# What is the true FSB rate and how can FSB be prevented?

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# FSB or asphyxiated, but still alive?

Photo: Helping Babies Breathe

# Background

- Estimated 1.2 M fresh stillbirths (FSB) and 1 M early neonatal deaths (END) secondary to birth asphyxia
  - Based on clinical assessment and Apgar scoring
- FSB not counted in the MDG and SDG

- "Helping Babies Breathe" (HBB) and "Safer Births"
  - The National HBB Study in Tanzania
  - Observational studies at Haydom Hospital

# National HBB study Tanzania - 2009

## Lead by the Ministry of Health


Bugando

Sekotoure

**Haydom**

KCMC

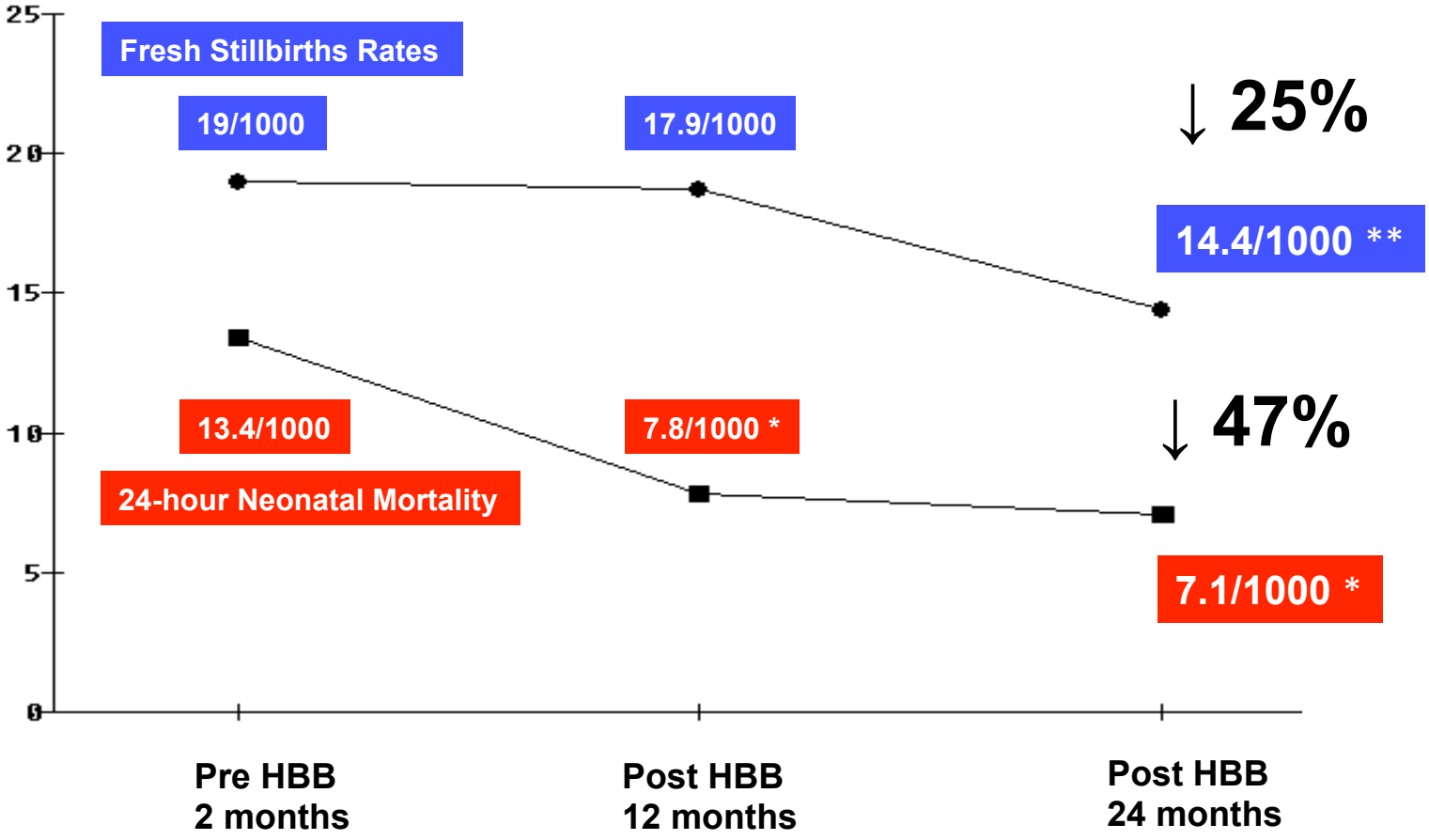
Mawensi

Muhimbili

Amana

Bugurundi

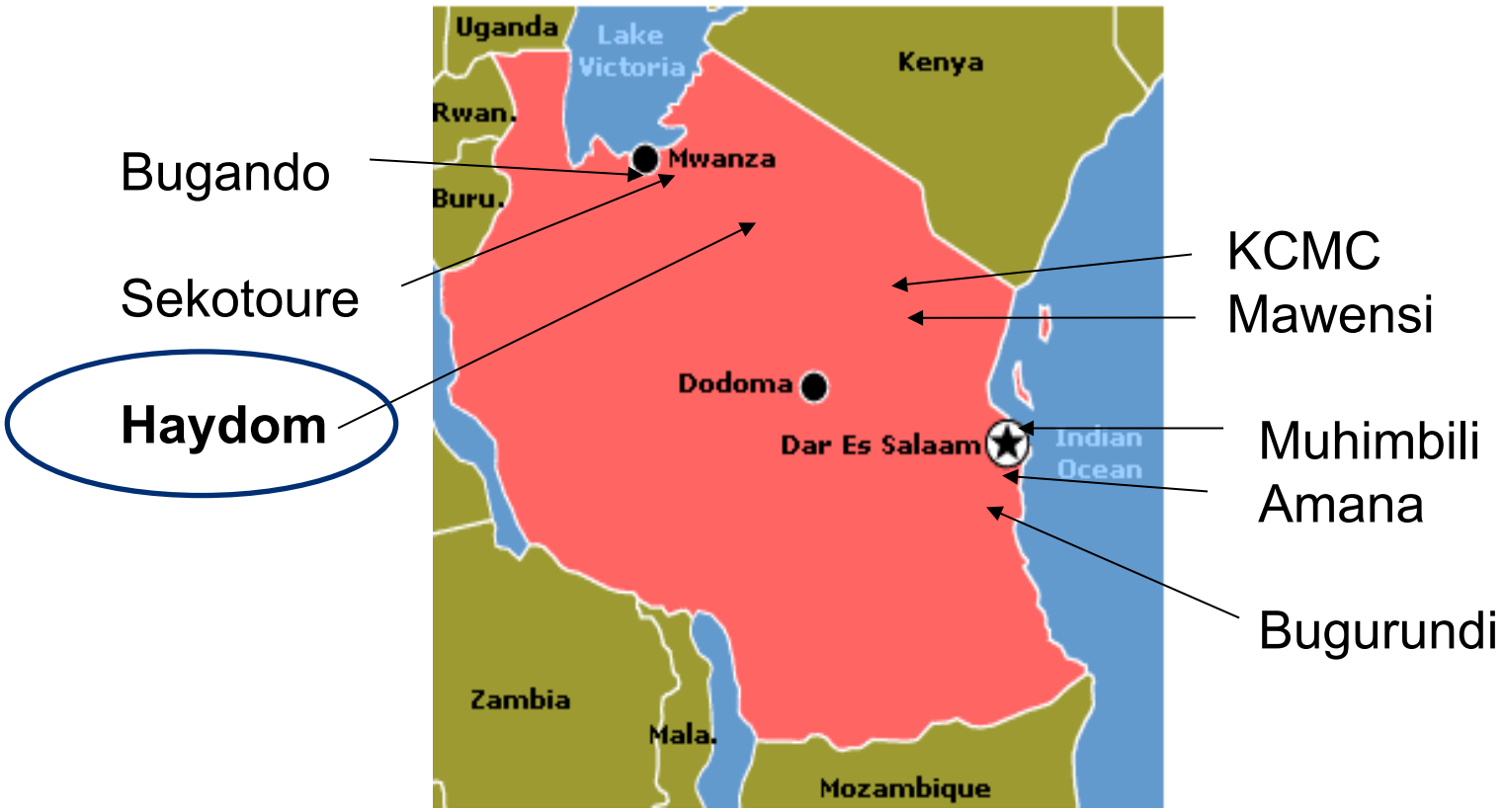
# Impact of HBB training over two years, ~80.000 deliveries recorded prospectively




