

The West Nile Virus Outbreak 1999



Deborah S. Asnis, M.D., F.A.C.P.
Director, Infectious Diseases
Flushing Hospital Medical Center



- Founded in 1884.
- Queens' first hospital.
- It is a 250-bed voluntary, non-for-profit teaching hospital.
- Located in Flushing, Queens, New York.

<u>Case</u>	<u>Age/sex</u>	<u>History</u>	<u>Presenting sx's</u>	<u>Course</u>
1	60 M	Pneumonia	Fever (F), weakness (W) nausea 3d	Confusion, flaccid paralysis FP, BIPAP, urinary retention, d/c 6wk
2	80 M	CHF,A fib	F, W, diarrhea (D) 1wk, unresponsive	Intubated, FP day 3, DTR ↓ expired after 3 wks
3	75 M	Prostate Ca	F,confusion,urinary incontinence <24h	Intubated day 2, FP, DTR ↓ expired after 3wks
4	87 F	Breast Ca, Colon Ca	F, D, ha, weakness, dysarthria 1 wk	FP, confusion, DTR ↓ intubated day 6, died 10d
5	57 M	ETOH	F, confusion, vomiting 3d	No muscle weakness, d/c @ 2 wks w/o sequelae
6	79 M	None	F,confusion, W, anorexia 3 d	D/c @ 11d w/o sequelae
7	29 F	None	F, ha, rash, D, vomiting 8 d (sister)	D/c @ 5 d, generalized W & memory loss - 3 mo
8	49 M	None	F,ha, W, ?rash 4d	D/c @1wk, W - 2 wk

Cerebrospinal Fluid Profile

<u>Case</u>	<u>Days after onset</u>	<u>WBC</u> cells/mm ³	<u>%</u> (P/L)	<u>RBC</u> cells/mm ³	<u>Protein</u> mg/dl	<u>Glucose</u> mg/dl
1	8	35	0/90	0	69	83
2	8	0	0	47	62	89
3	0	93	96/4	1346	117	133
4	10	14	6/84	8	51	91
5	3	100	2/78	800	129	96
6	3	10	10/56	195	78	76
7	9	85	94/4	15	81	66
8	3	37	22/62	4	66	58

Signs & symptoms encephalitis

- Common:
fever, headache, nausea, vomiting,
altered mental status, seizures,
hyperreflexia, mild stiff neck
- Less common:
tremors of arm or face, dysarthria,
hemiparesis, cranial nerve palsies,
aphasia

Viral Causes

- Enteroviruses
- Arboviruses
- Herpes
- HIV
- LCM
- Rabies

→ 75% undiagnosed

West Nile Encephalitis Epidemic

- On August 23, the NYC DOH was notified about two cases which were suspicious for encephalitis.
- All of our initial cases were noted to be active outdoors, living within a 2 x 2 mile radius of one another.
- On September 3rd, IgM-capture ELISA for antibodies to the common North American arboviruses identified the agent as St. Louis encephalitis.

