

# West Nile Virus Disease in Pregnancy

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**Dan O'Leary, D.V.M.**  
**Arboviral Diseases Branch**  
**Division of Vector-Borne Infectious Diseases**  
**NCID / CDC**  
**Fort Collins, CO**



# West Nile Virus Disease in Pregnancy

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- Review of data from 2002
- Summary of 2003 pregnancy registry data to date
- Conclusions

# Case summaries, WNV in pregnancy, United States, 2002

Case I.D.	Mat. Age of WNV infection	Trimester infected	Mat. WNV illness	Infant abnorm. at birth	WNV IgM cord blood	WNV RNA placenta	WNV RNA cord
1*	28 yr	2	Neuro-Invasive	Premat., low B/W	Not tested	Not Tested	Not tested
2	39 yr	2	Neuro-Invasive	None noted	–	Not tested	–
3	30 yr	2	Uncompl. Fever	None noted	–	–	–
4	32 yr	3	Neuro-Invasive	None Noted	–	–	Not tested
5	20 yr	3	Neuro-invasive	Severe CNS	+	+	+



\*Chapa JB et al., *Obstet Gynecol.* 2003;102:229-31



## **2002: First Documented Case of Intrauterine Transmission of WNV**

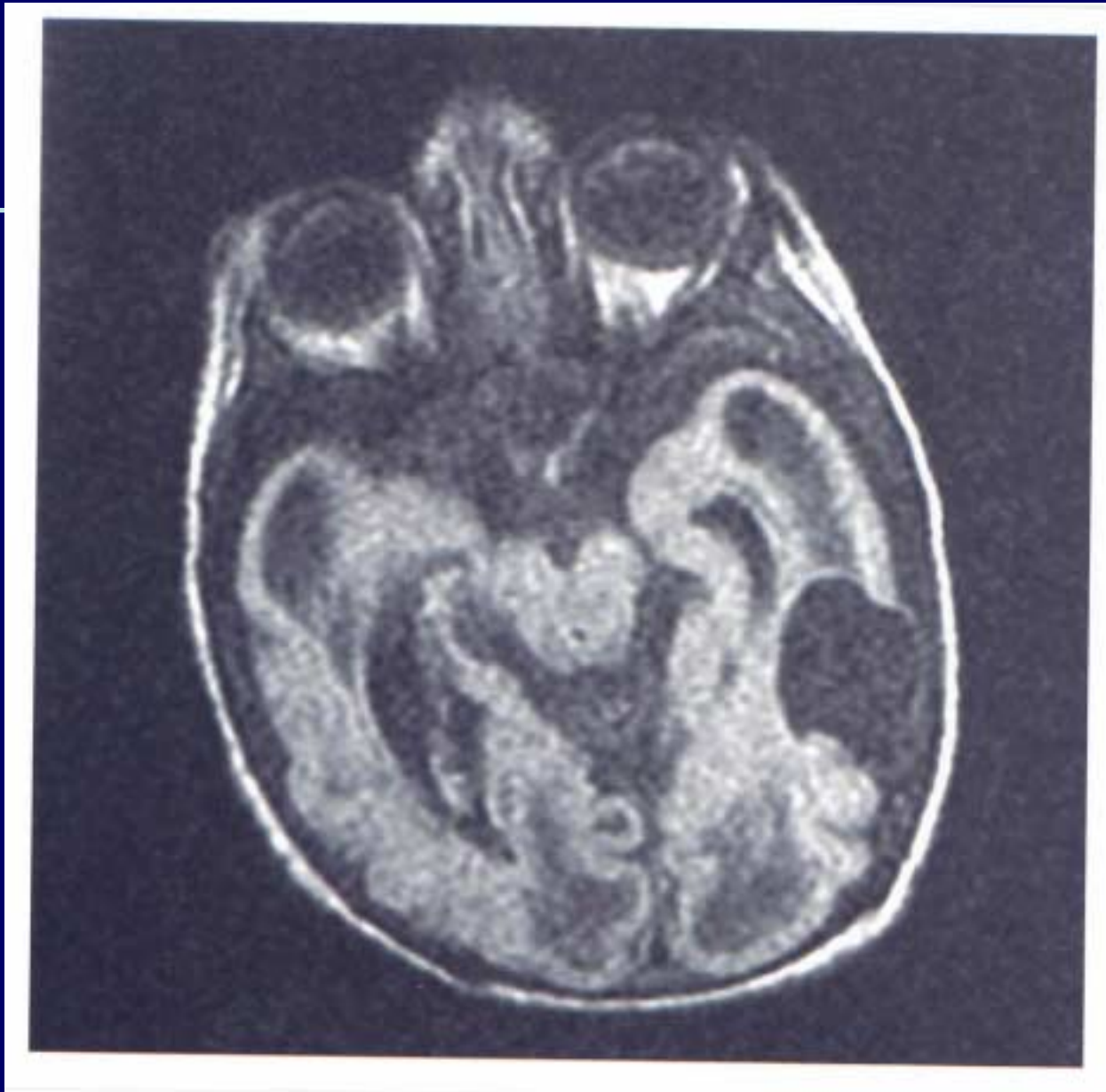
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- **20 y/o in 27<sup>th</sup> week of pregnancy**
- **Fever, headache, blurred vision, back pain, abdominal pain, vomiting**
- **Fetal heart rate increased, sonogram normal**
- **Fever abated, persistent weakness, hyporeflexia, discharged AMA**
- **Readmitted post falling, fetal monitoring normal**

