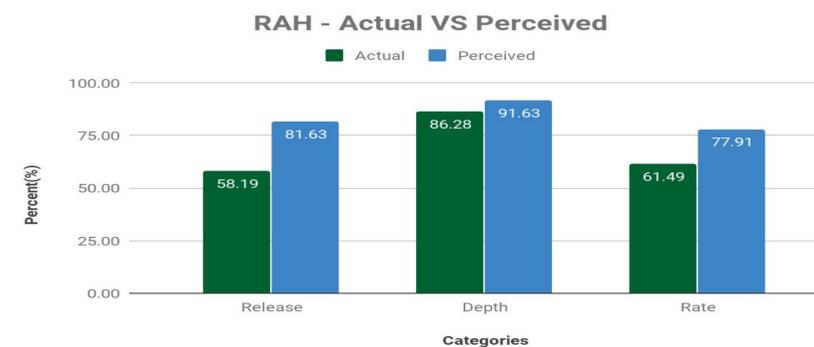
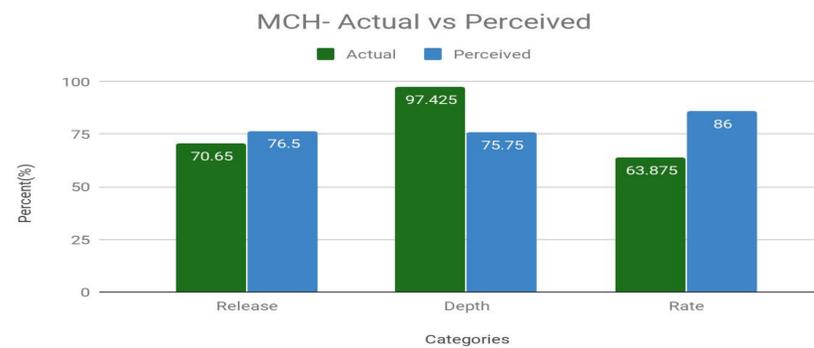


Figure 4: Actual vs Perceived values for Royal Alexandra Hospital.

Discussion

Statistical Significance and Survey Results

| Participant Survey Results | |
|--------------------------------|--------------------------|
| Average Years of Training | 11.84682469 |
| Frequency of giving CPR | Some What Frequently |
| Self Evaluation of CPR Ability | Intermediate to Advanced |
| Opinion on CPR Meter | Very Useful |

Figure 5: Survey Form Results

| Summary of Data Collected from the Two Hospital Sites | | | | | |
|---|------------|----------|----------|----------|------------------|
| Hospitals | Comparison | Release | Depth | Rate | Overall Score(%) |
| Misericordia Hospital | Before | 88.31 | 97.43 | 63.88 | 83.2 |
| | After | 91.95 | 97.88 | 85.83 | 91.88 |
| | C.I | 12.41577 | 4.380537 | 25.0506 | 13.94896897 |
| | T-Test | 5.06E-05 | 0.352042 | 0.000423 | 1.22275E-06 |
| Royal Alexandra Hospital | Before | 58.19 | 86.28 | 61.49 | 68.65 |
| | After | 82.42 | 92.77 | 84.83 | 86.67 |
| | C.I | 16.05531 | 9.726834 | 13.99063 | 13.25759237 |
| | T-Test | 6.6E-08 | 0.022112 | 4.16E-06 | 0.000000066 |

Figure 6: Summary Data from both Hospital Sites.

- Feedback improves chest compression release and rate.
- Feedback does not result in statistically significant improvements in depth.
- The CPR Meter2 will be used at the MCH and RAH in the future.

Conclusion

- Clinicians cannot accurately self-monitor chest compression quality.
- Feedback data can be used in training and clinical practice.
- Feedback improves release and rate and overall chest compression quality.
- All participants described the device was useful.
- T-Test analysis demonstrates proves statistically significant improvements in chest compression quality.

References

1. Regular Heart vs Cardiac Arrest Heart, accessed August 5, 2019 <https://medicalxpress.com/news/2019-02-aha-news-heart-stopping-drama-on-screen.html>
2. Heart Model, accessed August 5, 2019 <http://nirmanhitech.com/cardiac-ct.html>
3. T-test, accessed August 5, 2019 <https://www.investopedia.com/terms/t/t-test.asp>