Unusual Encephalitis Cluster in Northern Queens, 1999









SPORTS

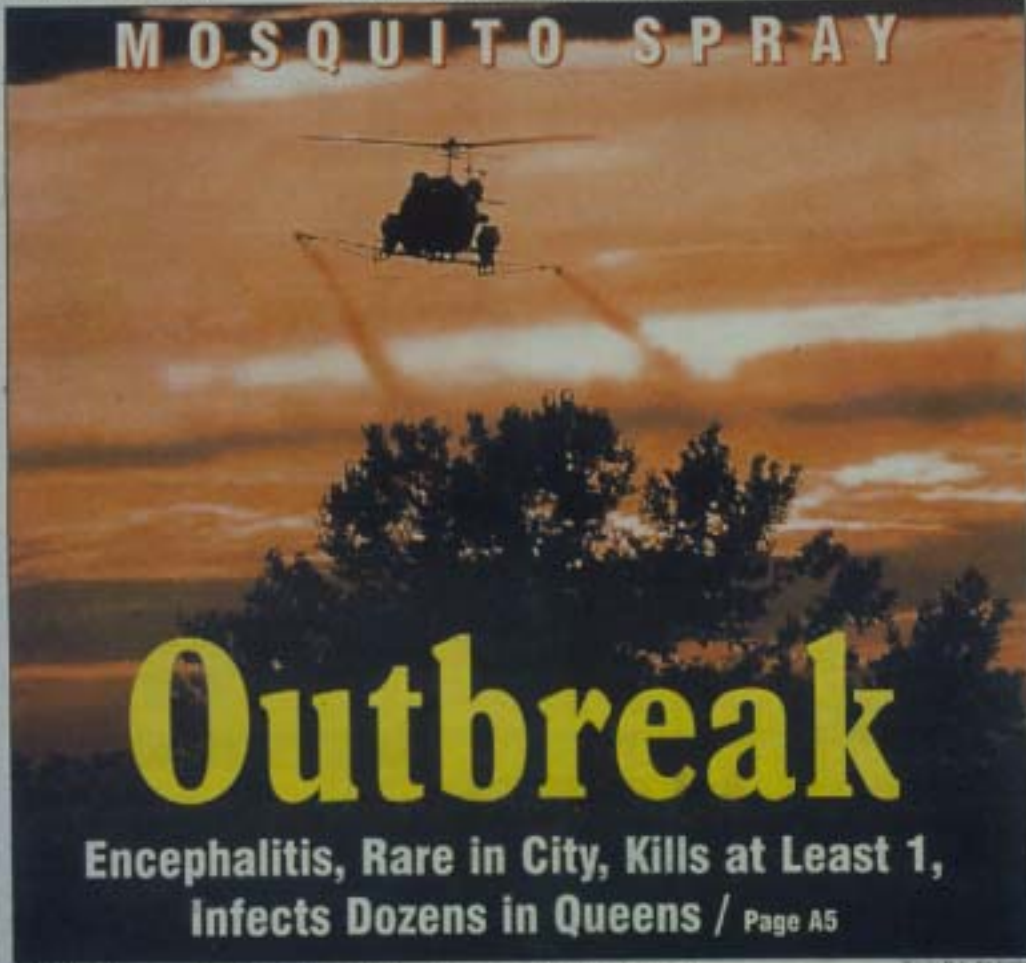
Newsday

<http://www.newsday.com>

SATURDAY, SEPT. 4, 1999 • QUEENS

50¢

MOSQUITO SPRAY



Outbreak

**Encephalitis, Rare in City, Kills at Least 1,
Infects Dozens in Queens / Page A5**

A helicopter releases spray intended to kill disease-carrying mosquitoes over Pender's Cove Park in College Point.

PHOTOGRAPH BY JAMES HARRISON FOR NEWSDAY. PAUL BLANKS ©





SPORTS

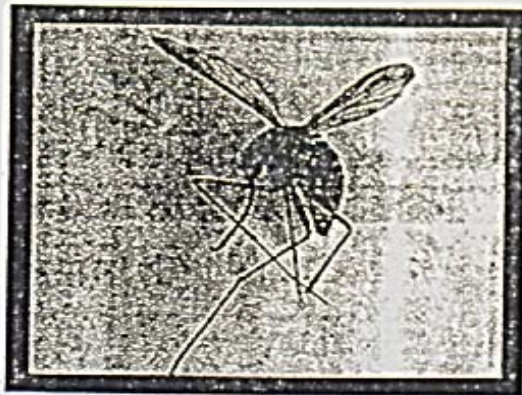
Newsday

<http://www.newsday.com>

SATURDAY, SEPT. 25, 1999 • QUEENS

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Second Virus

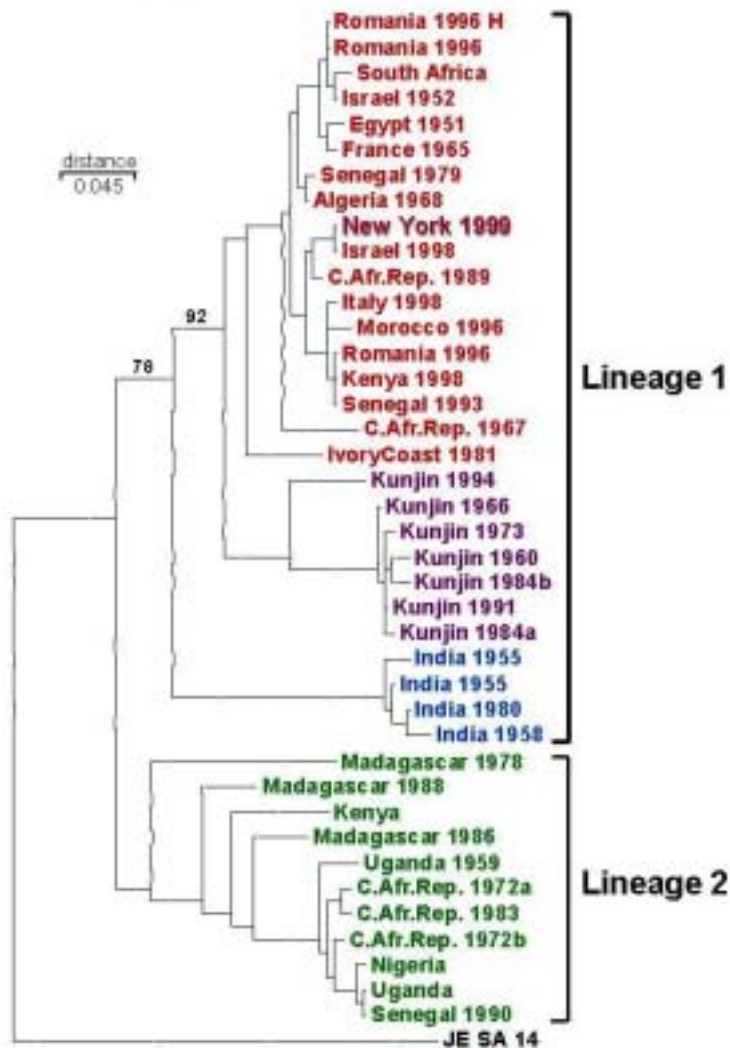


AP File Photo
A female *Culex pipiens* mosquito, which can carry West Nile encephalitis.

**Potentially Deadly
West Nile
Encephalitis
Is Detected In
Dead Birds in City**

Page A3

Phylogenetic Tree Based on Envelope Glycoprotein Sequence Data



Lanciotti et al. 1999.
Origin of the West Nile virus responsible for an outbreak of encephalitis in the northeastern U.S.
[Science 286:2333-337.]