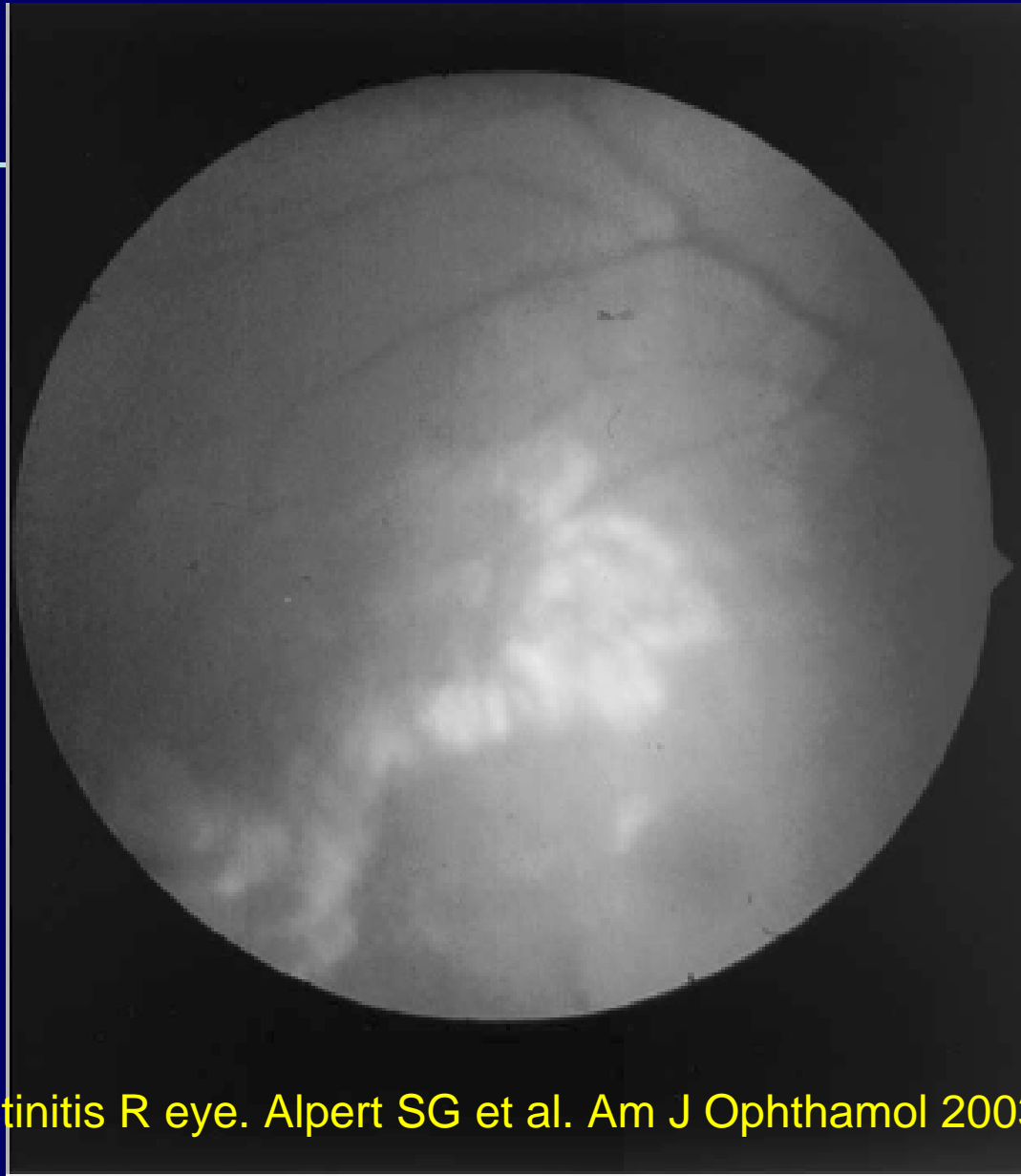
## **2002: First Documented Case of Intrauterine Transmission of WNV (cont)**