Ref: Msemo G et al, Pediatrics 2013

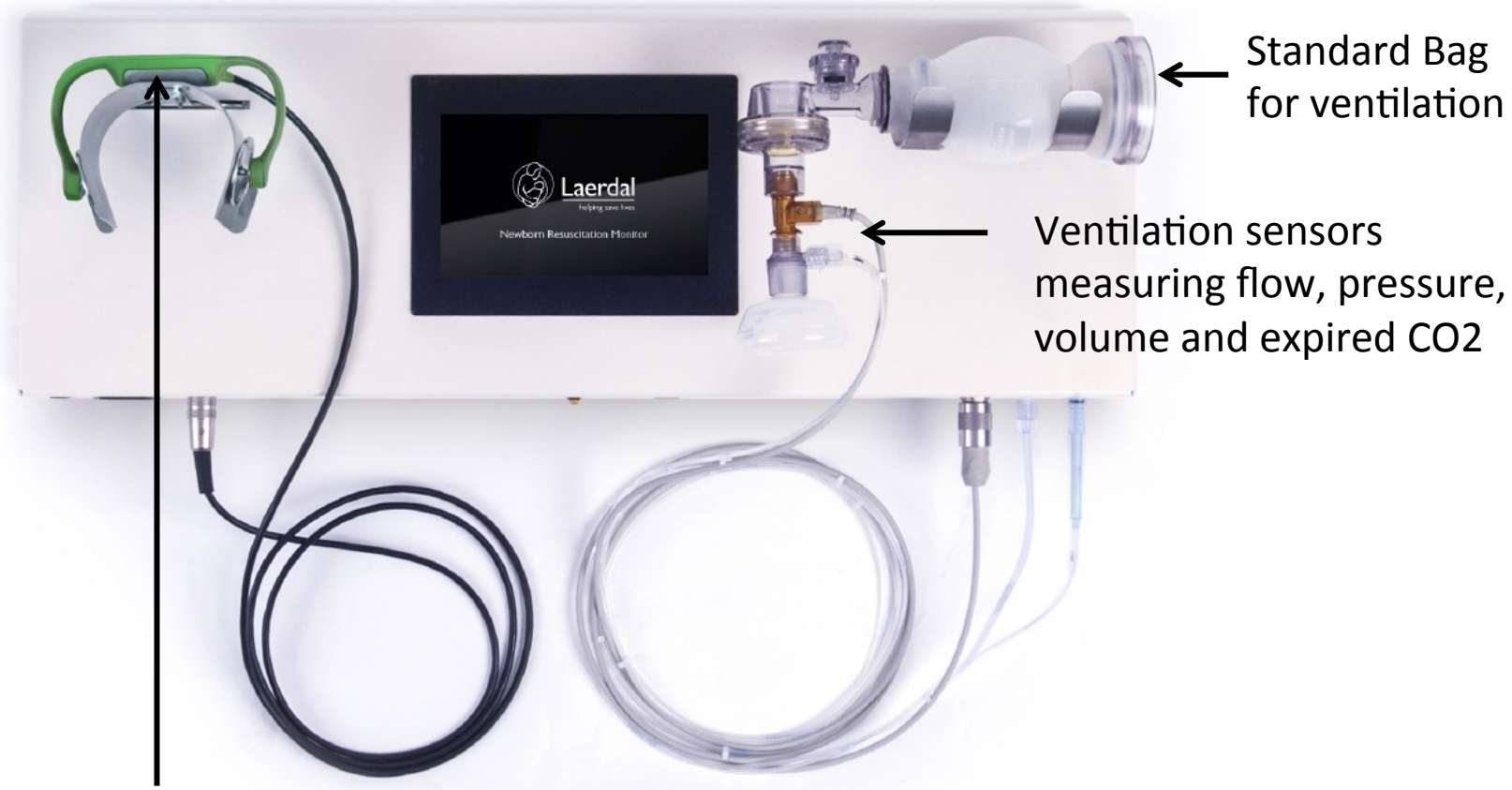
*p<0.0001, **p=0.001

# Haydom Lutheran Hospital



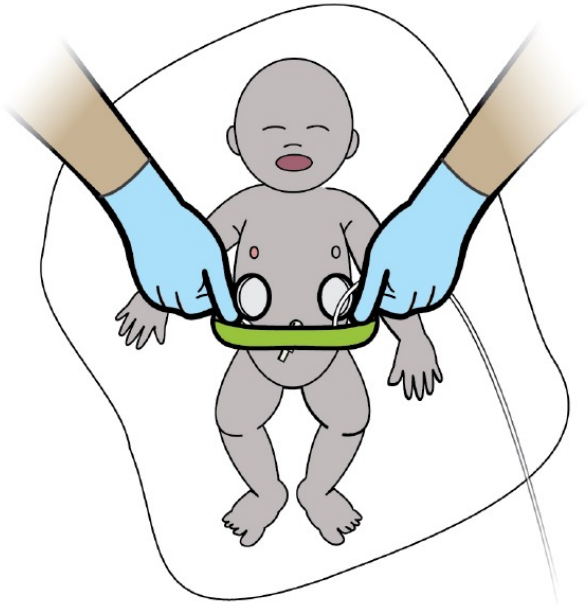
# The Safer Births project – March 2013

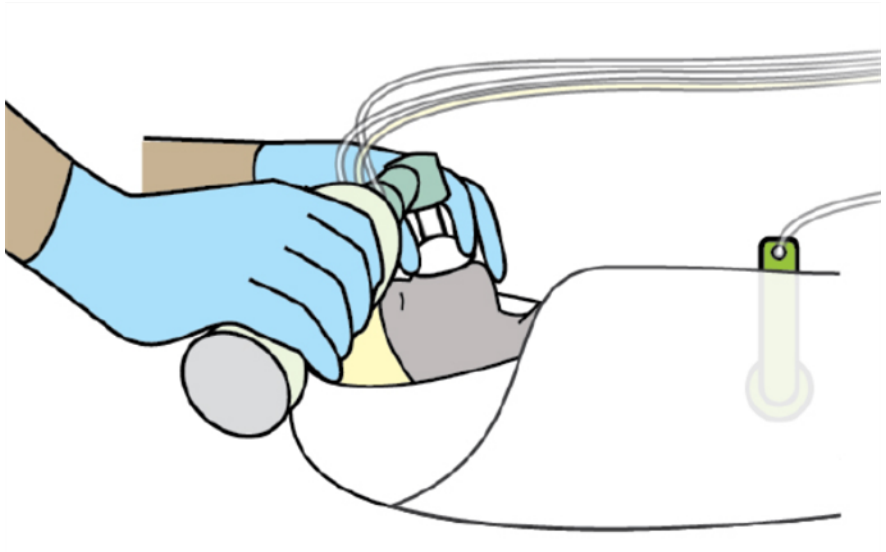
# Neonatal Resuscitation Monitor



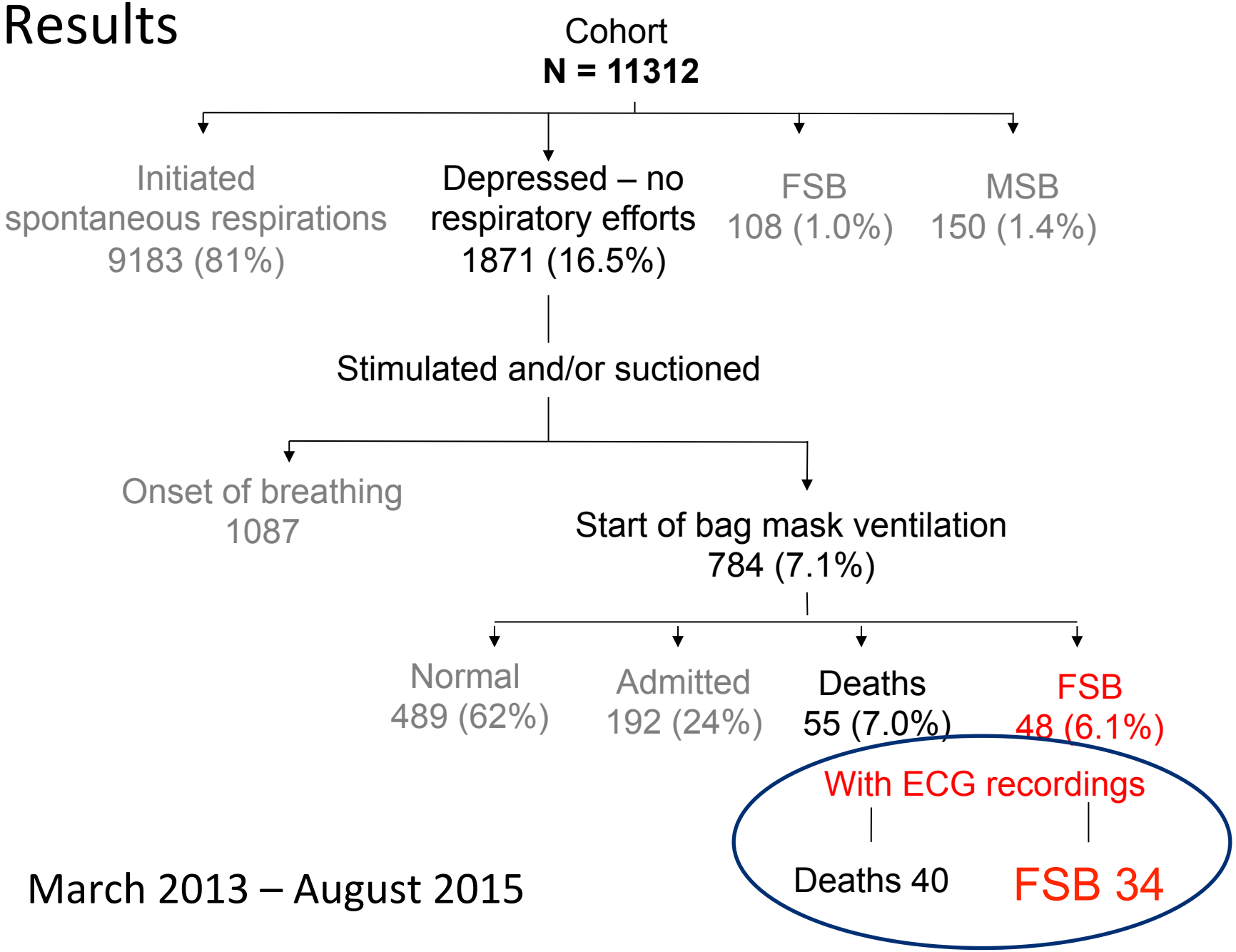

ECG based newborn heart rate sensor using dry electrodes


Heart rate
HR
79
BPM
Heart rate
Beats per minute
Elapsed time:
00:03
Elapsed time





# Results




March 2013 – August 2015

# Neonates classified as FSB versus END

| | FSB: n=34 | END: n=40 | p-value |
|---|---|---|---|
| **BW grams** | 2871±597 | 2813±607 | 0.68 |
| **GA weeks** | 37.0±2.5 | 37.1±2.6 | 0.82 |
| **Apgar 1 (median)** | 0 | 5 (IQR 3,6) | |
| **Apgar 5 (median)** | 0 | 9 (IQR 5,10) | |
| **HR present at start and stop of bag-mask ventilation** | 15 (53%) | 40 (100%) | |
| **HR at start (mean)** | 53 bpm | 76 bpm | 0.04 |