Serology of blood, CSF, & brain tissue for WNV

<u>Case</u>	<u>Serum IgM</u>	<u>PRNT WNV titers</u>	<u>CSF IgM</u>	<u>Brain PCR & IHC stain</u>
1	+	1:5120	+	N/D
2	+	1:1280	N/D	+
3	+	1:160	+	+
4	+	1:1280	+	+
5	+	1:640	N/D	N/D
6	+	1:160	N/D	N/D
7	+	1:320	+	N/D
8	+	1:320	N/D	N/D

Admission WBC & % lymphocytes

<u>Patient</u>	<u>WBC</u> (4.2-11.4/mm ³)	<u>% lymphocytes</u> (20-40%)	<u>Absolute lymphocytes</u> (1.2-2.8 k/mm ³)
1	17.9	7.0	1.3
2	9.5	4.2	0.4
3	4.3	13.2	0.6
4	12.5	4.9	0.6
5	15.5	14.2	2.2
6	9.1	7.4	0.7
7	12.3	7.2	0.9
8	13.0	14.0	1.8

Profile of symptoms in WNV patients

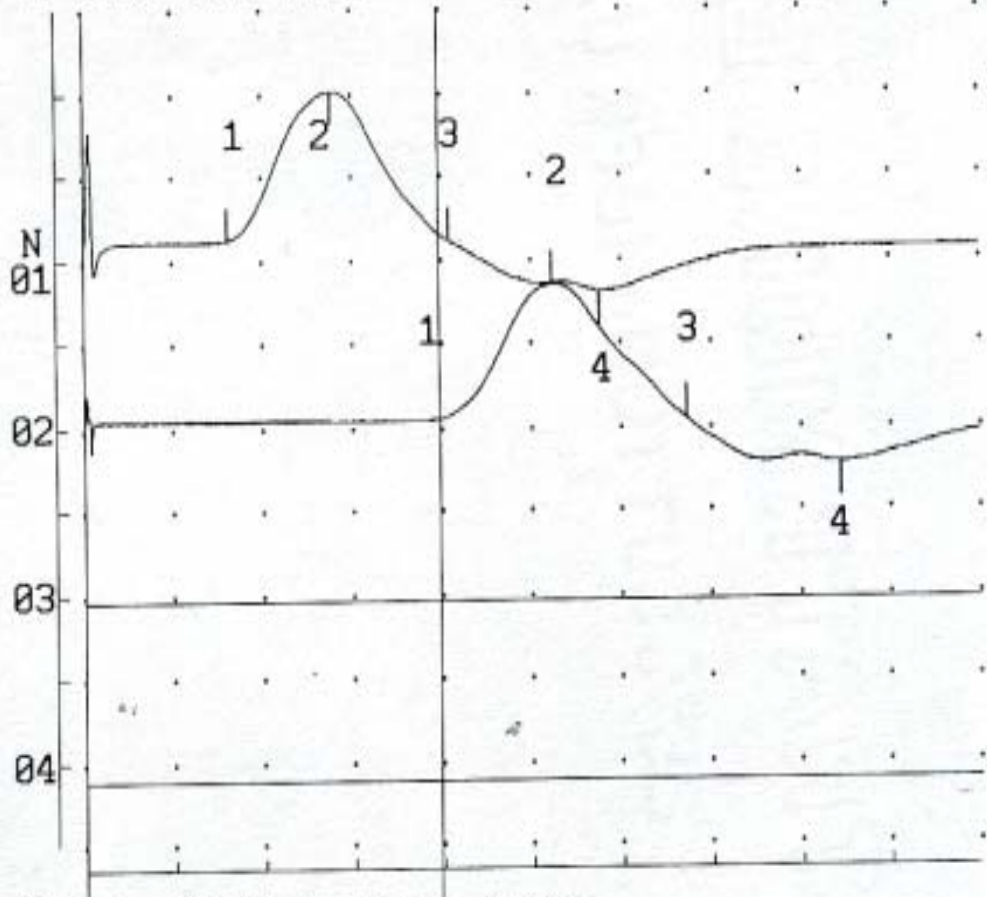
	1	2	3	4	5	6	7	8
Fever > 39C	+	+	+	---	+	+	+	+
Headache	--	+	--	+	--	--	+	+
Stiff neck	--	--	--	--	--	--	+	--
Confusion	+	+	+	+	+	+	--	--
Skin rash	--	--	--	--	--	--	+	--
GI complaints	+	+	--	+	+	+	+	+
Severe muscle weakness	+	+	+	+	--	--	--	--

