

Expanded CMV Newborn Screening: Adding Intrauterine Growth Restriction Diagnosis to Targeted CMV Screening in Newborns

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Background

Intrauterine growth restriction (IUGR) has been observed in symptomatic congenital CMV infections (cCMV).

IUGR is considered a sign of cCMV when it occurs among a constellation of other CMV-related symptoms.

(Rawlinson WD, et al. Congenital cytomegalovirus infection in pregnancy and the neonate: consensus recommendations for prevention, diagnosis, and therapy. Lancet Infect Dis 2017. 17:e177-88)

It is unknown if IUGR alone could indicate cCMV.

Some targeted newborn cCMV screening programs are considering IUGR as part of an expanded cCMV screening approach.

Objective

To determine the frequency of IUGR among infants screened for cCMV and whether IUGR could be used for an expanded cCMV screening approach.

Methods

CHIMES Study – 12,192 UAB infants prospectively enrolled between 2007 & 2012.

- Saliva and DBS were collected from newborns and tested for CMV by PCR.
- Infants with positive screening specimens enrolled in follow-up to confirm cCMV.
- Maternal, demographic, limited EMR, & auditory information collected for the total cohort.

Maternal CMV seroprevalence was determined from stored DBS samples (n=10,106) for CMV IgG testing via an in-house CMV ELISA.

IUGR is defined as birth weight below the 10th percentile for gestational age and includes both asymmetric and symmetric IUGR.

Results

Study Characteristics (12,192)

Race/Ethnicity		%
	Black, non-Hispanic	52.8
	White, non-Hispanic	22.3
	White, Hispanic	21.7
	Asian	1.0
	Multiracial	2.2
Insurance –Hospital Stay		%
	Medicaid/No Insurance	84.8
	Commercial	15.2

Results

Study Characteristics (12,192)

Nursery		%
	NBN	85.1
	NICU	14.9
Infant CMV status		per 1000
	Positive (n=98)	8
IUGR		%
	IUGR/SGA	7.8

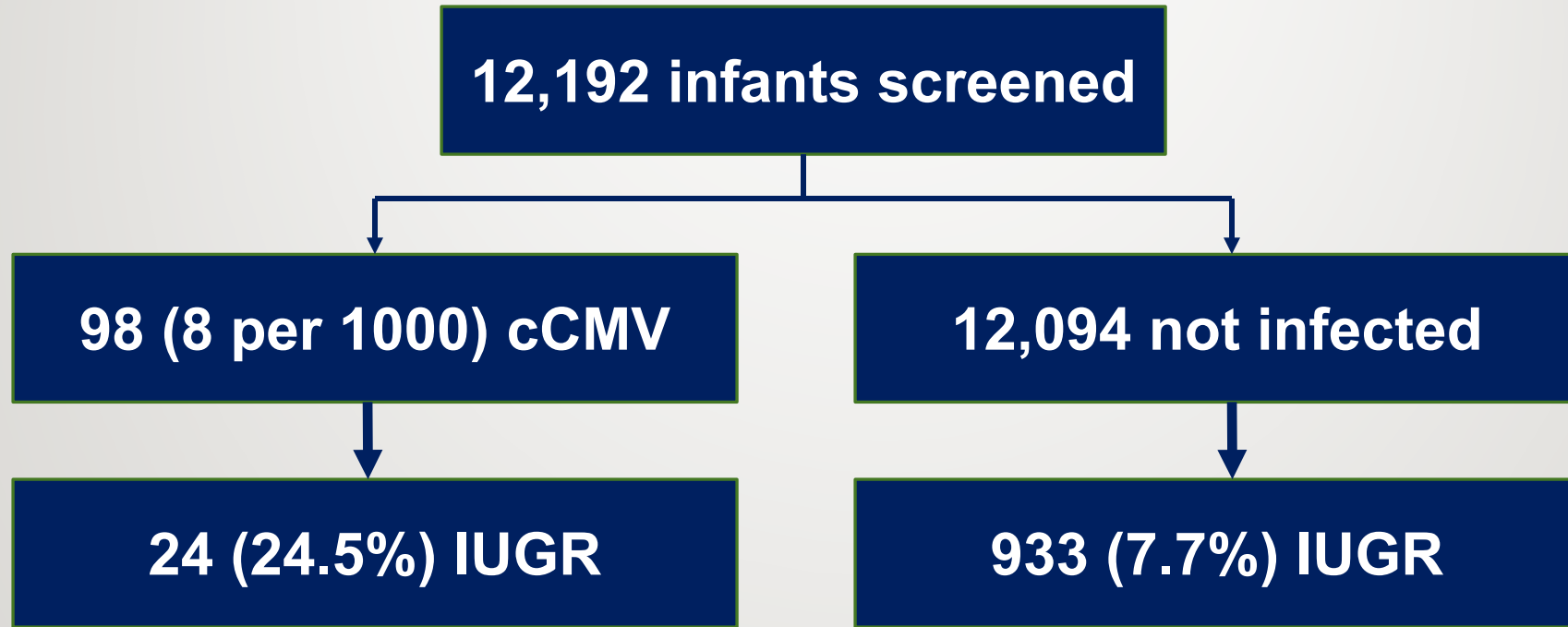
Results

Study Characteristics (12,192)