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- **Mother serum and CSF WNV IgM pos**
- **Mother CSF PCR neg WNV, EV, and HSV**
- **Live infant born at 38 weeks, weight AGA and normal appearance**
- **Bilateral chorioretinitis**
- **Cystic cerebral tissue destruction in temporal lobe, bilateral white matter loss in occipital and temporal lobes**



Cystic cerebral tissue destruction and white matter loss.  
Alpert SG et al. Am J Ophthalmol 2003;136:733-5



Chorioretinitis R eye. Alpert SG et al. Am J Ophthalmol 2003;136:733-5

## **2002: First Documented Case of Intrauterine Transmission of WNV (cont)**

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- **WNV IgM pos cord blood, heelstick, and CSF (with RBCs)**
- **Infant CSF PCR neg WNV, EV and HSV**
- **Infant serum IgG pos / IgM neg CMV, urine culture CMV neg**
- **Serology toxoplasmosis and LCM neg**
- **Placenta and cord WNV PCR pos; culture neg**



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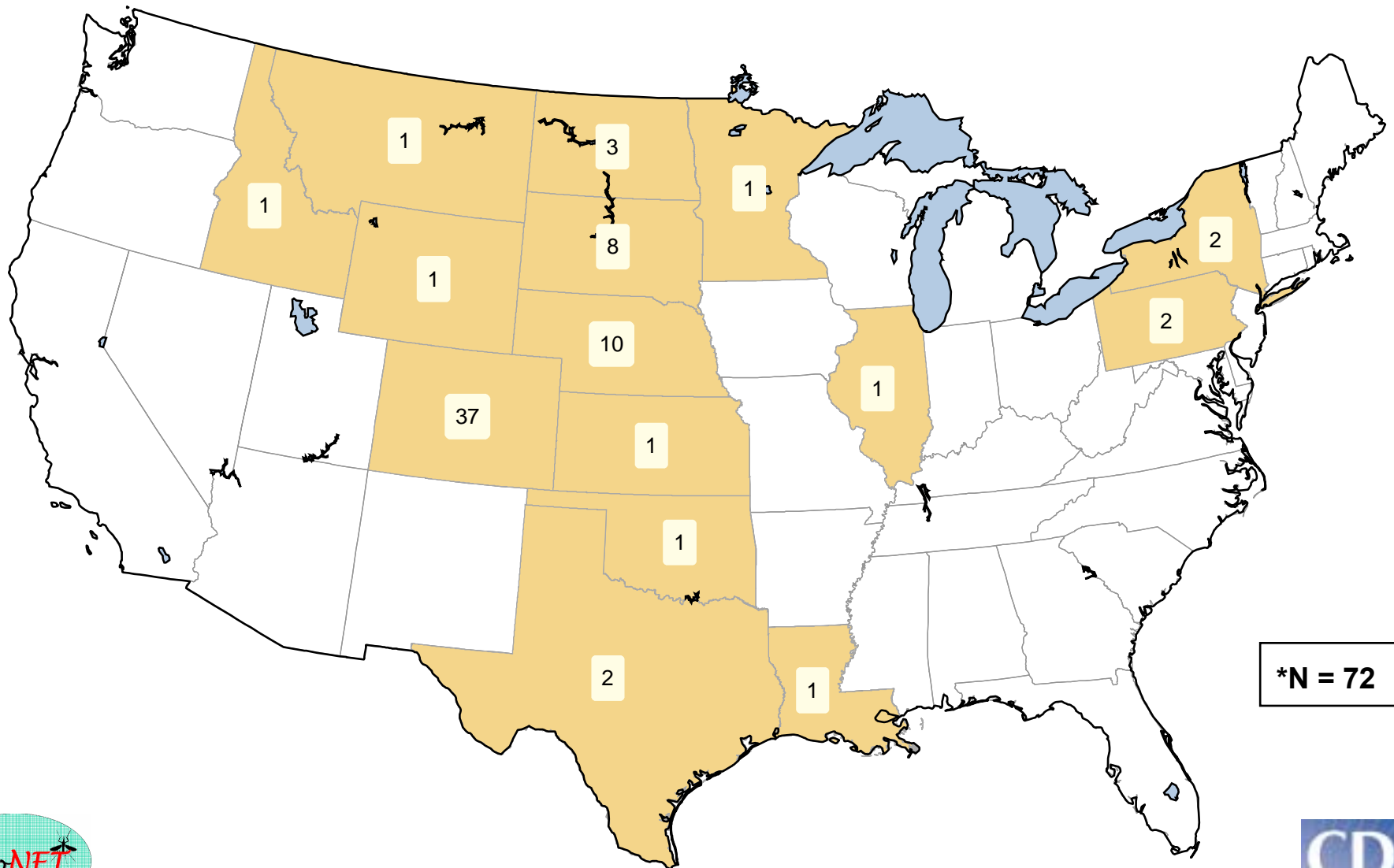
# Summary of 2003 West Nile Virus Pregnancy Registry Data

# 2003 WNV Pregnancy Registry

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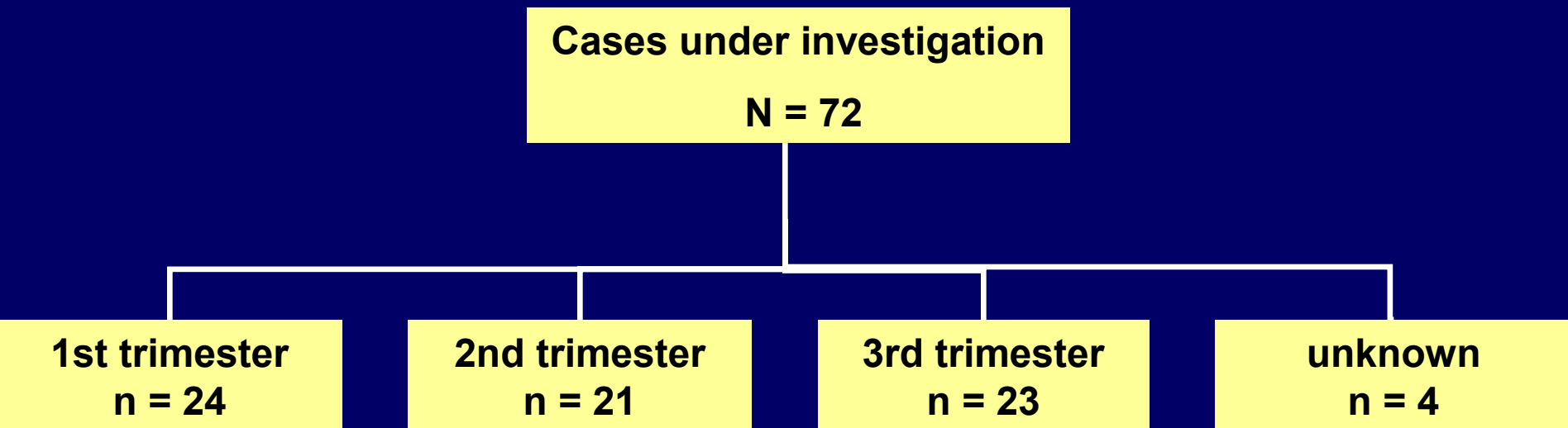
- **Collaboration with clinicians / state health departments**
- **Pregnancies complicated by WNV illness reported to CDC**
- **Clinical status of mother and infant collected following informed consent**
- **Placenta, umbilical cord, cord blood, and breastmilk collected at time of delivery**