1 Motor NCV Auto

1

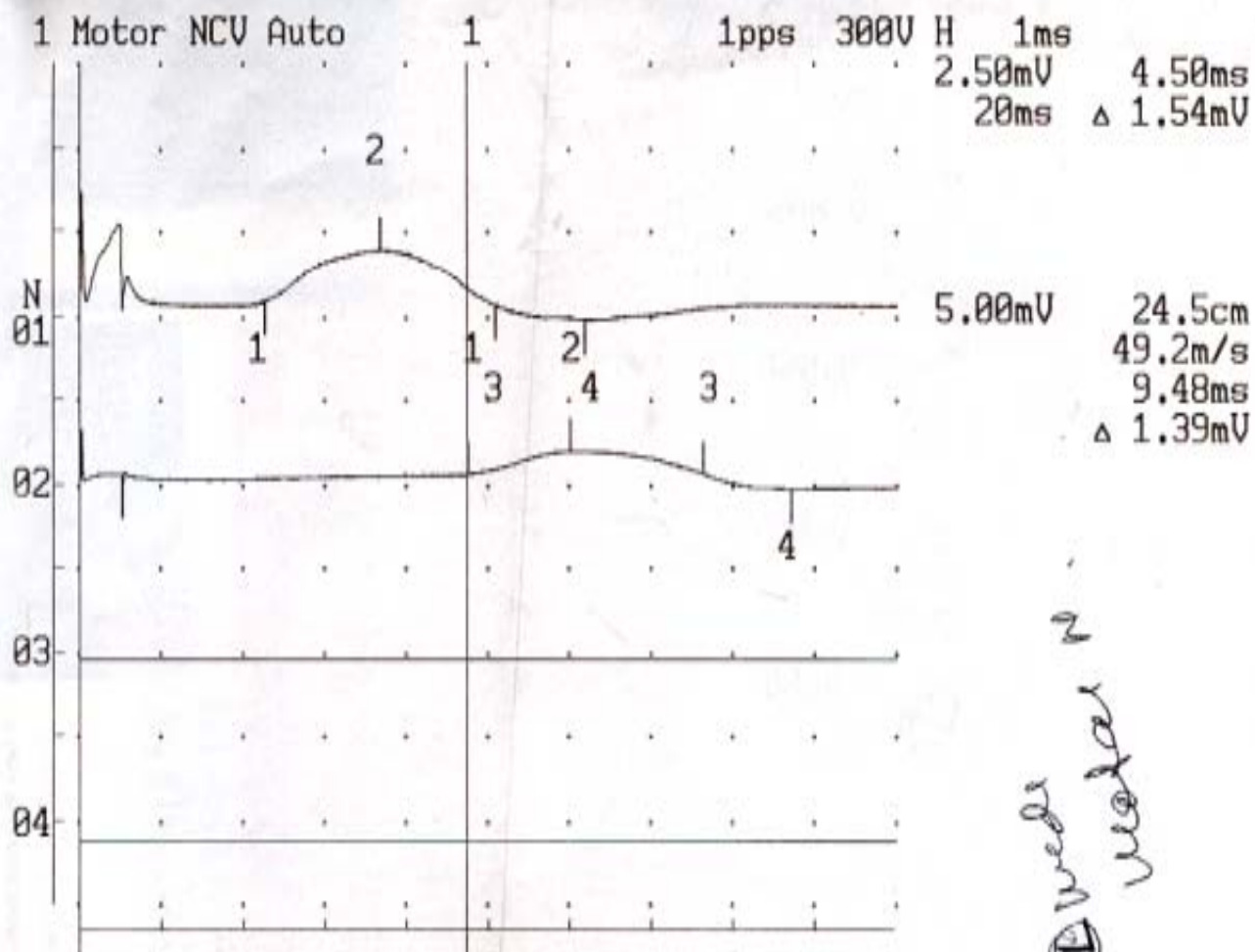
1pps 188V H 100 μ s

5.00mV 3.20ms
20ms Δ 8.94mV



26.0cm
55.1m/s
7.92ms
 Δ 7.91mV

Medelec/TECA Sapphire (E01)
Flushing Hosp. Medical Center



Medelec/TECA Sapphire (E01)
