

Avoiding Transfers and Improving Care: Newborn Resuscitation in Community and Rural Hospitals

October 2, 2018



Quick Facts About Intermountain Healthcare

Headquartered in
Salt Lake City

39,000
employees

470
volunteers
governing
trustees on 32
boards

Created in
1975
when
LDS Church
donated its 15
hospitals to the
communities
they served

\$419 million in charity care during
2016 (249,000 cases)

Integrated Health System
Serving Utah and Southern Idaho

23
hospitals
with 2,769
licensed beds

1,600
employed
physicians and
APCs at more
than
180
clinics

SelectHealth
insurance
plans
with
members

TeleHealth
Homecare &
Hospice
InstaCare
Connect Care
Life Flight
Precision
Genomics

Strong Bond Agency Ratings
S&P: **AA+** Moody's: **Aa1**

Why TeleHealth: Newborn Critical Care Program?

- 10% of newborns require transition assistance and some resuscitative measures.
- 1% of newborns require extensive resuscitative measures.
- 14,598 births in facilities without onsite neonatologist in 2017
- Newborn resuscitation program requires recertification every 2 years.



Women & Newborns

Newborn Critical Care



TeleHealth Equipment



- Camera & Audio managed by TeleHealth Provider



2013 -- Prototype

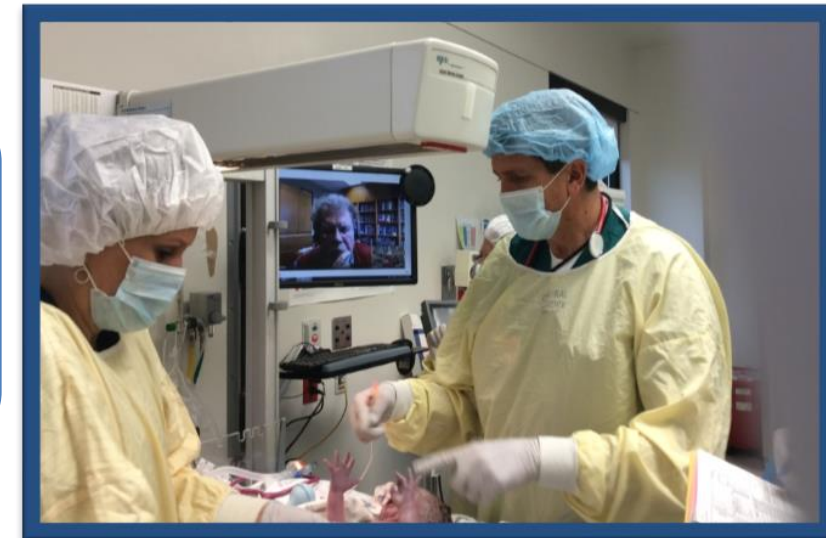
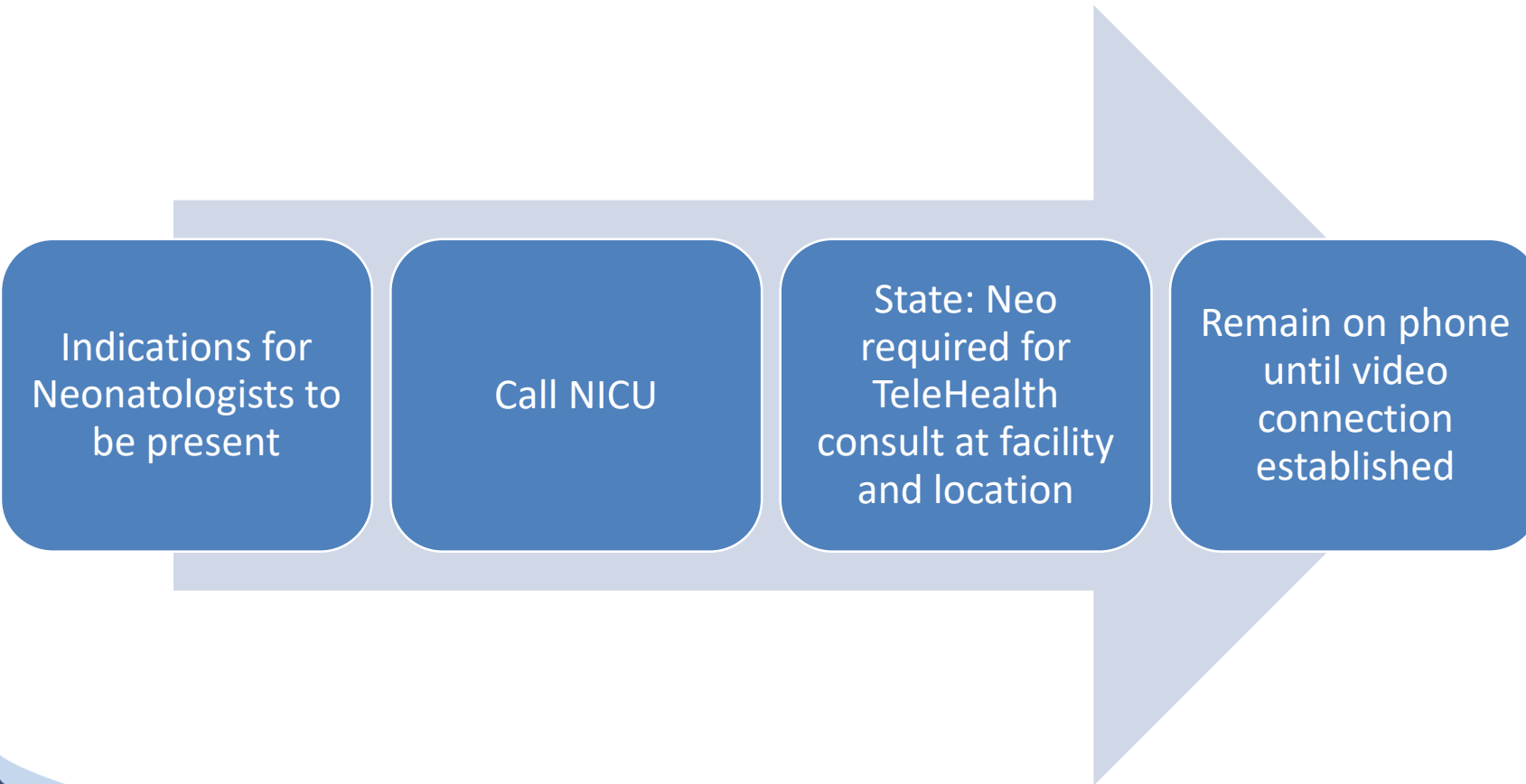


