

Mortality Index for Neonatal Transportation score (MINT) – Usefulness in 2012 MedSTAR SOUTH AUSTRALIA



Deirdre Clarke
Ann-Marie Tamassy

MedSTAR Emergency Medical Retrieval



Research Objective

Compare validity of the MINT score from NETS NSW 2004 to MedSTAR 2010-2012

- Is the MINT score still valid as a predictor for mortality in neonatal groups in 2012 in South Australia
- Can the MINT score be used in the coordination centre in South Australia as a predictor for neonatal triage in 2012.



OUTBORN Neonates who require critical care need urgent triage and asset allocation.

MedSTAR

- Improves outcomes of infants who are transferred in South Australia
- Assessment at initial call
- Facilitate resource allocation
- Education
 - RURAL

What is missing?

- Prediction tool or a triage tool



MULTI TASKING AT MedSTAR



RETRIEVAL
COORDINATION
(RETRIEVAL
AND
TRANSPORT)



MED
STAR

ADULT
RETRIEVAL
PREhospital
AND RAPID
RESPONSE



NEONATAL
PEDIATRIC
PERINATAL
PREHOSPITAL



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Distances Travelled



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Process:

Literature Review and Data Comparison

- MINT 2004 (Mortality Index Neonatal Transportation)
- TRIPS 2001 (Transport Risk Index of Physiologic Stability)
- SNAP 2001 (Score for neonatal acute physiology)
- CRIB-II 2003 (Clinical Risk index for Babies)
- PRISM and PIM Paediatric scores



TRIPS 2001 (Transport risk index of physiologic stability)

Impact of transport on stability of ELBW

This score is mainly conducted within 15 minutes of arrival at the referring centre.

- > Variables
 - > Temperature
 - > BP
 - > Respiratory status
 - > Noxious stimuli



SNAP 2001 (Score for Neonatal Acute Physiology)

- BP
- Temp
- PaO₂/FIO₂
- Serum ph
- Seizures
- Urine output
- BW
- SGA
- Apgar at 5 min

Total score is out of 158



MINT 2004 (Mortality index neonatal transportation)

Australian design study NETS NSW

Mortality predication score for retrieved neonates with data collected at first call.

- Age
- Apgar
- Weight
- Ph
- Pa02
- Respiratory support
 - Intubation
- Congenital abnormalities



What is already known on this topic?

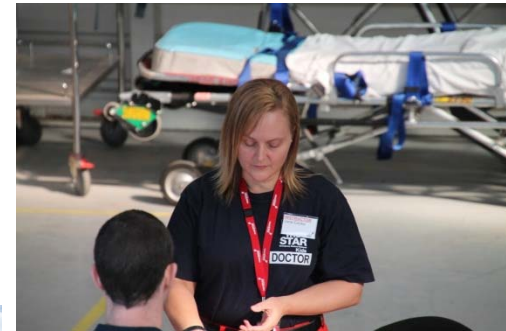
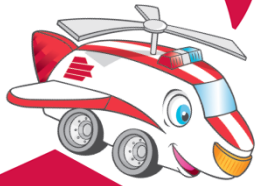
- > Limited tools for the Australian Population
- > CRIB-II is a predictor for in-house mortality
- > TRIPS is conducted on arrival at the hospital not prior to a retrieval/transfer.
 - TRIPS is not validated in VLBW infants
- > PIM and PRISM can not be transferred to the neonatal age groups
- > Despite extensive research neurological outcome remains difficult predict



Clinical changes from 2004 to 2012

	2004	2012
ANTENATAL CARE (STEROIDS)	Variable	Yes
CARDIAC ULTRASOUND	No	Yes
SURFACTANT	Yes	Yes
HFOV	No	Yes
NITRIC	Yes	Yes
CPAP	Variable	Yes
HIGH FLOW	No	Yes
COOLING	Trials in progress	Yes
RAPID RESPONSE	Yes	Yes



