The West Nile Virus Outbreak 1999

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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.

Case	Age/sex	History	Presenting sxs	Course
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

Case	Days after onset	WBC cells/mm^3	% (P/L)	RBC cells/mm^3	Protein mg/dl	Glucose 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

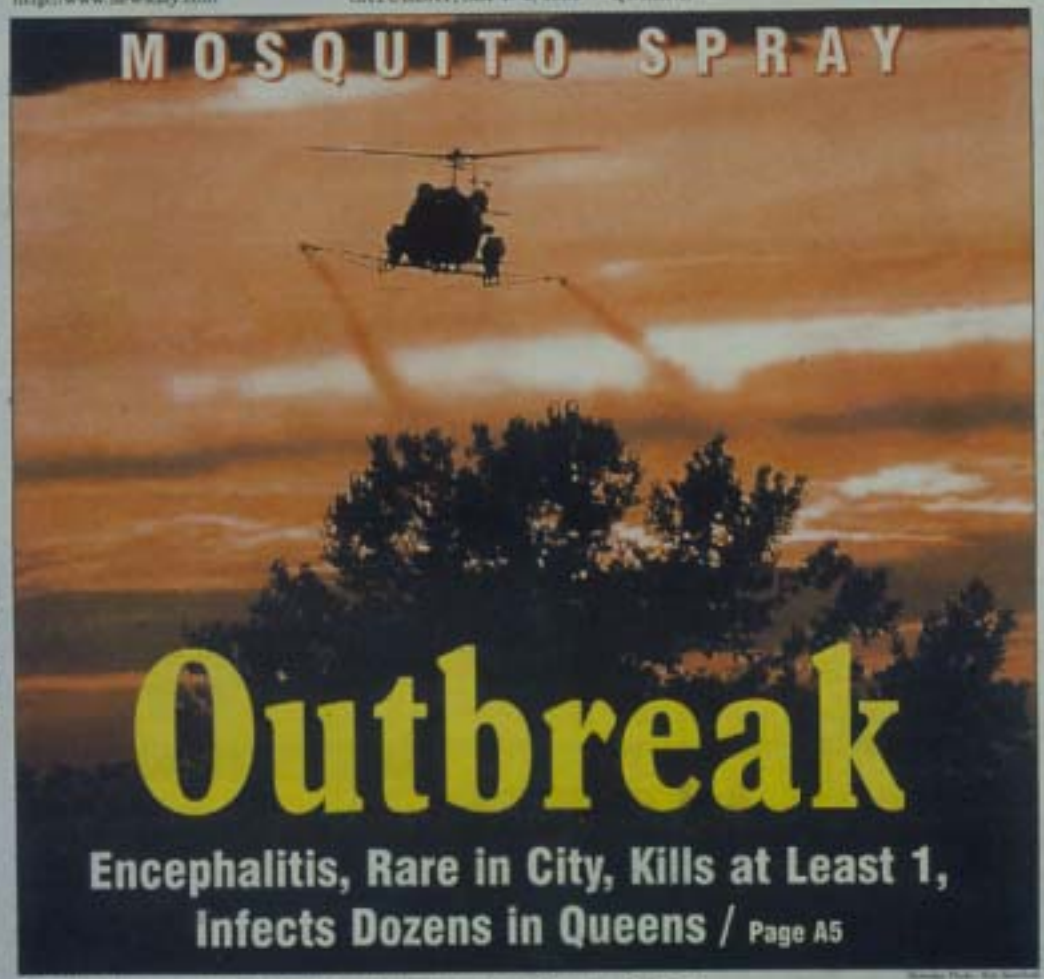
West Nile Encephalitis Epidemic

- 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

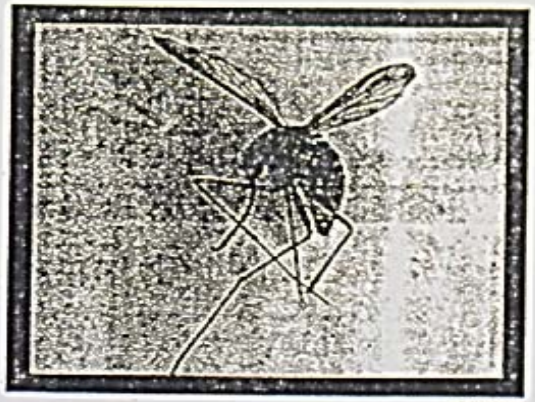
Encephalitis, Rare in City, Kills at Least 1, Infects Dozens in Queens / Page A5