| **HR at stop (mean)** | 61 bpm | 119 bpm | <0.0001 |
| **HR increase (mean)** | 8 bpm | 43 bpm | 0.02 |
| **Rapid low-high HR transition** | 2 (6%) | 26 (65%) | <0.0001 |
| **Time to start ventilation (sec)** | 144±102 | 135±75 | 0.66 |

HR = Heart Rate, bpm = beats per minute

# Importance of the “Golden Minute”

The risk of END increases by

12-16% for every 30 sec delay

in start of ventilation

Ref: Ersdal et al, Resuscitation 2012 and
Ersdal et al, BJOG in press

# Importance of fetal heart rate (FHR) monitoring and timely obstetrical actions

- FHR abnormalities are highly associated with FSB and birth asphyxia/END
- Almost 75% of birth asphyxia/END had a normal FHR record
- As much as 40% of FSB had a normal or abnormal FHR on admission

These findings may reflect an inability to perform intermittent measurements correctly or as often as recommended

Ref: Ersdal et al, Neonatology 2012, and Kidanto et al, IJOG 2015

# Will continuous FHR detect FHR abnormalities earlier - and promote more timely obstetrical actions?

- Compare intermittent vs continuous FHR at two urbane sites and two district sites


# Summary

- Clinical determination of FSB is imprecise
  - Distinguishing an asphyxiated newborn from a true FSB in the delivery room is difficult
- Delayed interventions and/or ventilation will influence outcome
- FHR abnormalities is a strong predictor of asphyxia
- To measure FHR intermittently as often as recommended is likely impossible in many low-resourced hospitals

# Conclusions

- There is a need for better FHR equipment
- The progression to FSB and/or END after intrapartum hypoxia is likely part of the same end process
- Misclassification probably influences Newborn Mortality Rate - the true number of END may be higher

# Acknowledgment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