2014 – Newborn in room equipment



2018 – Layton cabinet warmer

Originating Site Workflow



Distant Site Workflow

Neo notified of
TeleHealth consult:
Pre-notification,
emergent, post
delivery consult

Neo locates
computer on unit and
initiates TeleHealth
call

Neo calls into
newborn location



Quality Improvement: Case Study – LDRP Unit with 23 beds

- Rural hospital in an urban setting
- 1200-1400 births a year
- Level II A facility; keep newborns > 34 wks gestation
- RNs completed NRP yearly
- Respiratory Therapist on call and attends every delivery
- Newborn resuscitation-skilled MDs/LIPs are not on site



What happened in 2013?

- 30 resuscitation errors were identified
- 4 Cases - serious errors and required a case review
- Errors included:
 - Equipment
 - RN Skills
 - NRP Sequencing
 - Resuscitation Form
- Newborn TeleHealth program began



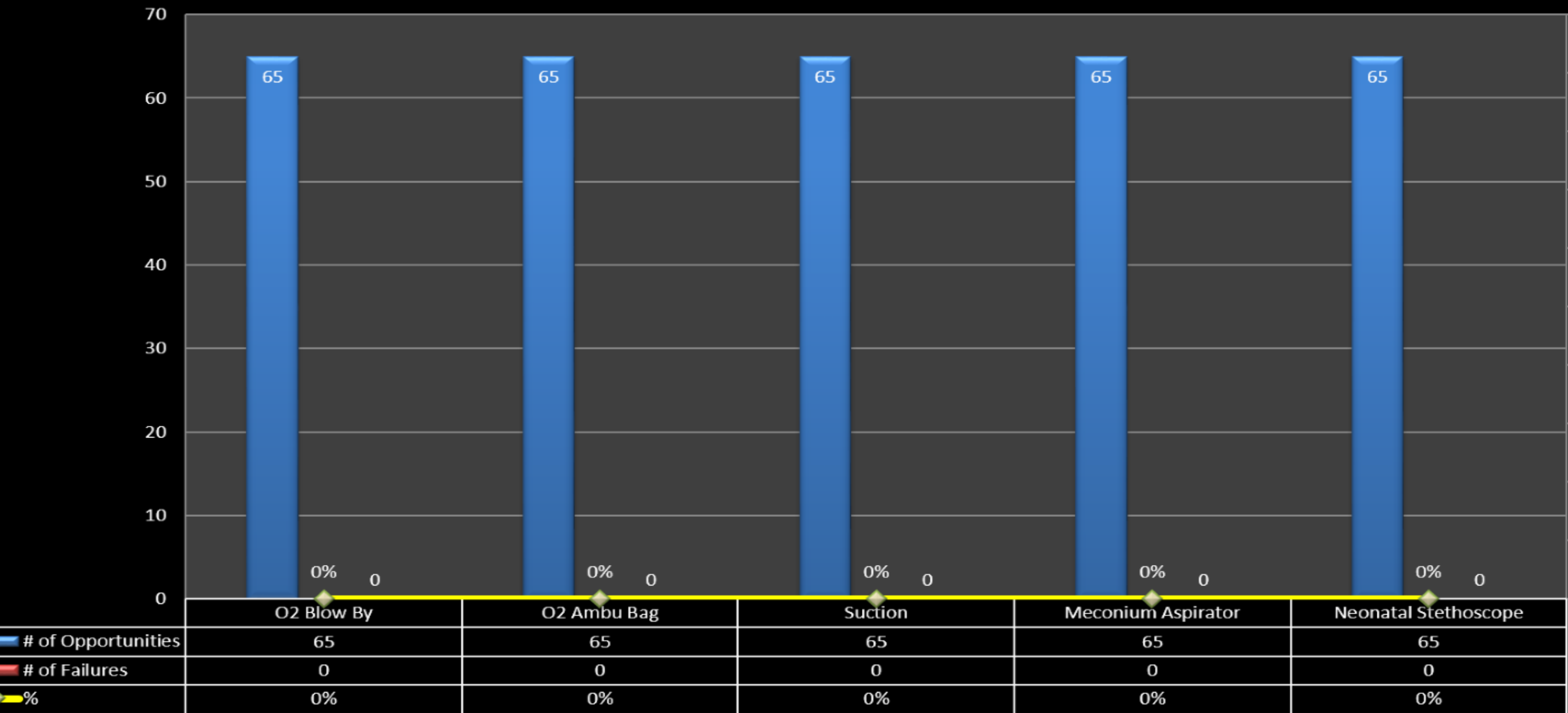
Implemented training based on case study data

- RRTs tested monthly on 102 skills
- Process for timely communication to RRTs
- Process to document all equipment present before delivery
- All RNs participate in 2 NRP simulations monthly (scheduled, unscheduled)
- All RNs perform 20 key NRP components with results scored
- Strict guidelines for timely notification of both pediatrician and neo
- Monthly review “everything”
- Feedback to the staff