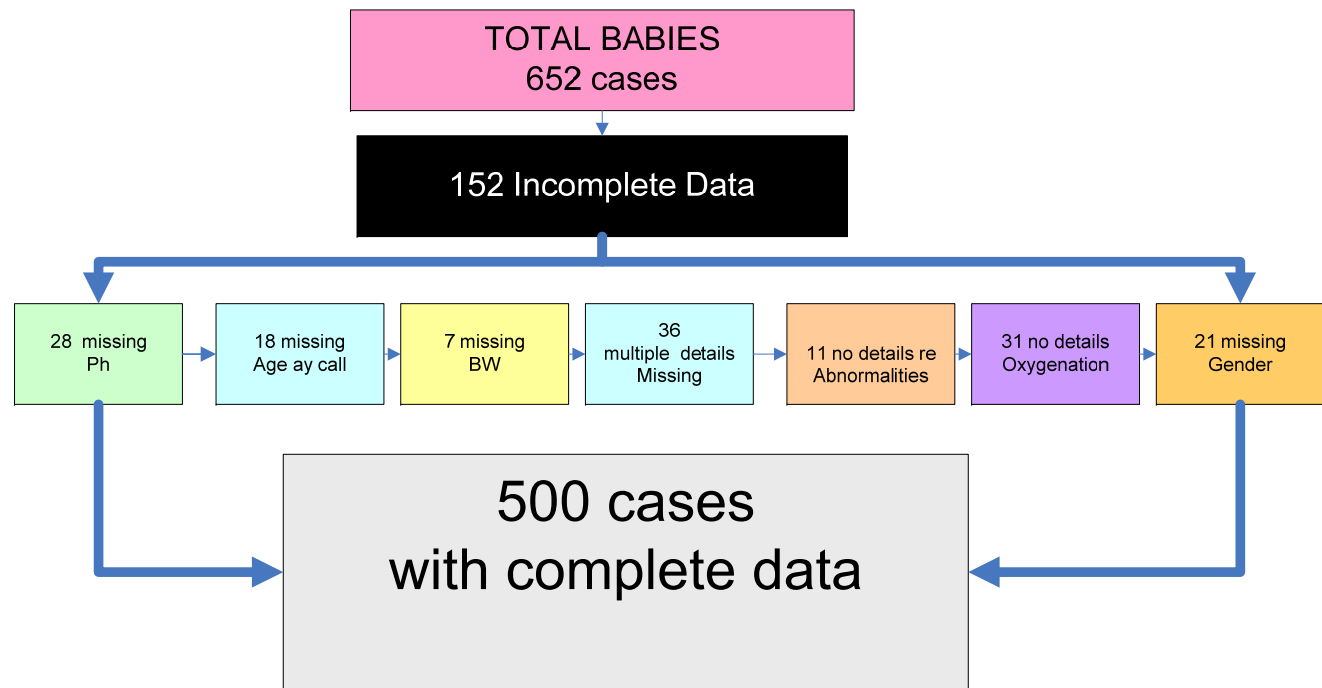


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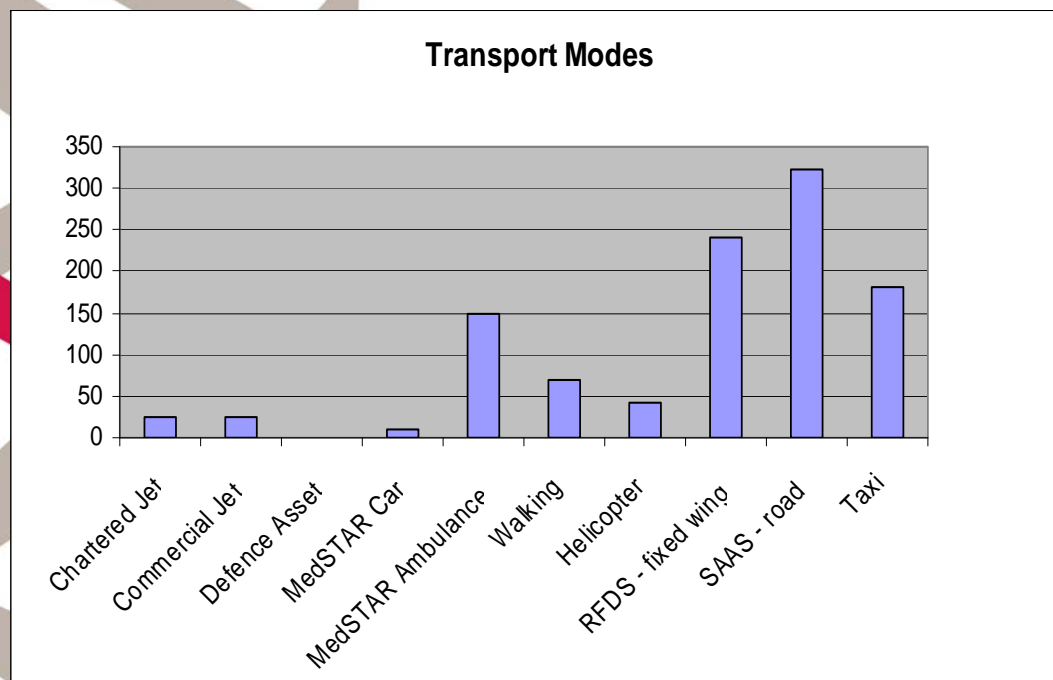
MedSTAR COHORT = 500