Maternal Age	Mean (SD)
Age, years	25.1 (5.8)
Gravidity	%
Primigravida	30.3
Maternal Seroprevalence*	%
CMV Seropositive	56.1
CMV Seronegative	43.4
Unknown	0.5

*2,086 either no stored card or not enough DBS sample to test

Results



RR_{IUGR}: 3.2 (95% CI, 2.2 – 4.5)

Results

Other Maternal Factors and IUGR

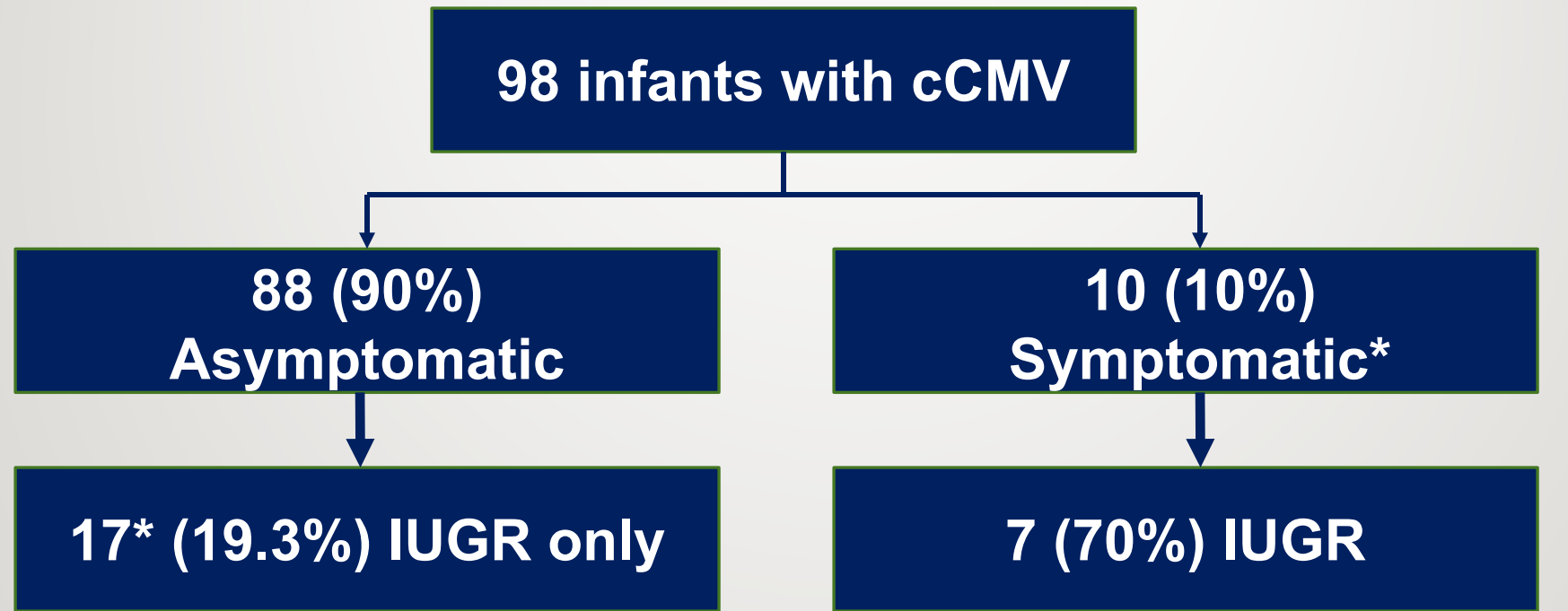
	IUGR	No IUGR
Black, non-Hispanic*	67.3%	51.4%
Medicaid/No Insurance*	89.6%	84.4%
Primigravida*	37.7%	29.7%
Maternal Age, years*	24.0 ± 5.7	25.1 ± 5.8
Maternal CMV Seropositivity	56.3%	56.0%

*p < 0.0001

Adjusted RR_{IUGR}: 2.7 (95% CI, 1.9 – 3.8)