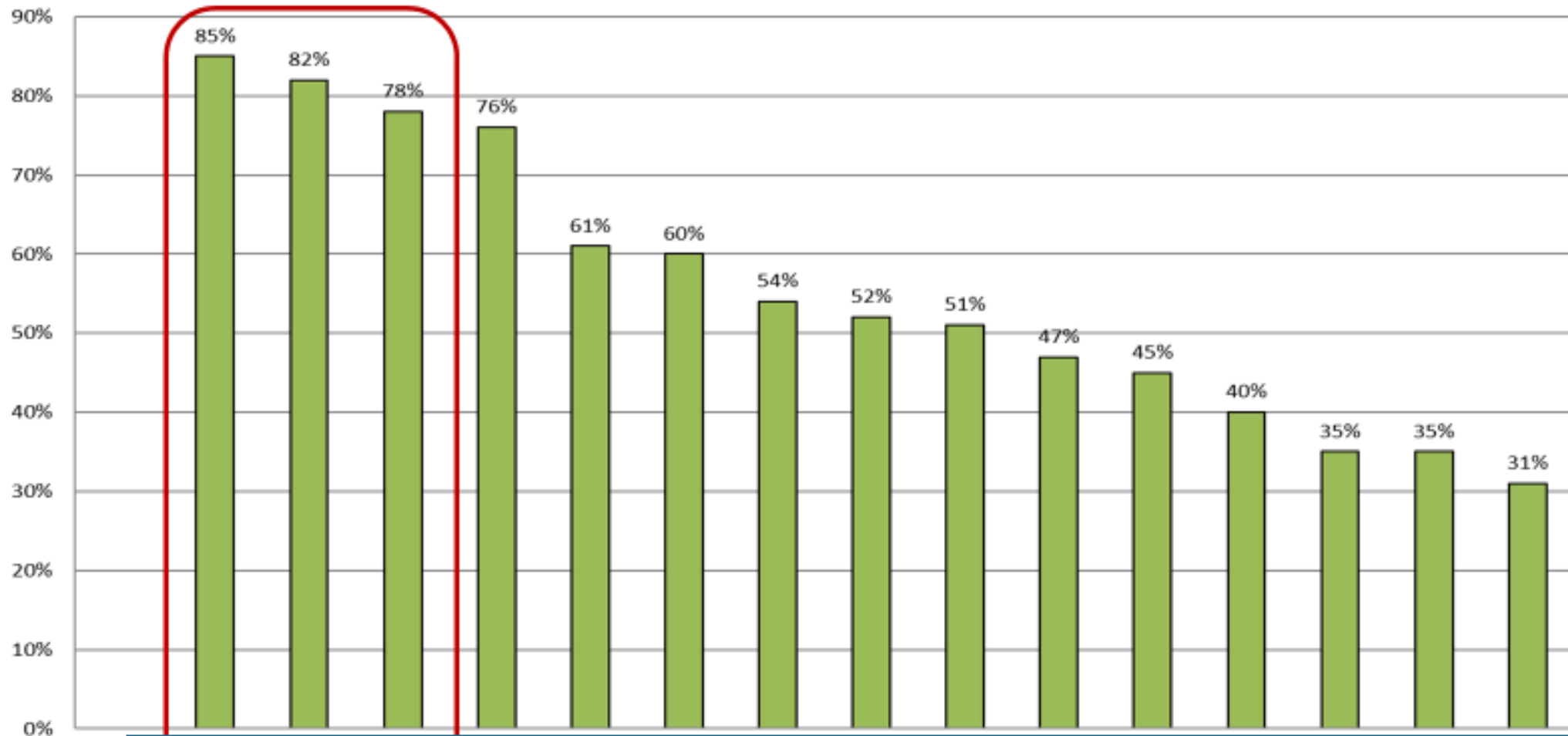
Equipment errors were solved one year post implementation

Documentation of Equipment Ready



Knowledge Baseline Scores

All Units



Registered Respiratory Therapists and Registered Nurse Facility Scores

TeleHealth Incorporated into training and practice

Resuscitation Communication with Neonatologists and Pediatricians

Please give information in the following order:



We are Resuscitating a

- _____ week (gestation) baby
- _____ minutes old (age)
- _____ delivery -Vaginal, C-section(reason), abruption, meconium, prolapsed cord, forceps, vacuum
- _____ other risk factors-PIH, Chorio, Diabetes (GDM, IDDM), Drug use, or recent medications given

A&I

- PPV started (how long ago)
- Heart Rate is _____ (if less than 60 – report chest compressions; if started) or if >100 (how long)
- Is PPV effective – report PIP/Peep , Rate, FIO₂, Breath sounds
- _____ Oxygen Saturations if reading
- _____ Muscle Tone (normal, hypotonic)

Repeat **Assessment and Interventions (A&I)** every minute during resuscitation.

