

Statistical Analysis of Nurses Perceptions of NICU Webcams (AngelEye Health)

Coleman Harris, Biostatistician

Updated: 03/05/2021

Overview

- Because all of the responses are on a scale of 1 to 5, I used a type of statistical method called a “cumulative link model”. It’s a regression method that is better suited for this type of data. You’ll see values like “1|2” in each of the tables below, which are the different intercepts for each question’s response values. I’m happy to explain what we’re actually interpreting here since it’s a bit different from a simple linear or logistic regression, but for now you can basically ignore these when reviewing the results.
- One variable was important in EVERY question’s analysis: whether or not the facility sets clear expectations around webcams. This will be valuable to consider once you start to turn this data and analysis into actionable results.
- From an AngelEye perspective, the type of webcam is not associated with:
 - How willing a nurse is to recommend NICU webcams.
 - How nurses perceive parents’ time in the NICU.
 - Nurses’ perceived stress levels associated with webcams.
- However, it’s worth noting that nurses with experience with NicView cameras (or NicView and AngelEye cameras) feel *slightly* more comfortable with the safety and security of NICU webcams, and feel that parents call the NICU slightly less, than those only with AngelEye experience. Emphasis on *slightly* here, as the difference between the groups is minimal and can largely be ignored.
- Note also that for these two analyses (safety and security, and calls to the NICU), users of *any* webcam felt far better than users with no experience working with webcams in the NICU.

Recommending NICU webcams

| | Estimate | Std. Error | Pr(> z) |
|--|----------|------------|----------|
| 1 2 | -0.48 | 0.39 | 0.21 |
| 2 3 | 0.86 | 0.39 | 0.03 |
| 3 4 | 2.08 | 0.39 | 0.00 |
| 4 5 | 3.70 | 0.41 | 0.00 |
| current_roleSupervisor/Charge Nurse | 1.52 | 0.49 | 0.00 |
| current_roleNurse Educator | 1.72 | 0.59 | 0.00 |
| current_roleNursing Management (Assistant Nurse Manager, Nurse Manager) | 1.61 | 0.39 | 0.00 |
| current_roleNursing Administration (Director, CNO, etc.) | 0.95 | 0.34 | 0.00 |
| facility_clear_expectationsNot Much | 0.51 | 0.44 | 0.25 |
| facility_clear_expectationsNeutral | 0.94 | 0.46 | 0.04 |
| facility_clear_expectationsSomewhat | 1.42 | 0.41 | 0.00 |
| facility_clear_expectationsVery Much | 2.62 | 0.43 | 0.00 |
| facility_clear_expectationsI do not have experience working with webcams in NICU | 0.60 | 0.41 | 0.14 |

- The most relevant variables according to the scale of nurses recommending NICU webcams are the nurse’s **current role** and whether they feel their **facility sets clear expectations**.
- The “reference groups” for the model are Frontline Bedside Nurses who feel that their facilities do “not very much” set clear expectations regarding webcam technology.

- We interpret the coefficients (the “Estimate” column) as a proportional change in how nurses feel about recommending NICU webcams. So, for example, the value for Nurse Educators is +1.52, meaning that Nurse Educators feel better about recommending NICU webcams than Frontline Bedside Nurses (all other things equal).

Safety and security of NICU webcams

| | Estimate | Std. Error | Pr(> z) |
|--|----------|------------|----------|
| 1 2 | -1.30 | 0.40 | 0.00 |
| 2 3 | 0.11 | 0.39 | 0.78 |
| 3 4 | 0.48 | 0.39 | 0.22 |
| 4 5 | 1.94 | 0.40 | 0.00 |
| all_camerasAngelEye and NicView | 0.38 | 0.36 | 0.29 |
| all_camerasI do not have experience working with webcams in NICU | -1.42 | 0.52 | 0.01 |
| all_camerasNicView | 0.22 | 0.20 | 0.27 |
| all_camerasOther | -0.34 | 0.31 | 0.26 |
| current_roleSupervisor/Charge Nurse | 0.53 | 0.57 | 0.35 |
| current_roleNurse Educator | 1.89 | 0.70 | 0.01 |
| current_roleNursing Management (Assistant Nurse Manager, Nurse Manager) | 0.94 | 0.39 | 0.01 |
| current_roleNursing Administration (Director, CNO, etc.) | -0.29 | 0.37 | 0.43 |
| facility_clear_expectationsNot Much | 0.15 | 0.42 | 0.72 |
| facility_clear_expectationsNeutral | 0.54 | 0.43 | 0.21 |
| facility_clear_expectationsSomewhat | 0.57 | 0.38 | 0.13 |
| facility_clear_expectationsVery Much | 1.66 | 0.40 | 0.00 |
| facility_clear_expectationsI do not have experience working with webcams in NICU | 0.72 | 0.54 | 0.18 |

- The most relevant variables according to the safety and security of NICU cameras are the nurse’s **current role**, the **type of webcam** they have experience with, and whether they feel their **facility sets clear expectations**.
- The “reference groups” for the model are Frontline Bedside Nurses, with experience with AngelEye cameras, who feel that their facilities do “not very much” set clear expectations regarding webcam technology.
- We again interpret the coefficients (the “Estimate” column) as a proportional change in how nurses feel about the safety of NICU webcams.