# Active Investigations\* of Human WNV Cases in Pregnancy, 2003



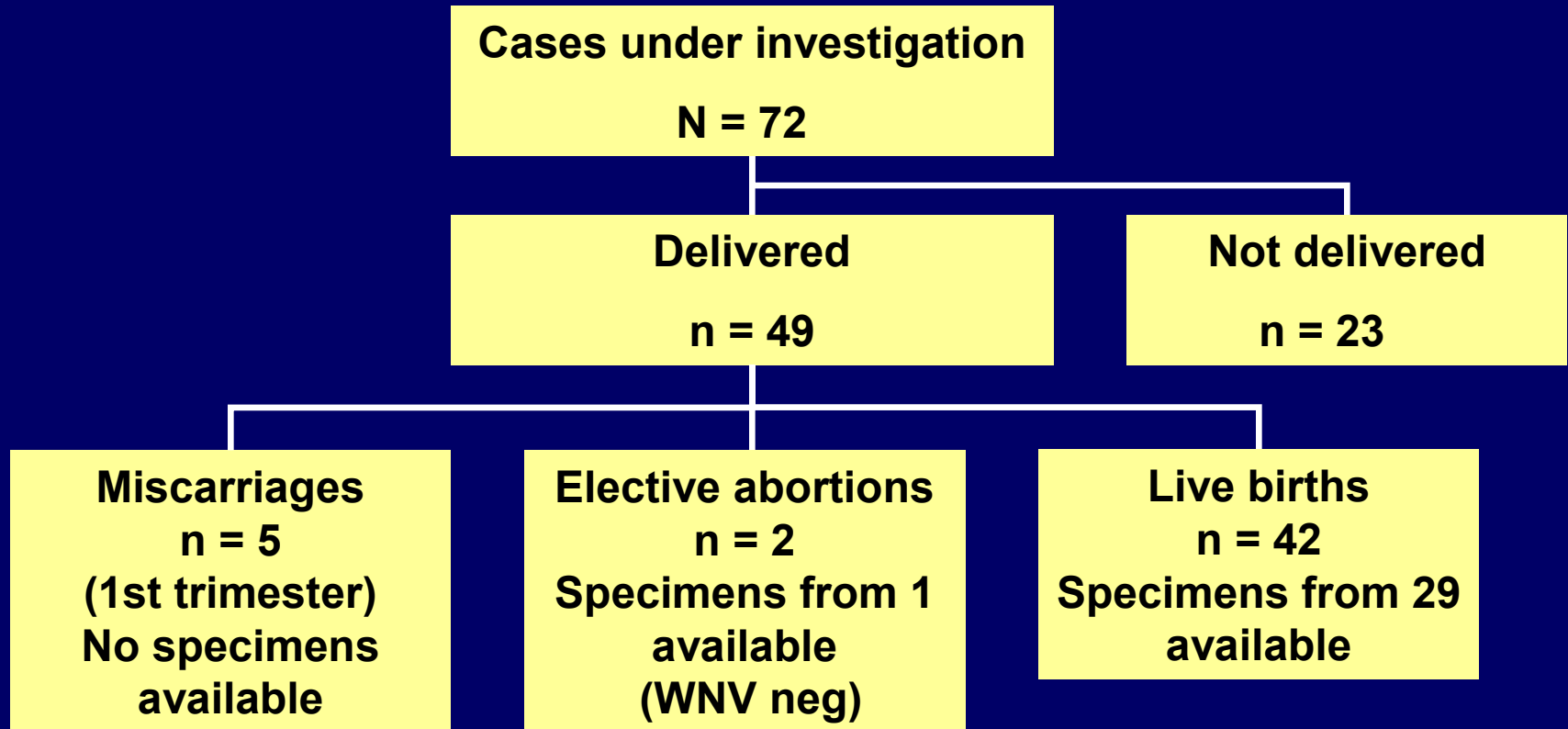
# Trimester of suspected WNV infection

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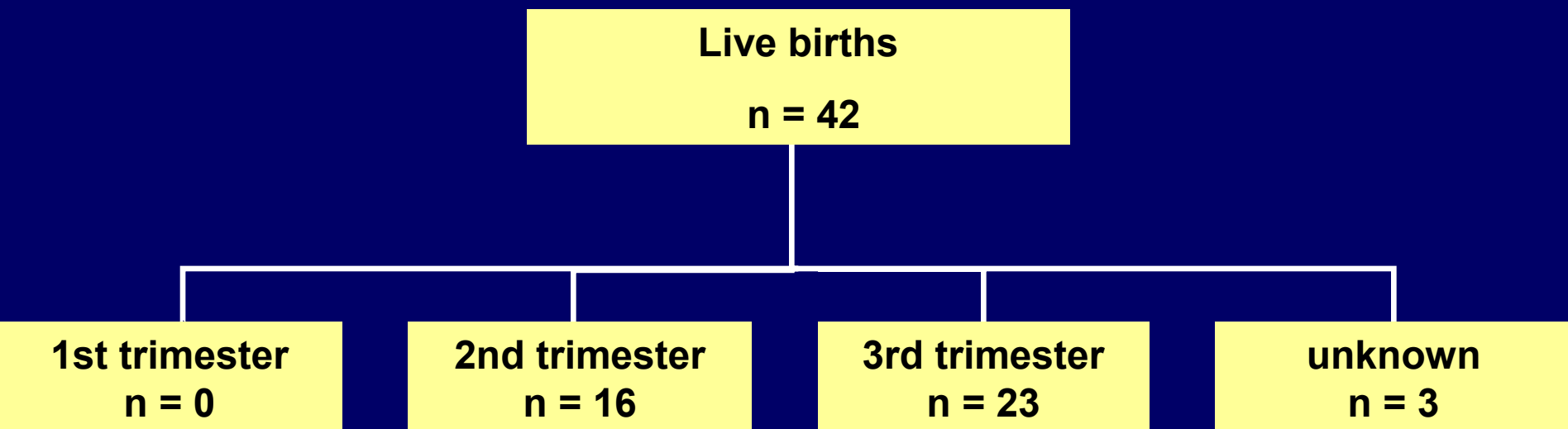
# Pregnancy outcomes as of January 30, 2004

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# Trimester of suspected WNV infection among 42 women delivering live infants as of January 30, 2004

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Specimens have been tested from 29 of 42 live births to-date

# Laboratory results for 29 of 42 live births following pregnancies complicated by WNV, United States, 2003

	IgM*	TaqMan*	IHC*	Total*
Maternal serum	16/28	0/8	NT	16/28
Cord serum	1/28	0/28	NT	1/28
Placental tissue	NT	1/28	0/1	1/29
Cord tissue	NT	0/28	0/1	0/29
Breast milk		1/22	NT	1/22

\* # WNV pos results / # cases tested



# Outcomes of 42 live births following pregnancies complicated by WNV infection, United States, 2003

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- Twenty-eight infants apparently **normal** at delivery
- For 3 infants the condition at delivery is unknown
- Five infants with major abnormalities: cleft palate (1), Down's syndrome (1), **lissencephaly** (1), microcephaly (2)
- Four infants with minor abnormalities: **rash** (3), **skin tags** (1)
- Two infants born premature
- **One infant had laboratory evidence of intrauterine WNV infection without clinical illness**
- **Three infants had laboratory evidence of WNV infection that could have been acquired *in utero* but were unconfirmed (specimen timing)**



