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Clinical Integration of a Clinical Decision Support System (CDSS) for the Neonatal Intensive Care Unit (NICU)

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Goals of the project and final users that will benefit

- To design an AI system for physicians and parents of infants in the NICU, using successful criteria for successful integration into the clinical setting.
- Users are neonatologists and parents/guardians of infants in the NICU.

Criteria for successful deployment in clinical setting

- (i) Data entry and decision algorithms must be automated.
- (ii) Access must be easy, secure, and use the least amount of physician time possible.
- (iii) The output should be of clinical value to physicians, improve the quality of care, decrease the costs of health care delivery, and fit into the physicians' workflow. Information must to simple and efficient.

Frize, M., Weyand, S., Gilchrist, J., Bariciak, E. (2010) "Successful Intensive Care Unit (NICU)." MeMeA. Ottawa, May: 69-72.

Deployment of a CDSS for Neonatal

PPADS: Physician-Parent Decision-Support Design

- Collects data from infants in the NICU (bedside monitor, ventilator, laboratory, medical imaging, discharge diagnosis information).
- Physicians see a summary of all patients in the unit; individualized data can be retrieved for any of the infants.
- A trending tool tracks patients' vital signs and generates warnings and alerts for meaningful deviations.
- For parents: current condition, current treatment, outcome prediction, decision support, and the glossary.
- The parent module provides risk predictions for mortality and other conditions.

M. Frize, A. Esty, J. Gilchrist, J. Harrold, E. Bariciak (2018) Development of an Automated Trending Tool for the Neonatal Intensive Care Unit (NICU). WC2018. Prague, June.

Results

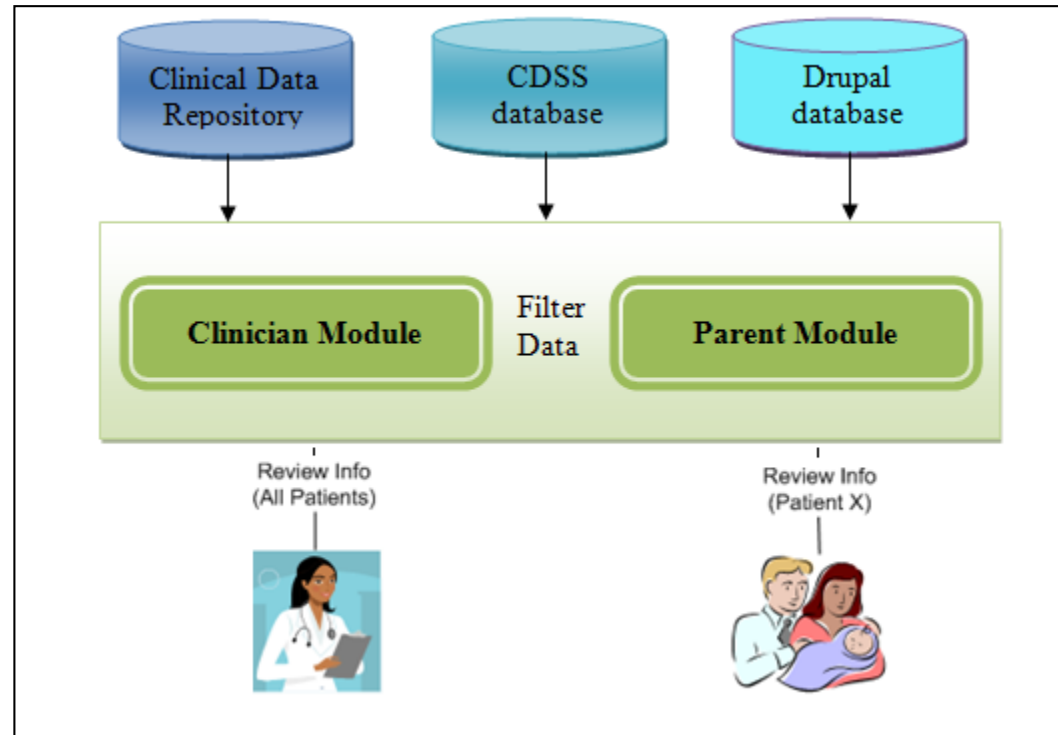
- Data entry is automated, access is secure and user-friendly, and physician and nurse time spent using the system is minimized.
- The system was developed with a front-line physician on the design team from system conception to final prototype, ensuring the format and type of information supplied is of clinical value to physicians and integrates in to their workflows.
- Displayed information is simple and efficient.
- Usability study with NICU parents showed that the system improved the parents' access to relevant information on their infant's conditions and treatments, and led to a better communication with the medical team.

Weyand, S., Frize, M., Bariciak, E., and Dunn, S. (2011) "Development and Usability Testing of a Combined Physician-Parent Decision-Support Tool for the Neonatal Intensive Care Unit." IEEE/EMBC, Boston, September.


Conclusion and future work

- Physicians at the CHEO can't wait to use the system in their clinical environment.
- This system should lead to improved quality of care and perhaps decrease the costs of health care delivery.
- A new usability study will be carried out, late 2021, to test how well the system fits into the physicians' workflow using real-time information.
- The system will be offered for deployment shortly after the study.

PPADS Design



Physician Module



NICU Decision Support Tool

HOMEPAGE
PATIENT SEARCH
USER MANAGEMENT
WEBFORM RESULTS
CREATE / ADD
GLOSSARY

CLINICIAN1

- My account
- Create content
- Log out


Welcome, Dr. Clinician1

The most recent alerts are:


Patient ID	Last Name	First Name	Admit Date	Location	Risk Level	Updated	Patient File
9000005	Lee	Briana	2010-07-15 14:40:59	NICUG2	▲▲▲	2010-07-15 14:41:16	View file

Full list of admitted patients


Patient ID	Last Name	First Name	Date of Birth	Admit Date	Location	Risk Level	Patient File	Parent Account
1234567	Doe	Jane	2010-12-16	2010-12-16 12:22:46	NICUY4	●	View file	<input checked="" type="checkbox"/> Activated
9000007	Hall	Frederick P	2010-07-15	2010-07-15 15:43:04	NICUY1	▼▼	View file	<input checked="" type="checkbox"/> Activated



SEARCH DISCHARGED
PATIENT RECORDS



PARENT-USER
MANAGEMENT



ADD NEW
PARENT-USER

Parent Module

CHEO NICU Decision Support Tool

[HOMEPAGE](#)[CURRENT CONDITION](#)[CURRENT TREATMENT](#)[OUTCOME PREDICTIONS](#)[DECISION SUPPORT](#)[GLOSSARY](#)**1234567**

- [My account](#)
- [Log out](#)

SEARCH
GLOSSARY**SEARCH**[Home](#)

Decision Support

You have been asked to consider a change in the direction of care.

Direction of care options:

You are being asked to consider the following directions of care:

- ▶ Full, active care
- ▶ Non-escalation of care
- ▶ Do not resuscitate order (DNR)
- ▶ Withdrawal of life support / palliative care

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