NETS NSW COHORT = 1252



MedSTAR Results

Mode of Transport



Diagnosis

Prematurity	419
HMD (Hyaline Membrane)	104
Respiratory	120
Cardiac	37
Congenital	40
Metabolic	29
Sepsis	25
Neonatal Encephalopathy	26



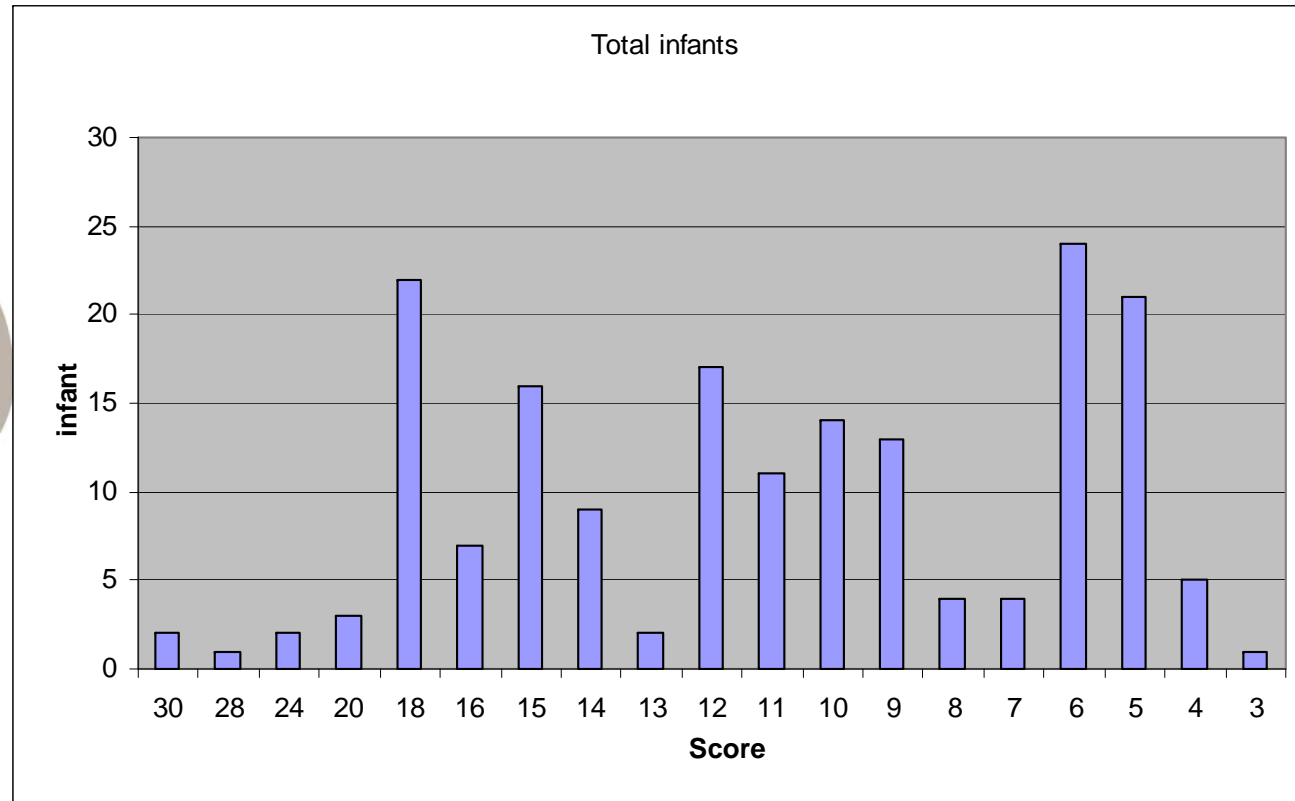
Characteristic of Cohorts

	NETS NSW 2004	MedSTAR 2010-202
Gender	63.6% male	59.2% male
Weight	2782 grams	2632 grams
Time calls received	4.5 hours of age	2.8 hours of age
Gestational age	36 weeks	34.2 weeks
Mortality	12.1%	1.8%