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

SPORTS Newsday

http://www.newsday.com SATURDAY, SEPT. 25, 1999 • QUEENS 50¢

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

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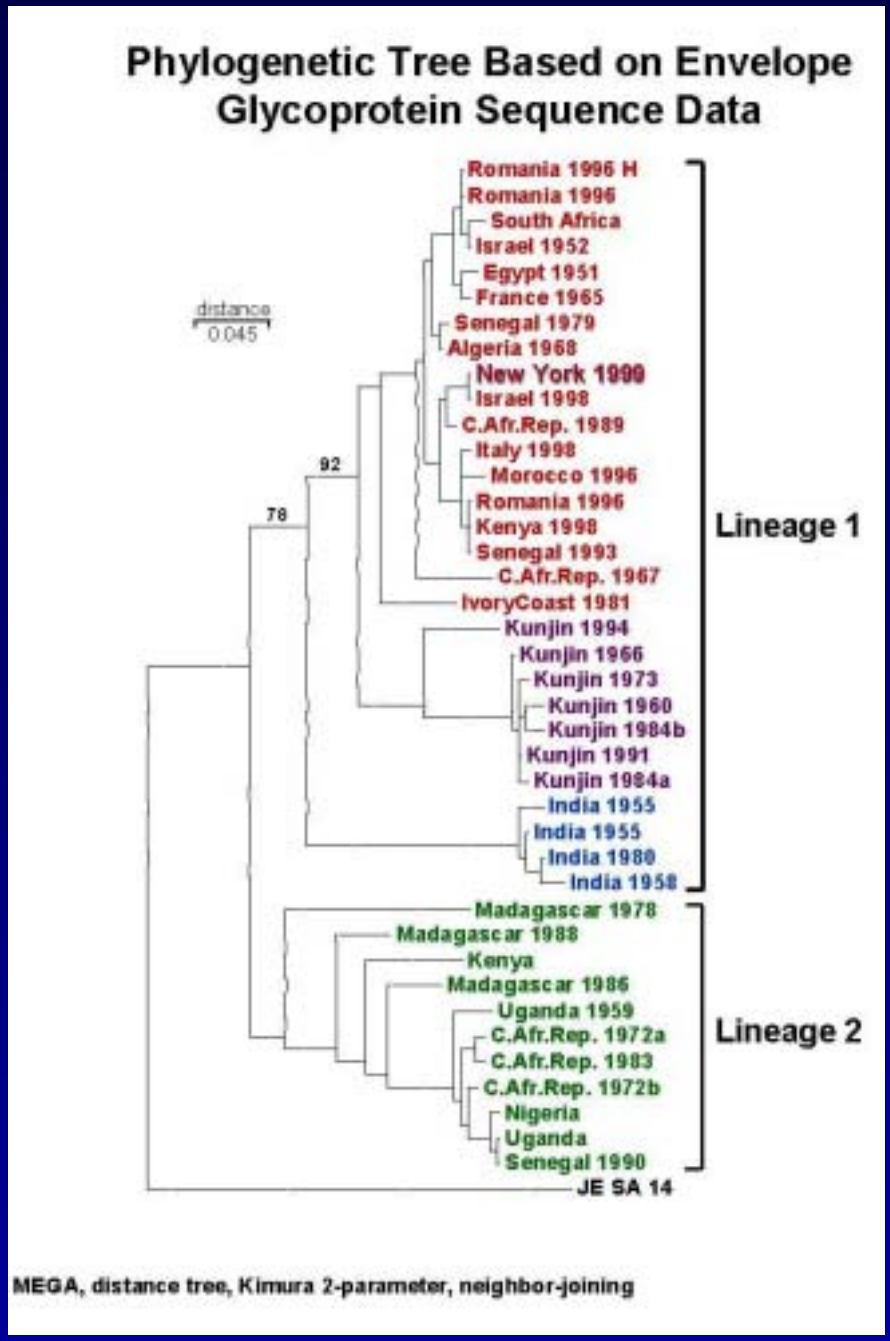


Lanciotti et al. 1999. Origin of the West Nile virus responsible for an outbreak of encephalitis in the northeastern U.S. [Science 286:2333-337.]