Adj for: Maternal age, parity, race/ethnicity, SES

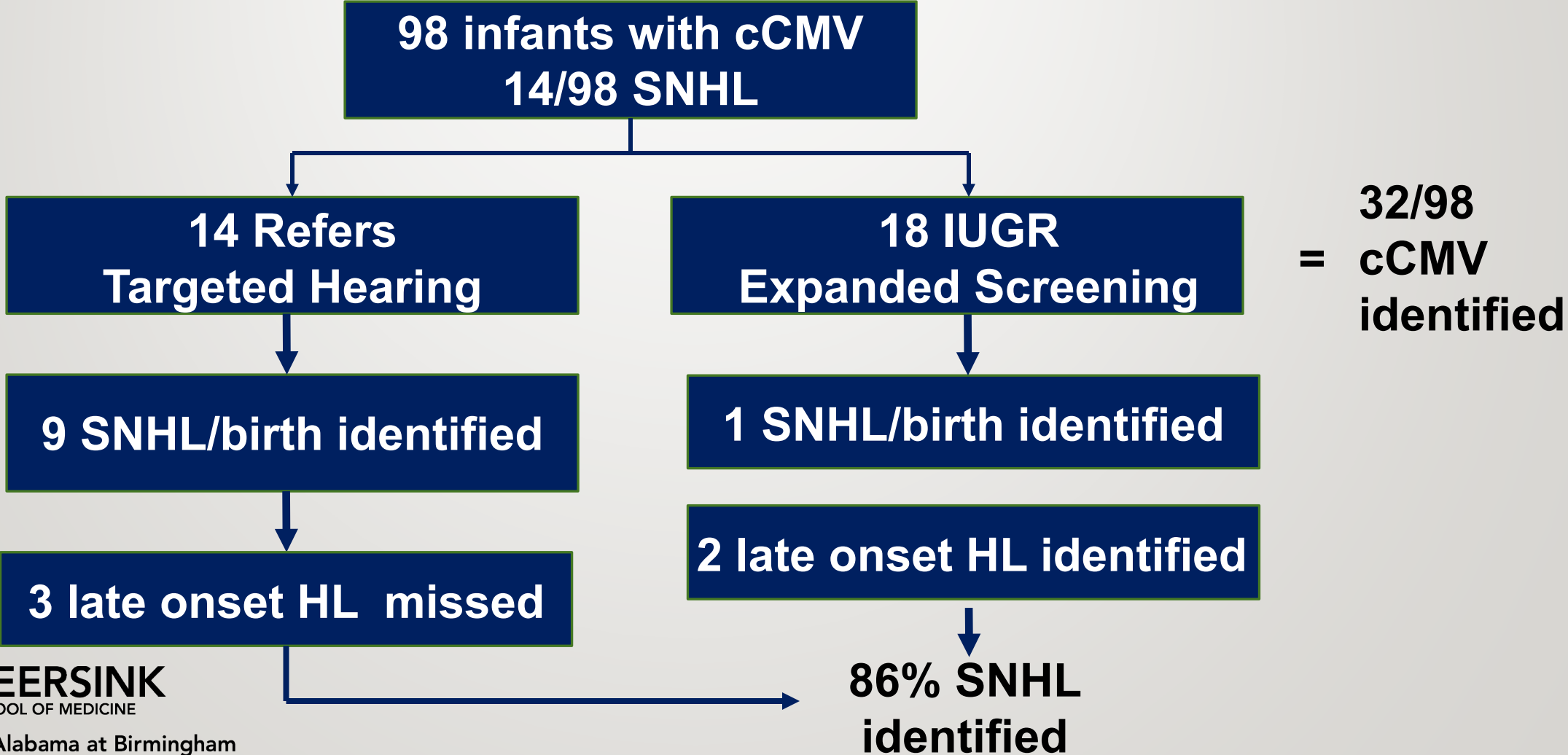
Results



*3-PIH/preeclampsia & 3-Smoking

*Generalized petechial rash, purpuric rash, hepatomegaly, splenomegaly, jaundice with direct bilirubin of 3 mg/dL or greater, unexplained neurologic/CNS abnormalities (eg, microcephaly, seizures, focal or generalized neurologic deficits)

Results




Conclusions

- Infants with cCMV had a significant increased risk for IUGR compared to uninfected infants.
- About 25% of CMV-infected infants had IUGR.
- IUGR was identified in 19% of asymptomatic infants without any other physical findings.
- Expanding targeted screening to include IUGR will identify about 33% of cCMV infants and identify 86% of CMV-related hearing loss.
- Only universal cCMV screening will identify all infants with cCMV in the population.

Acknowledgements

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Prevent CMV

Preventing CMV
doesn't mean you
can't share
affection with
young children.
Kiss them on the
forehead or give
them a big hug.

Promoting
Healthy
Pregnancies
for all women



Prevent CMV



Remember not to put
anything in your mouth
that has recently been in
a child's mouth.

Promoting
Healthy
Pregnancies
for all women



Results