Parameter	Finding	MedSTAR
pH	> 7.1	41.4%
	6.91 - 7.1	10.4%
	<= 6.9	2.6%
Age in hours	> 1 hour	64.2%
	0 to 1 hour	35.8%
Apgar score at 1 minute	> 3	89.4%
	3	4.4%
	2	5.2%
	1	3.2%
	0	1.8%
Birth weight in grams	> 1,500 grams	94%
	1,001 - 1,500	5.2%
	751 - 1,000	0.2%
	<= 750	0.6%
PaO ₂	> 3 kPa (> 22.56 mm Hg)	46.4%
	<= 3 kPa	3.8%
Congenital abnormality	absent	91.4%
	present	8.6%
Intubated	absent	82.6%
	present	17.4%

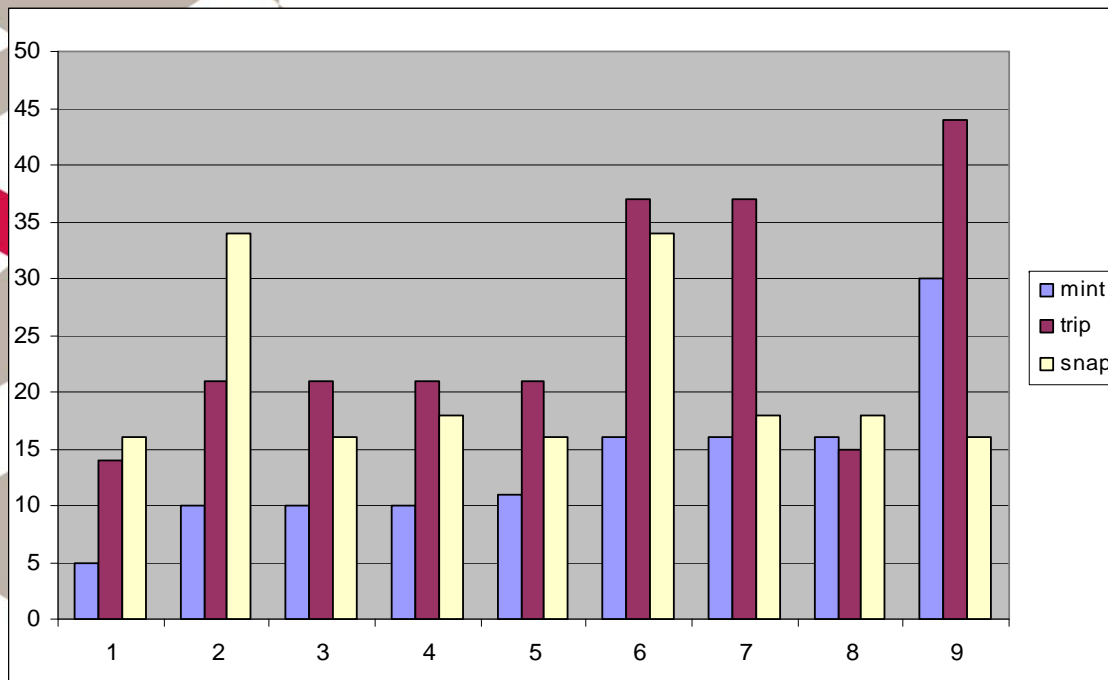
MedSTAR: MINT Scores from the cohort



Binomial Distribution

DEATHS	SUPPOSED POPULATION PROBABILITY	LIKELIHOOD	SCORES	NUMBER OF INFANTS
1	80%	0.0084 %	30	2
			28	1
			24	2
			20	3
3	49%	0.00000009 %	18	22
			16	7
			15	16
1	30%	0.0016 %	14	9
			13	2
			12	17
			11	11
3	28%	0.4971 %	10	14
			9	13
			8	4
			7	4