Neonatal Resuscitation with Tele Health

Initiate Tele Health phone call **prior** to delivery if possible

- Prematurity < 34 ^{6/7} weeks
- Category III FHR tracing (EITHER sinusoidal pattern OR absent variability with recurrent late decelerations, recurrent variable deceleration, or bradycardia)
- Severe polyhydramnios (AFI > 35)
- Severe oligohydramnios (AFI 5 or less)
- Prolapsed cord
- Any prenatally detected condition with reasonable potential for requiring neonatal resuscitation or urgent neonatal transport (Fetal tachycardia with or without maternal tachycardia, fetal sepsis, fetal seizures, no fetal movement, etc)
- Fetal hydrops
- Maternal eclampsia if fetal distress
- Massive vaginal bleeding (Abrutio placentae)
- Suspected uterine abruption
- Placenta accreta/percreta/increta (diagnosed prior to delivery)
- Maternal Code Blue
- Neonatologist requested by delivering physician/CNM
- RN or RT feels a need to have Neonatologist on Tele Health phone call



The Effect of a Newborn Telehealth Program on Transfers Avoided

A Multiple-Baseline Study

Jordan Albritton, PhD, MPH

Lory Maddox, MSN, MBA, RN

Joe Dalto, PhD, MS

Erick Ridout, MD

Stephen Minton, MD

Background

TeleHealth Program for Newborn Critical Care (NCC)

- Purpose: Provide synchronous video assistance for resuscitations (VAR) and other newborn care at level 1 and 2 nurseries.
- Why?
 - 15% of births at Intermountain occur in suburban and rural facilities
 - 10% of newborns require assistance breathing and 1% require extensive resuscitation ⁽¹⁾
 - Skills associated with low frequency events deteriorate rapidly ⁽²⁻⁴⁾

Background

Key Research Question

- Does the TeleHealth NCC program reduce unnecessary transfers?
 - Transfers are costly and potentially risky
 - Transfers remove families from their local community and support
 - Preventing transfers supports the viability of local facilities

Existing Evidence

- Limited research on use of telehealth for neonatal care
 - Improved quality of resuscitation ⁽⁵⁻⁶⁾
- Decreased LOS and fewer transfers for other pediatric services ⁽⁷⁻¹⁰⁾

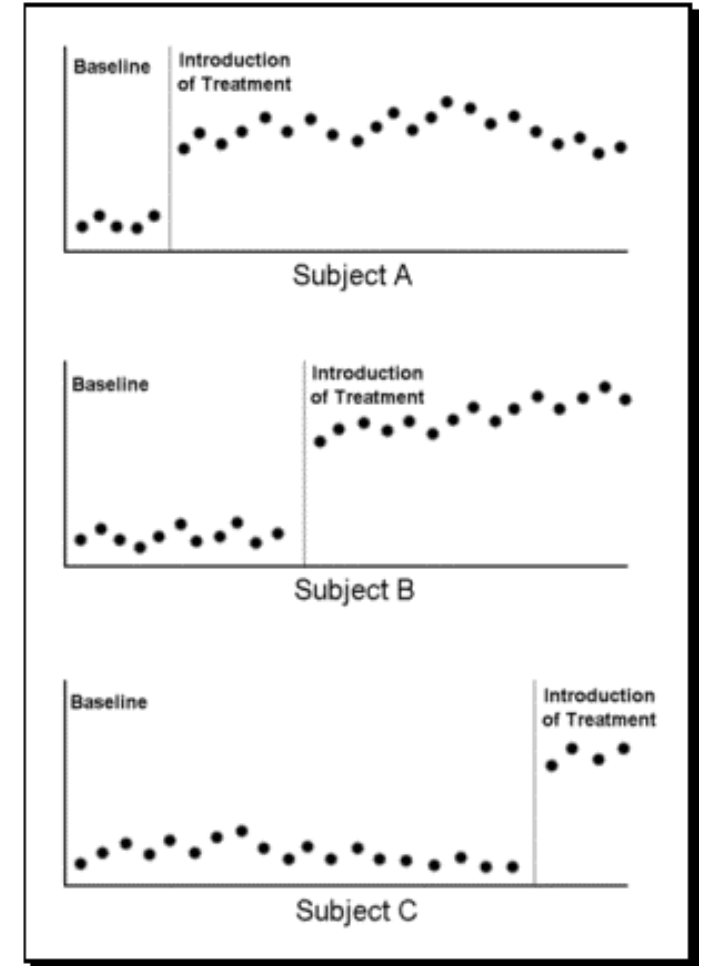
Research Methods

Multiple-Baseline Study Design

- Takes advantage of staggered implementation
- Controls for singular external events that could bias results
 - Internal or External Policies
 - Development of new pharmaceuticals
 - Celebrity events