 Flushing Hosp. Medical Center

Patient 1

*Medelec
 motor N*

1 Motor NCV Auto

1

1pps 300V H 1ms

500 μ V
20ms

N
06

07

08

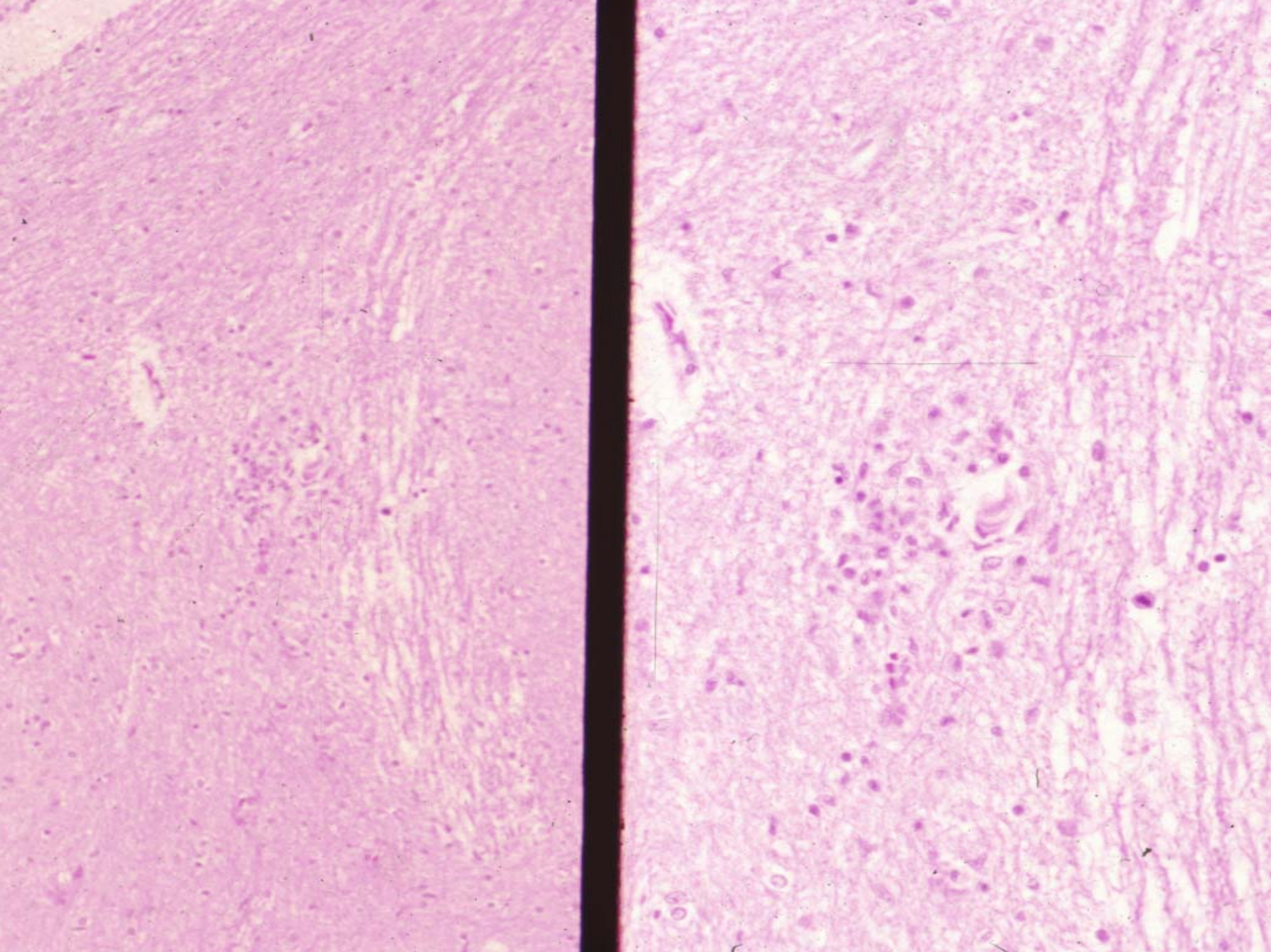
09

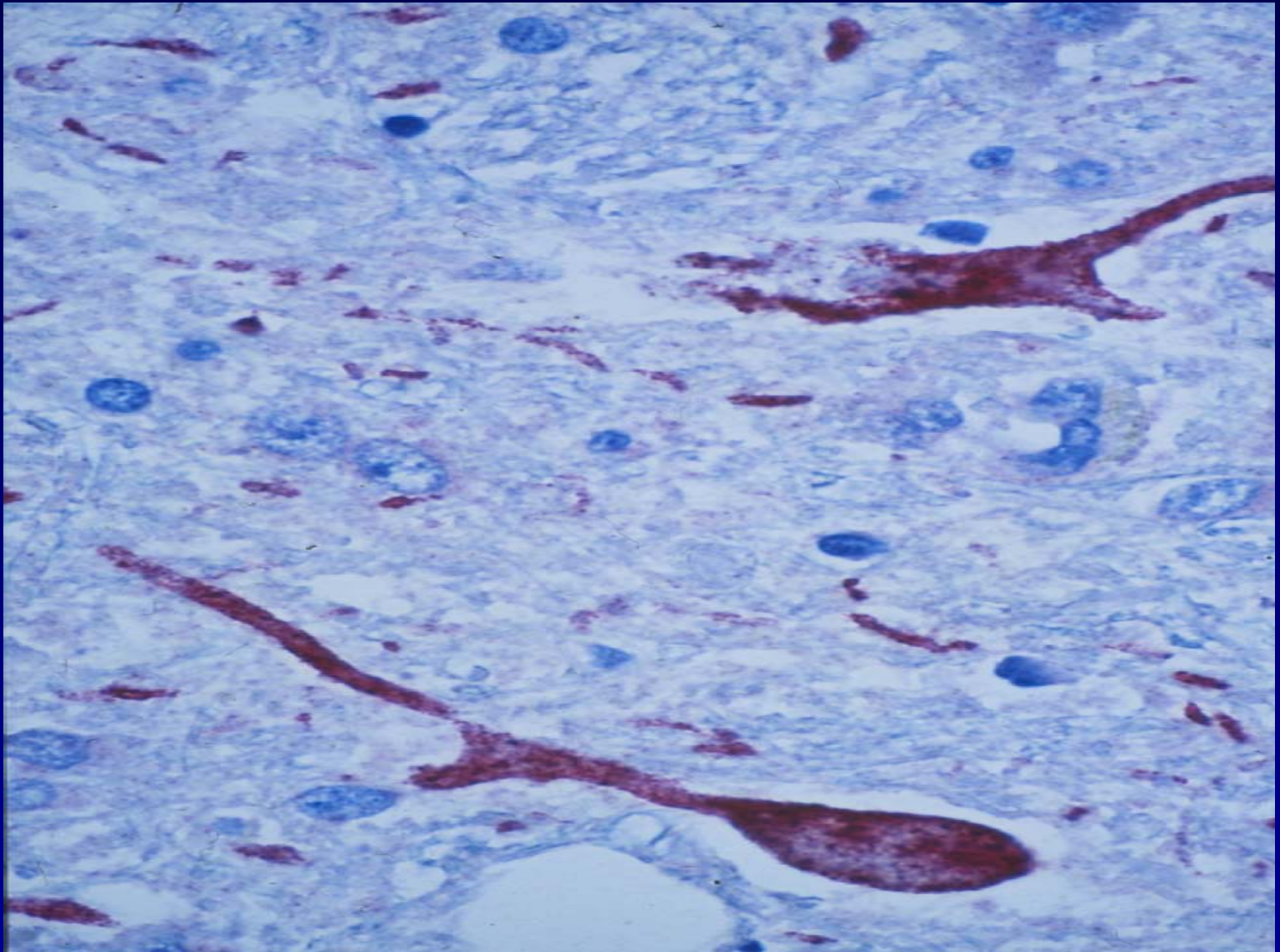
Medelec/TECA Sapphire (E01)