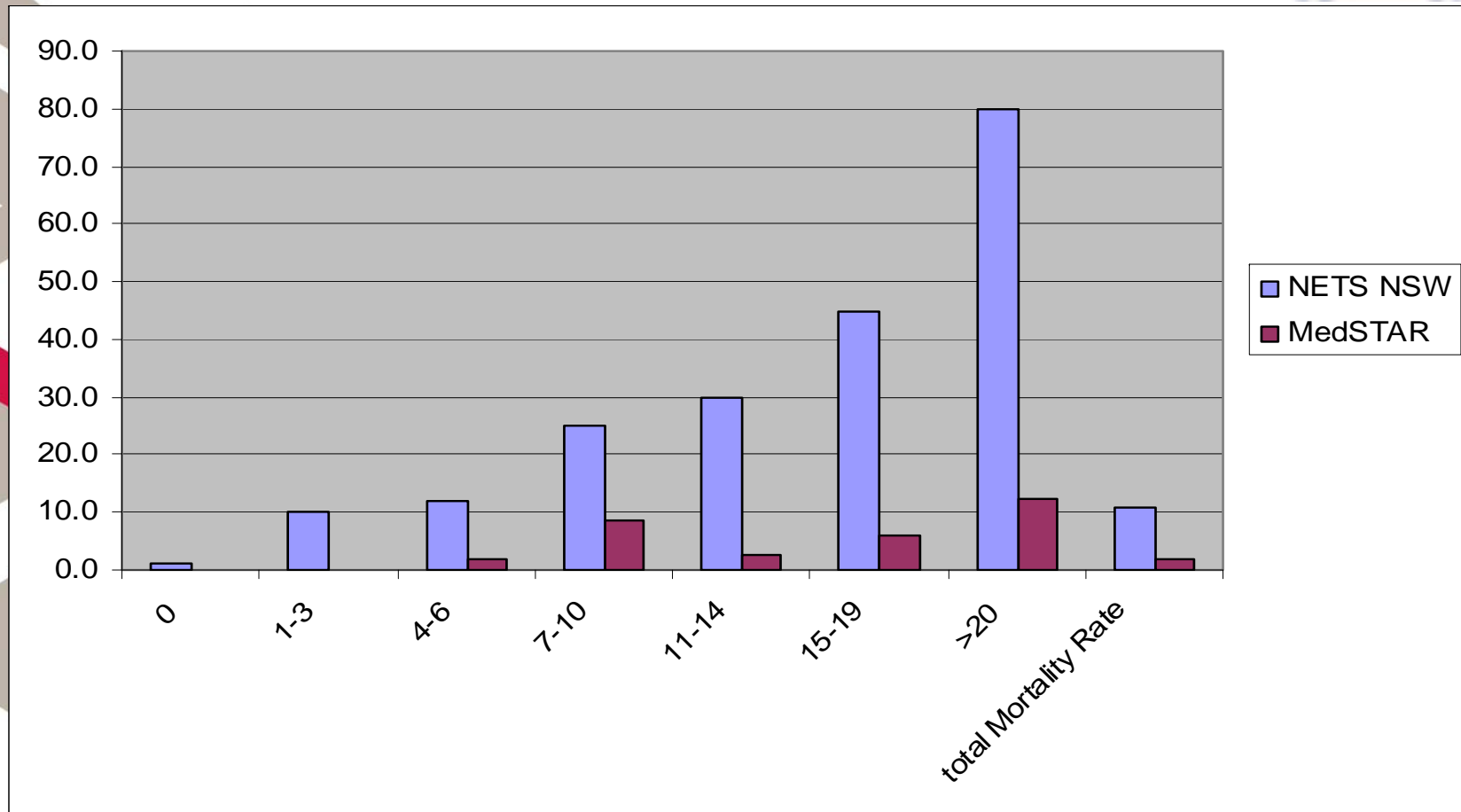
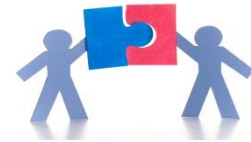
Comparison between MINT/SNAP/TRIP MedSTAR results