Poisson Regression

- Useful for outcome variables that are counts
 - → Count of transfers per facility by month
 - → Estimate difference in predicted number of events



Data

Inclusion Criteria

- All births at 8 Intermountain Hospitals that implemented telehealth for NCC between Nov 2014 and Dec 2015.
 - Births from Jan 1, 2013 to Dec 31, 2017

Exclusion Criteria

- Birthweight < 500 grams
- Gestational age < 23 weeks
- Patients that did not survive beyond the initial encounter
- Patients without 1-minute Apgar Scores
- Births during 6-month peri-implementation period

Data

Analytic Sample

- 44,643 births

Main analysis:

- Aggregated to facility-month level
 - 214 observations pre-implementation
 - 180 observations post-implementation

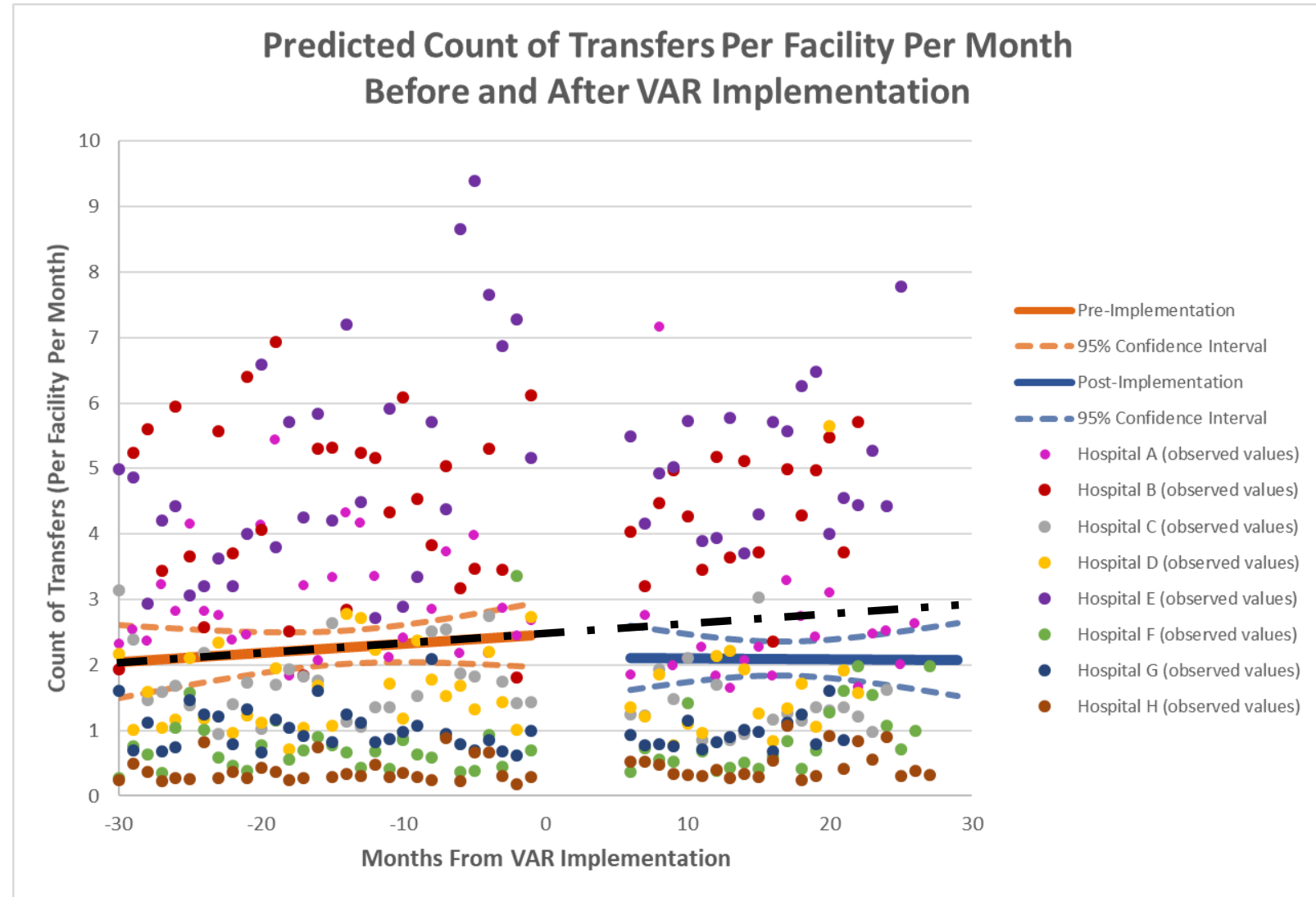
Key variables

- Main outcome
 - # of transfers per facility-month
- Main dependent variable
 - Dichotomous variable: before/after intervention
- Control variables
 - Calendar and Year
 - Patient Volume (births)
 - Facility
 - Clinical factors

Results

Facility level analysis:

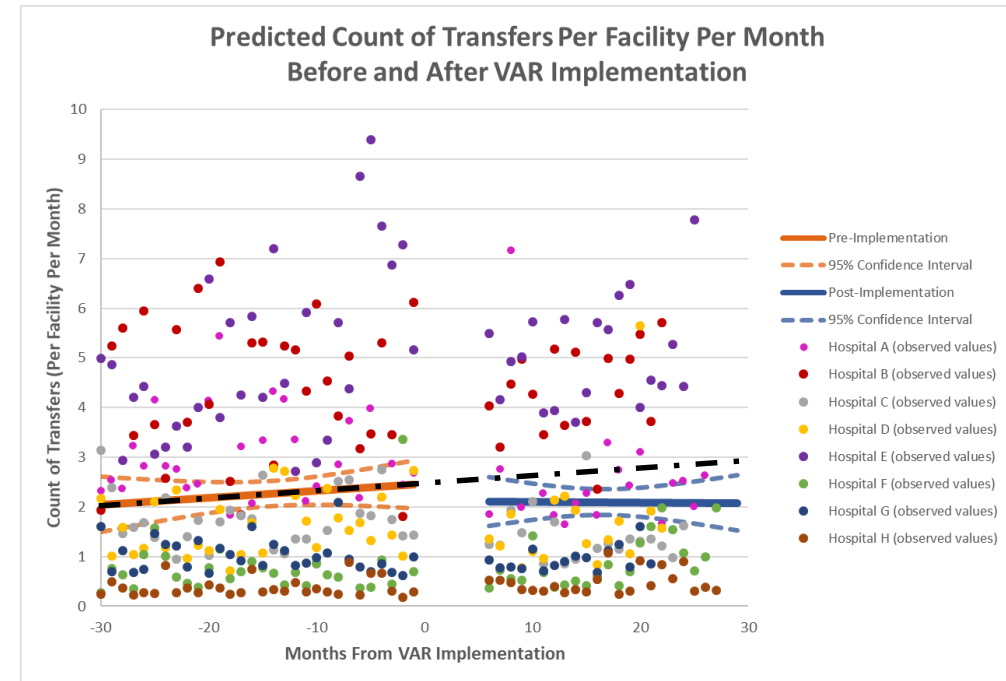
- Transfers per facility per month reduced by 0.70 ($p < 0.009$)
- 67.2 fewer transfers per year across the 8 facilities
- Predicted savings of \$1,220,352 per year



Results

Individual Level analysis

- Logistic regression (probability of being transferred)
 - Controlling for maternal/fetal conditions
- Intervention associated with:
 - 29.6% lower odds of being transferred ($p=0.008$)
 - → 0.49 %-point reduction in probability of being transferred



Conclusions and Implications

Conclusion

- The TeleHealth NCC program appears to reduce the number of transfers per facility per month

Implications

- Numerous benefits to patients and community
- Findings were based on only 8 facilities and TeleHealth utilization rate less than 1%
 - Target TeleHealth utilization rate of 3-5% would provide even greater benefit

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Panel Participants



Stephen Minton, MD



Taunya Cook, RN



Stephanie Merrell, RN



Jordan Albritton, PhD



Lory Maddox, RN

A newborn baby is lying in a hospital bed, wearing a clear oxygen hood. A hand is gently holding the baby's hand. The baby is wearing a white hospital gown with orange dinosaur patterns. Medical equipment is visible in the background.

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Healthiest Lives
Possible®