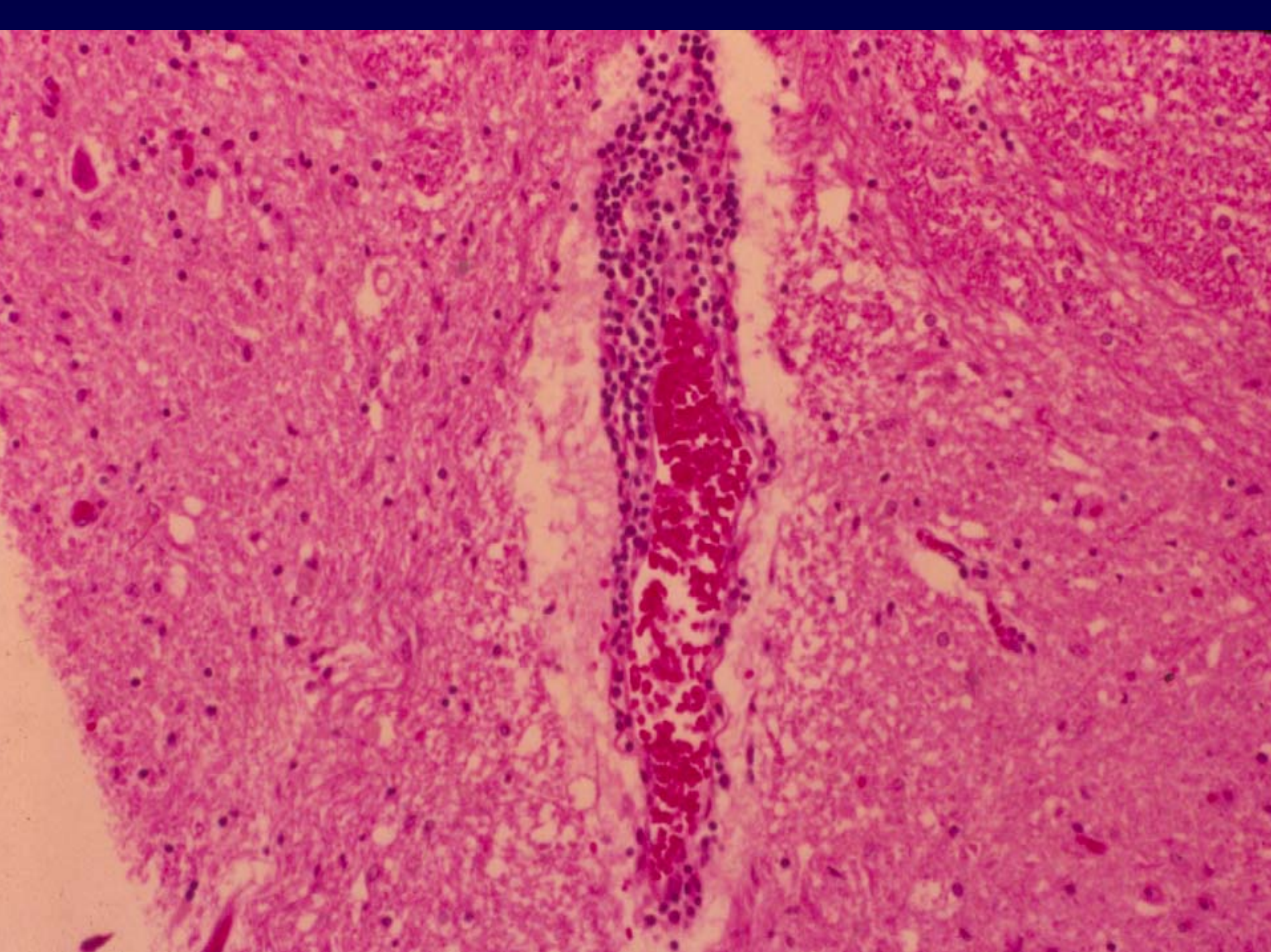
Flushing Hosp. Medical Center 08.27.99

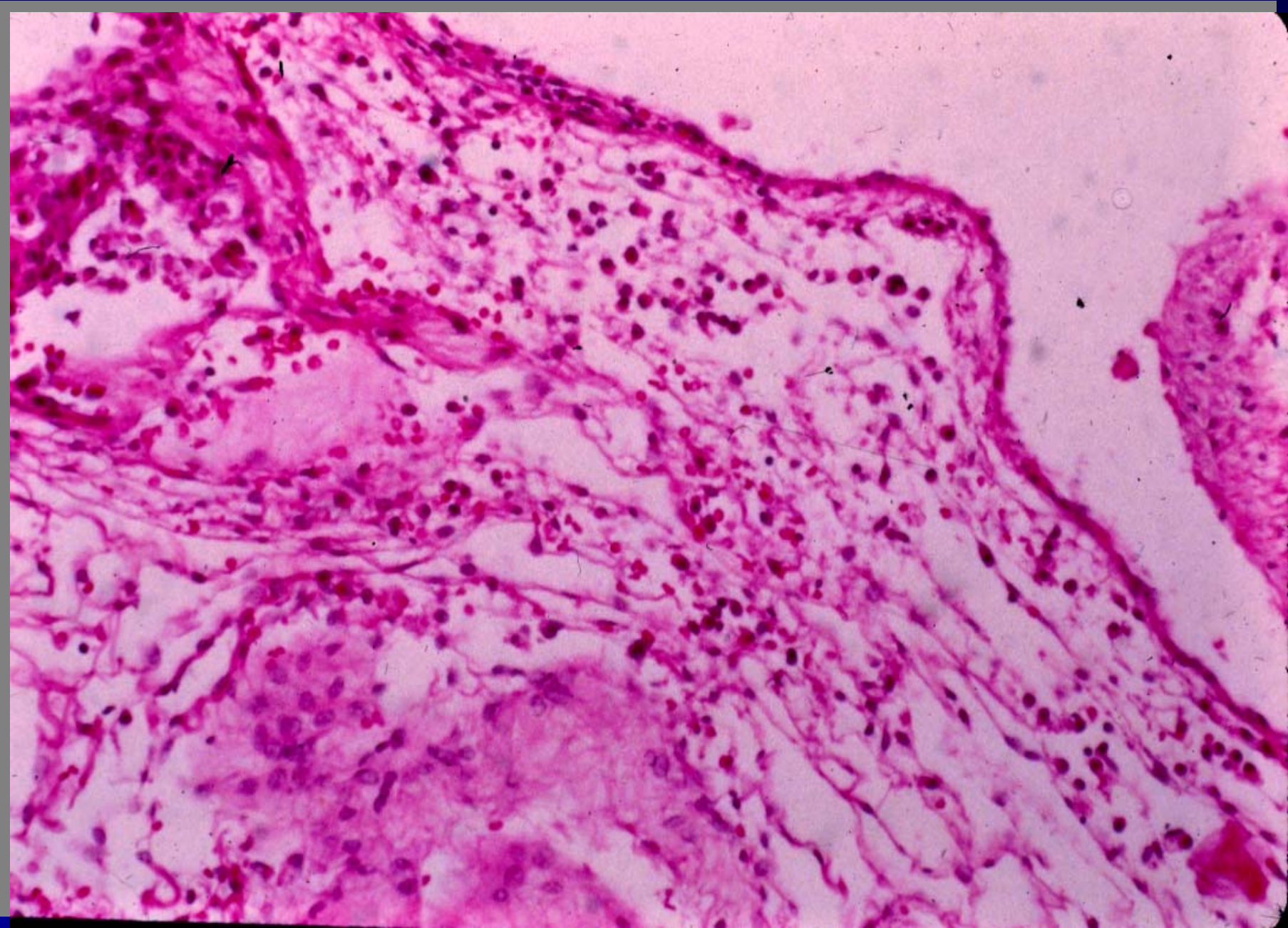
Patient 3

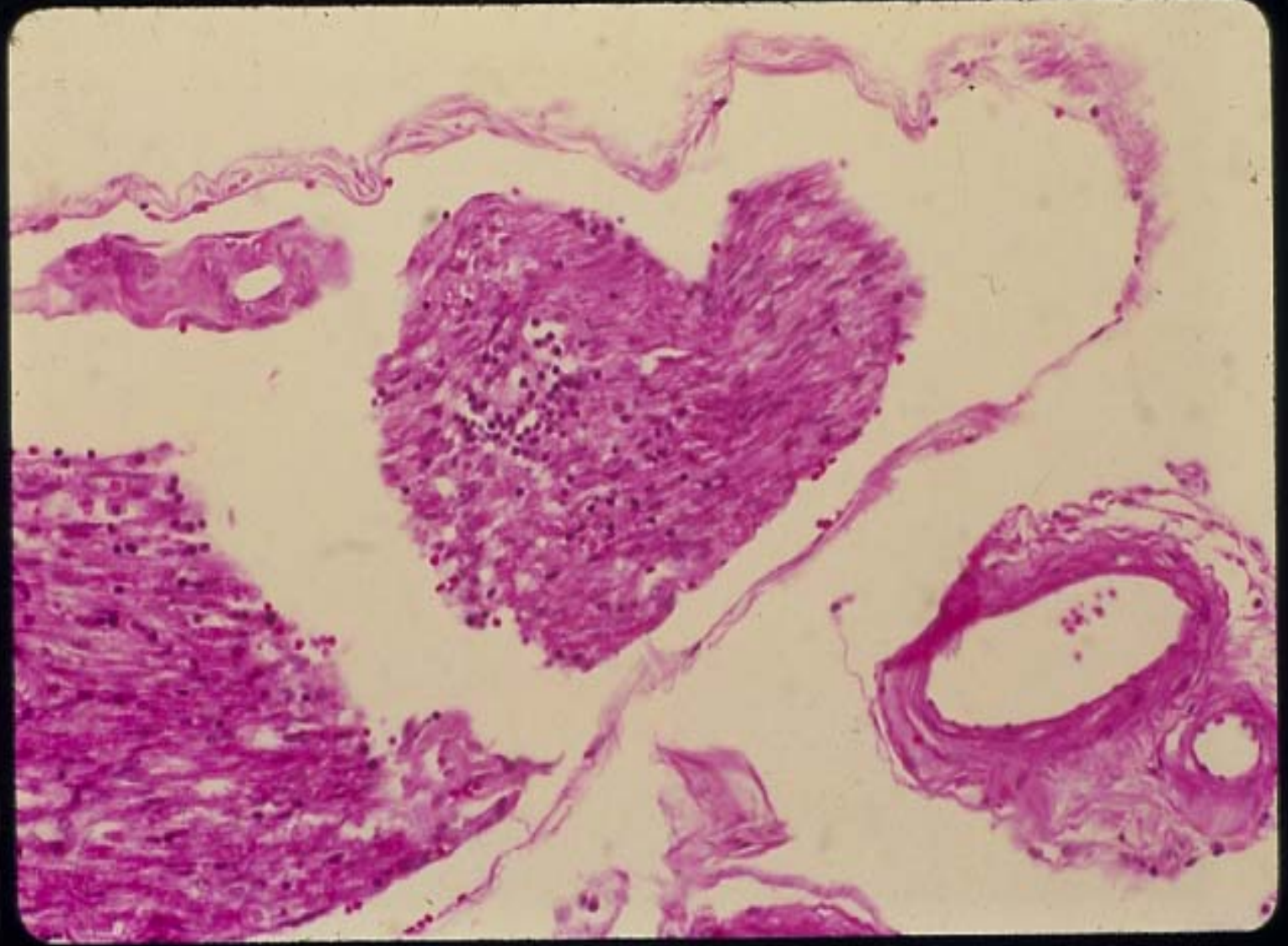
W. DeLeon











WNV Infection Recovery 12 month follow-up by NYCDOH

Fatigue	67%
Memory loss	50%
Difficulty walking	49%
Muscle weakness	44%
Depression	38%

**Long term sequelae higher in >65 yrs old & those
who presented with encephalitis**

West Nile Fever

- Incubation 3-15 days
- Presenting symptoms:
fever, headache, backache, myalgias
- Other complaints:
pharyngitis, conjunctivitis, nausea,
vomiting, abdominal pain, diarrhea,
rash, adenopathy

West Nile Fever

- Neurologic infection is rarely seen <1%
- It can present as:
 - aseptic meningitis
 - encephalitis
 - myelitis
 - optic neuritis
 - polyradiculitis
- Extraneurologic sites can include:
 - myocarditis