	MINT	TRIP	SNAP
1	5	14	16
2	10	21	34
3	10	21	16
4	10	21	18
5	11	21	16
6	16	37	34
7	16	37	18
8	16	15	18
9	30	44	16

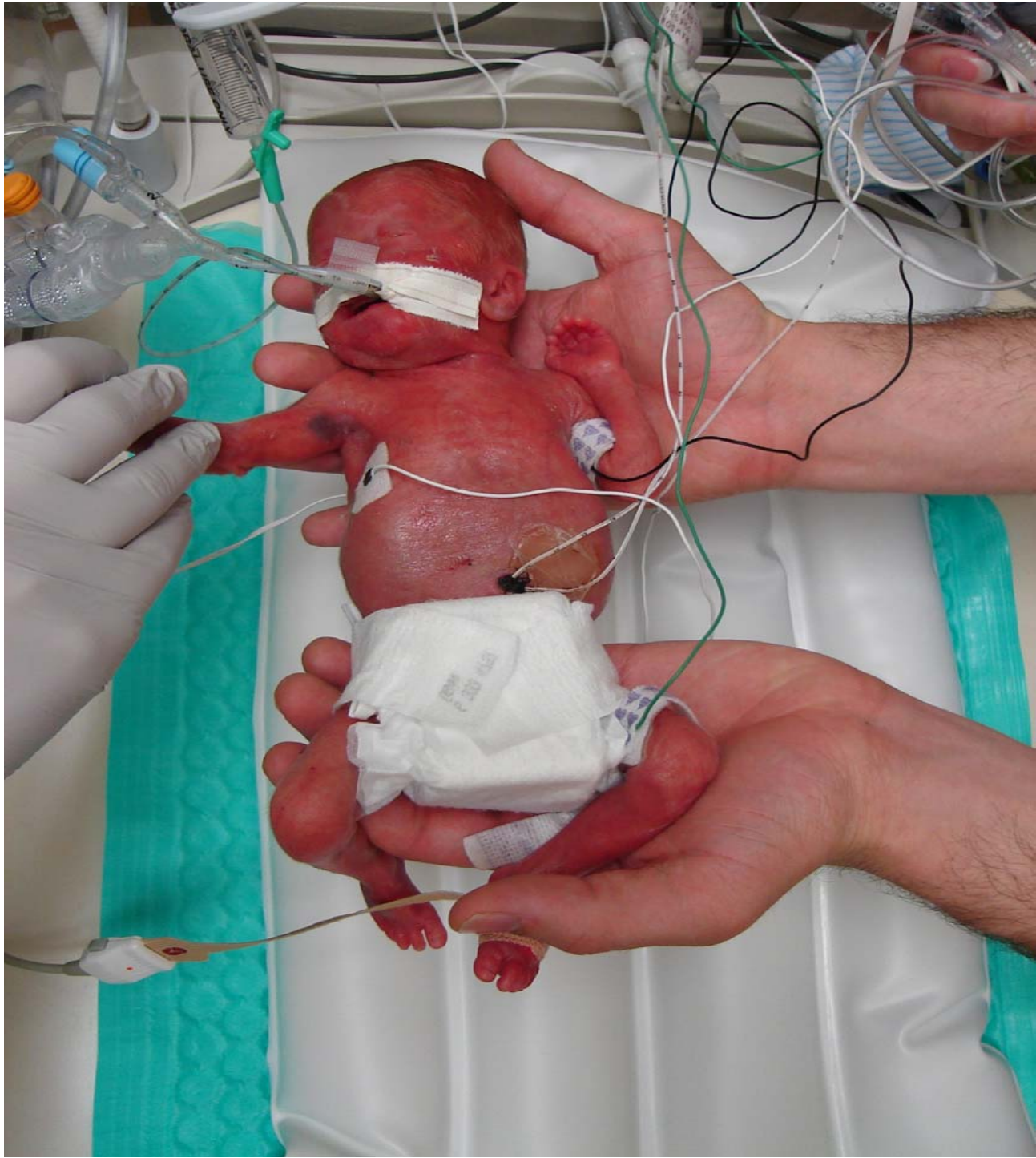


NETS NSW DATA and MedSTAR data combined



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Can the MINT score be used in South Australia as an effective triage tool?