Serology of blood, CSF, & brain tissue for WNV

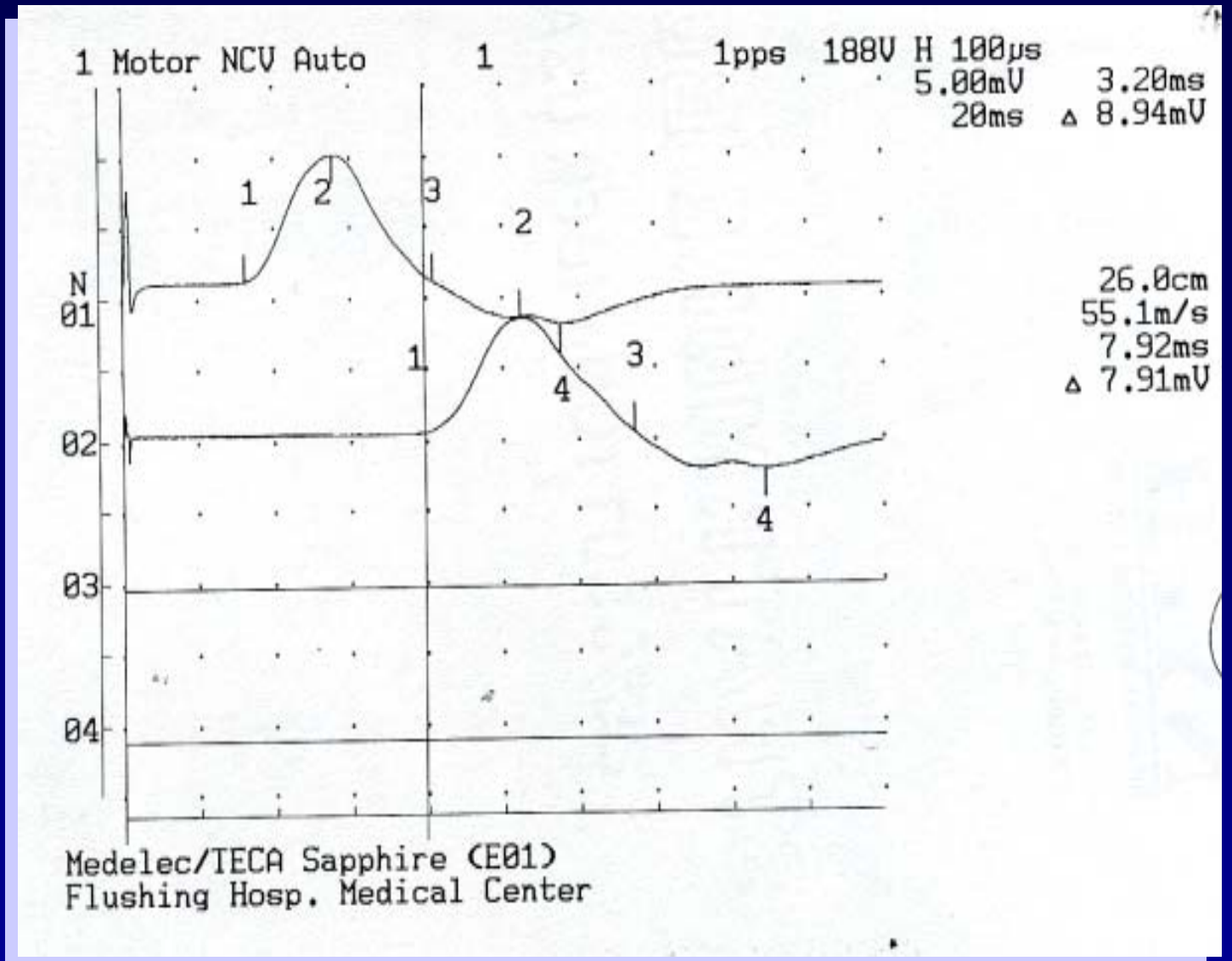
Case	Serum IgM	PRNT WNV titers	CSF IgM	Brain PCR & IHC stain
1	+	1:5120	+	N/D
2	+	1:1280	N/D	+
3	+	1:160	+	+
4	+	1:1280	+	+
5	+	1:640	N/D	N/D
6	+	1:160	N/D	N/D
7	+	1:320	+	N/D
8	+	1:320	N/D	N/D