 - pancreatitis
 - hepatitis

Annual outbreak data 1999-2001

Year	Human cases	States (human)	Deaths	States w/ avian+/-or mosquito
1999	62	1	7	4
2000	21	3	2	12 + D.C.
2001*	66	10	9	27 + D.C.

*As of 3/02, preliminary data



Librado Romero/The New York Times

Shutting Down a Source of Disease

Roger Csencsits, an exterminator for the city's Department of Health, dropped larvicide pellets into storm drains in the Glen Oaks section of Queens

yesterday as part of the city's campaign to prevent another outbreak of West Nile virus by inhibiting mosquito breeding in standing water.



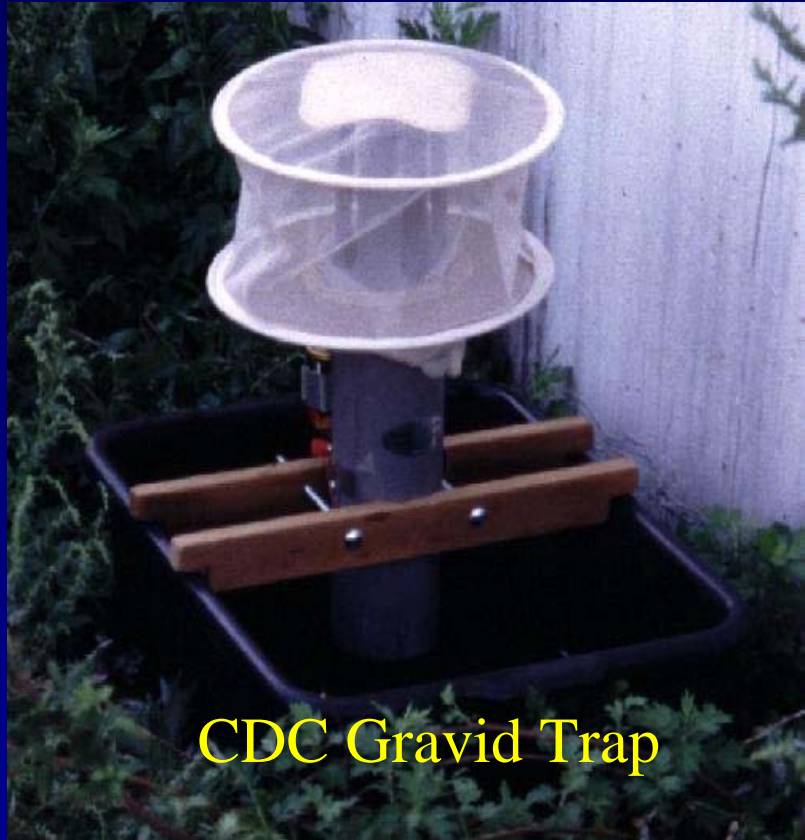
**Eliminate
Standing
Water
Around
the House**



**Keep
swimming
pools and
birdbaths
clean**

**Throw
away
used
tires**

**CO₂-Baited CDC
Miniature Light Trap**



CDC Gravid Trap

Dead Bird Surveillance





MIKE LUKAVICH © 2001
ARTIST CONSTRUCTION
INC. 1 400

Clues for WNV encephalitis

- Encephalitis, viral meningitis >17, GBS
- Unexplained bird deaths
- Mosquito season
- > 50 years old
- Muscle weakness +/- or flaccid paralysis
- Hyporeflexia
- EMG/NCV axonal neuropathy
- Lymphocytopenia

THANKS!

- Appreciation of the significance & dedication of the public health department & CDC
- A 2 way communication between local physicians & the PH sector is now established
- Doctors also must become an educational resource to our surrounding community
- These relationships will help recognize future outbreaks whether natural or intentional.



Shanahan

"We're pretty sure it's the West Nile virus."

CSF analysis in patient one

<u>HD</u>	<u>WBC</u>	<u>L>P</u>	<u>RBC</u>	<u>Protein</u>	<u>Glucose</u>
4	35	+	0	69	83
6	52	+	290	105	76
11	280	+	2140	75	130