So, for example, we can explore the impact of the type of webcam variable. At first glance, responses including NicView (e.g., “NicView” and “AngelEye and NicView”) have a slightly more positive perception to webcam safety. However, these estimates are small, with relatively sizable standard deviations, hence we conclude there is not much difference between AngelEye and NicView cameras in regards to safety and security of NICU webcams (all else held equal). What is more interesting, however, is the large reduction in feelings of safety and security for those who “do not have experience working with webcams in NICU”, and the comparative stability in feelings of safety and security among those with any experience with webcams.

Time in NICU

| | Estimate | Std. Error | Pr(> z) |
|--|----------|------------|----------|
| 1 2 | -4.22 | 0.86 | 0.00 |
| 2 3 | -2.93 | 0.75 | 0.00 |
| 3 4 | 1.51 | 0.72 | 0.04 |
| 4 5 | 3.53 | 0.75 | 0.00 |
| experience_with_cameraI've worked in an institution with camera-streaming technology for less than 2 years | 0.71 | 0.65 | 0.28 |
| experience_with_cameraI've worked in an institution with camera-streaming technology for more than 2 years | 1.01 | 0.66 | 0.13 |
| experience_with_cameraMy organization has evaluated camera-streaming technology | -0.92 | 0.80 | 0.25 |
| facility_clear_expectationsNot Much | -0.29 | 0.55 | 0.60 |
| facility_clear_expectationsNeutral | 0.76 | 0.54 | 0.16 |
| facility_clear_expectationsSomewhat | -0.22 | 0.50 | 0.66 |
| facility_clear_expectationsVery Much | -0.26 | 0.51 | 0.61 |
| facility_clear_expectationsI do not have experience working with webcams in NICU | 0.70 | 0.92 | 0.45 |

- The most relevant variables according to the scale of nurses perceptions of parents' time in the NICU are the nurse's **experience with NICU cameras** and whether they feel their **facility sets clear expectations**.
- The “reference groups” for the model are nurses with no experience with camera-streaming technology who feel that their facilities do “not very much” set clear expectations regarding webcam technology.
- Again interpret the coefficients (the “Estimate” column) as a proportional change in how nurses feel about the parents' time in the NICU.

Calls to NICU

| | Estimate | Std. Error | Pr(> z) |
|--|----------|------------|----------|
| 1 2 | 1.68 | 0.50 | 0.00 |
| 2 3 | 3.18 | 0.51 | 0.00 |
| 3 4 | 4.44 | 0.53 | 0.00 |
| 4 5 | 6.23 | 0.59 | 0.00 |
| all_camerasAngelEye and NicView | 0.23 | 0.36 | 0.52 |
| all_camerasI do not have experience working with webcams in NICU | -1.24 | 0.97 | 0.20 |
| all_camerasNicView | 0.05 | 0.20 | 0.81 |
| all_camerasOther | 1.03 | 0.34 | 0.00 |
| experience_with_cameraI have no experience with camera-streaming technology | 1.31 | 0.56 | 0.02 |
| experience_with_cameraI've worked in an institution with camera-streaming technology for less than 2 years | 0.63 | 0.19 | 0.00 |
| experience_with_cameraMy organization has evaluated camera-streaming technology | 0.92 | 0.46 | 0.04 |
| facility_clear_expectationsNot Much | 1.08 | 0.52 | 0.04 |
| facility_clear_expectationsNeutral | 2.05 | 0.52 | 0.00 |
| facility_clear_expectationsSomewhat | 1.73 | 0.47 | 0.00 |
| facility_clear_expectationsVery Much | 2.67 | 0.49 | 0.00 |
| facility_clear_expectationsI do not have experience working with webcams in NICU | 2.95 | 1.01 | 0.00 |

- The most relevant variables according to the scale of nurses perceptions of parents' calls to the NICU are the **type of webcam** they have experience with, nurse's **experience with NICU cameras** and whether they feel their **facility sets clear expectations**.
- The “reference groups” for the model are nurses who have worked with AngelEye cameras with more than 2 years experience with camera-streaming technology who feel their facilities do “not very much” set clear expectations regarding webcam technology.
- Again interpret the coefficients (the “Estimate” column) as a proportional change in how nurses feel about the calls to the NICU.

Stress

| | Estimate | Std. Error | Pr(> z) |
|--|----------|------------|----------|
| 1 2 | -1.51 | 0.59 | 0.01 |
| 2 3 | 1.90 | 0.59 | 0.00 |
| 3 4 | 4.38 | 0.66 | 0.00 |
| 4 5 | 5.32 | 0.76 | 0.00 |
| nicu_levelLevel III | -1.31 | 0.47 | 0.01 |
| nicu_levelLevel IV | -1.55 | 0.48 | 0.00 |
| nicu_levelOther (please specify) | -0.04 | 0.83 | 0.96 |
| facility_clear_expectationsNot Much | 0.83 | 0.48 | 0.08 |
| facility_clear_expectationsNeutral | 0.99 | 0.50 | 0.05 |
| facility_clear_expectationsSomewhat | 1.78 | 0.44 | 0.00 |
| facility_clear_expectationsVery Much | 2.50 | 0.46 | 0.00 |
| facility_clear_expectationsI do not have experience working with webcams in NICU | -0.92 | 0.88 | 0.30 |

- The most relevant variables according to the scale of nurses stressl levels are the hospital's **NICU Level** and whether they feel their **facility sets clear expectations**.
- The “reference groups” for the model are nurses who work in Level II NICU facilities who feel their facilities do “not very much” set clear expectations regarding webcam technology.
- Again interpret the coefficients (the “Estimate” column) as a proportional change in nurses stress levels.

References

1. Rune Haubo Bojesen Christensen (2019). ordinal: Regression Models for Ordinal Data. R package version 2019.12-10.