# Outcome summary

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- In 2003, four infants born to mothers infected with WNV in pregnancy have laboratory evidence of WNV infection:
  - One infant had WNV IgM in cord blood suggesting intrauterine transmission
  - Three infants had WNV infection that could have been acquired *in utero* but unconfirmed (specimen timing)
- Four case histories follow:

# Infant case history # 1

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- 18 y/o Native American G4P3
- West Nile fever onset at 33 wks GA
- Emergency C-section at 37 wks GA
- Infant assessment
  - Facial skin tags
  - Otherwise normal-appearing

# Infant case history # 1 (cont)

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- **Laboratory analysis**
  - TORCH testing not performed
  - **Cord blood WNV IgM pos** / PRNT pos / PCR neg
  - Cord, placenta, breast milk WNV PCR neg
  - **Heel stick serum at 1 m/o WNV IgM neg**
  - Serology of PKU paper WNV antibody neg
  
- **Infant normal at 2 m/o**

## Infant case history # 2

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- **32 y/o Native American G3P3**
- **West Nile fever onset at 37 wks GA**
- **Vaginal delivery at 40 wks GA**
- **Normal-appearing infant discharged at 2 d/o**

## Infant case history # 2 (cont)

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- **Twitching and bilateral extension of upper extremities at 6 d/o**
- **Admitted at 17 d/o (fever on day of admission by history only)**
- **CSF, 300 WBC's, WNV IgM-positive**
- **Imaging studies: lissencephaly, cerebral calcifications and cystic changes**
- **Infant died at  $\approx$  6 w/o**
- **Autopsy tissues negative for WNV by IHC**

## Infant case history # 3

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- 32 y/o Caucasian G2P1
- Maternal onset of fever at 39 wks GA
- Induced vaginal delivery 3 days post-onset
  - Mother afebrile at delivery
  - Maculopapular rash on legs, trunk
  - WBC 23,000 with left shift
  - Blood culture positive group B *Streptococcus*
  - Amniotic fluid normal-appearing

# Infant case history # 3 (cont)

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- **Infant assessment**
  - Afebrile
  - Mild nuchal rigidity
  - Macular rash on face and trunk; resolved in 36 hrs
- **Blood and placental cultures: no growth**
- **Discharged; breastfeeding**

## Infant case history # 3 (cont)

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- **Laboratory analysis**
  - TORCH testing not performed
  - Placenta WNV IHC neg
  - Mother's serum at 2 d post delivery WNV IgM pos; infant serum unavailable at delivery
  - Infant serum 2 m/o WNV IgM / PRNT pos
  - Breast milk 3 wk post delivery WNV IgM, IgG, and PCR neg
- **Infant normal at 2 mo age**



## Infant case history # 4

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- 19 y/o Caucasian G2P1
- Onset fever and rash at 37 wks GA
- Vaginal delivery 6 days post-onset
  - Mother afebrile at delivery
  - Residual rash
- Infant assessment normal
- Discharged; breastfeeding
- Maternal WNV IgM neg at 3 days pre-delivery and pos 6 days post-delivery

## Infant case history # 4 (cont)

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- Infant developed fever, rash and drowsiness at 9 d/o
  - Breastfeeding discontinued
- Infant hospitalized at 10 d/o; WNV IgM pos in CSF and serum
- TORCH testing not performed

## Infant case history # 4 (cont)

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- **Placenta / cord: WNV PCR neg**
- **Cord blood: WNV IgM, PRNT and PCR neg**
- **Breast milk WNV IgM pos / PCR neg at 4 wk post-delivery**
- **Infant normal at 2 m/o**

# Conclusions

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- **In 2003:**
  - 72 ongoing investigations of WNV disease among pregnant women
  - One instance with laboratory evidence of intrauterine WNV transmission without apparent infant abnormalities
  - One infant fatality following lissencephaly and superimposed WNV infection that might have occurred *in utero*
  - Two other possible instances of possible intrauterine WNV infection: one associated with neonatal rash and one with neonatal neuroinvasive disease

# Acknowledgements

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