In Conclusion

- > As the neonatal mortality rates in 2010-2012 were lower than the NETS NSW data from 2004.
- > We believe this can be explained by overall improvements in treatment and technology since 2004.
- > If NETS NSW repeated MINT scores for 2012 we would expect the data to show a drop in mortality.

At MedSTAR we will not implement this for
Triaging Neonatal retrieval requests

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FUTURE

- > Continue to review data to ensure the best outcomes for neonates retrieved by MedSTAR in SA.
- > Develop accurate KPIs to give appropriate prediction of treatment and allocation of resources.
- > Keep accurate data and work towards developing a prediction score for retrieval.
- > Develop a triage tool to assist non-neonatal trained staff in EOC to simplify the process and respond expediently.



Thank you

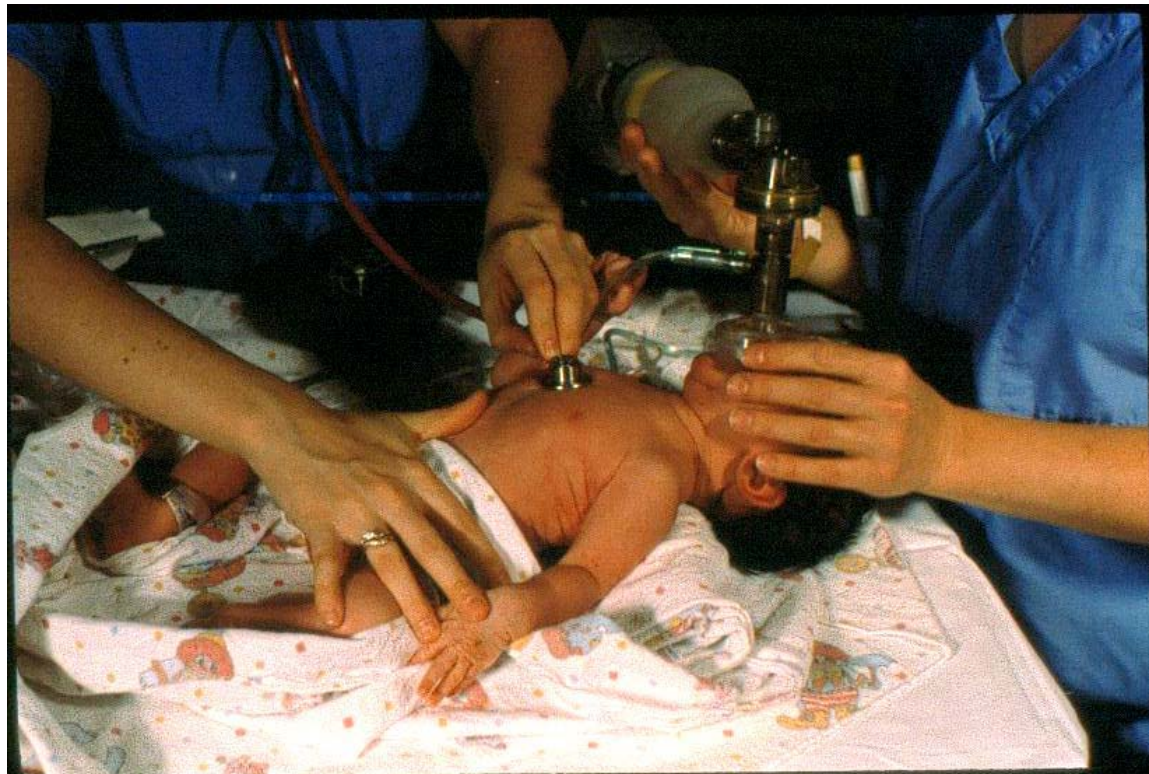
- > NETS NSW
- > DR Andrew Berry
- > Simon J Broughton
- > California Perinatal transport group

Articles / References

1. Neonatal disease severity scoring systems; JS Dorling
2. Neonatal Mortality Risk assessment in a neonatal intensive care unit (NICU); Malish Kadivar
3. Change in TRIPS score during transport; Prem Arora
4. California Perinatal transport system 2012
5. NSW maternal data base 2004
6. ANZ data 2004
7. CRIB and Prediction of neonatal outcome; Sarah Greenwood
8. PIM
9. PRISM



QUESTIONS



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**Government
of South Australia**

SA Health