Admission WBC & % lymphocytes

Patient	**WBC** **(4.2-11.4/mm^3)**	**% lymphocytes** **(20-40%)**	**Absolute lymphocytes** **(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	+	+	+	+	--	--	--	--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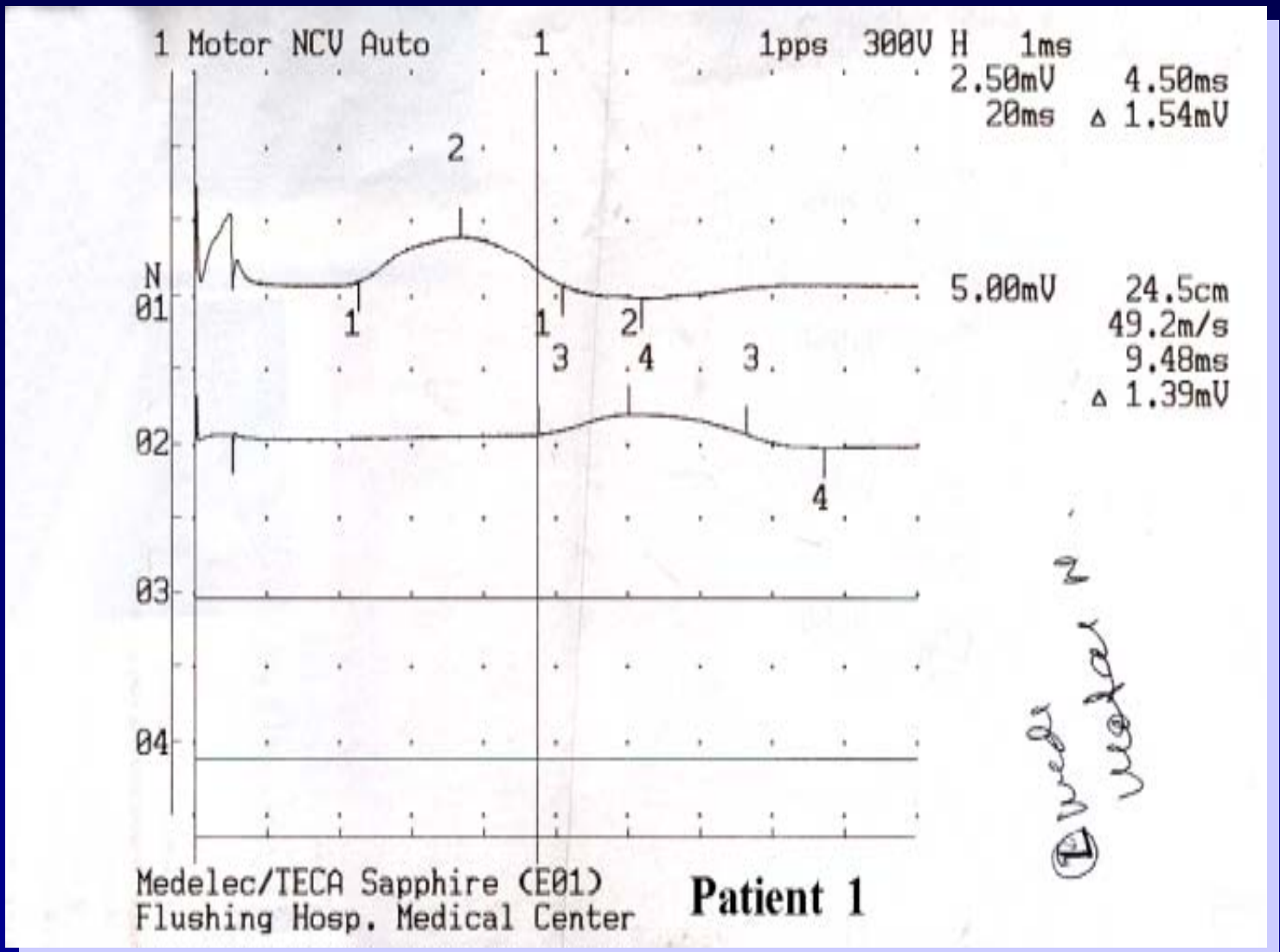
Medelec/TECA Sapphire (E01)
Flushing Hosp. Medical Center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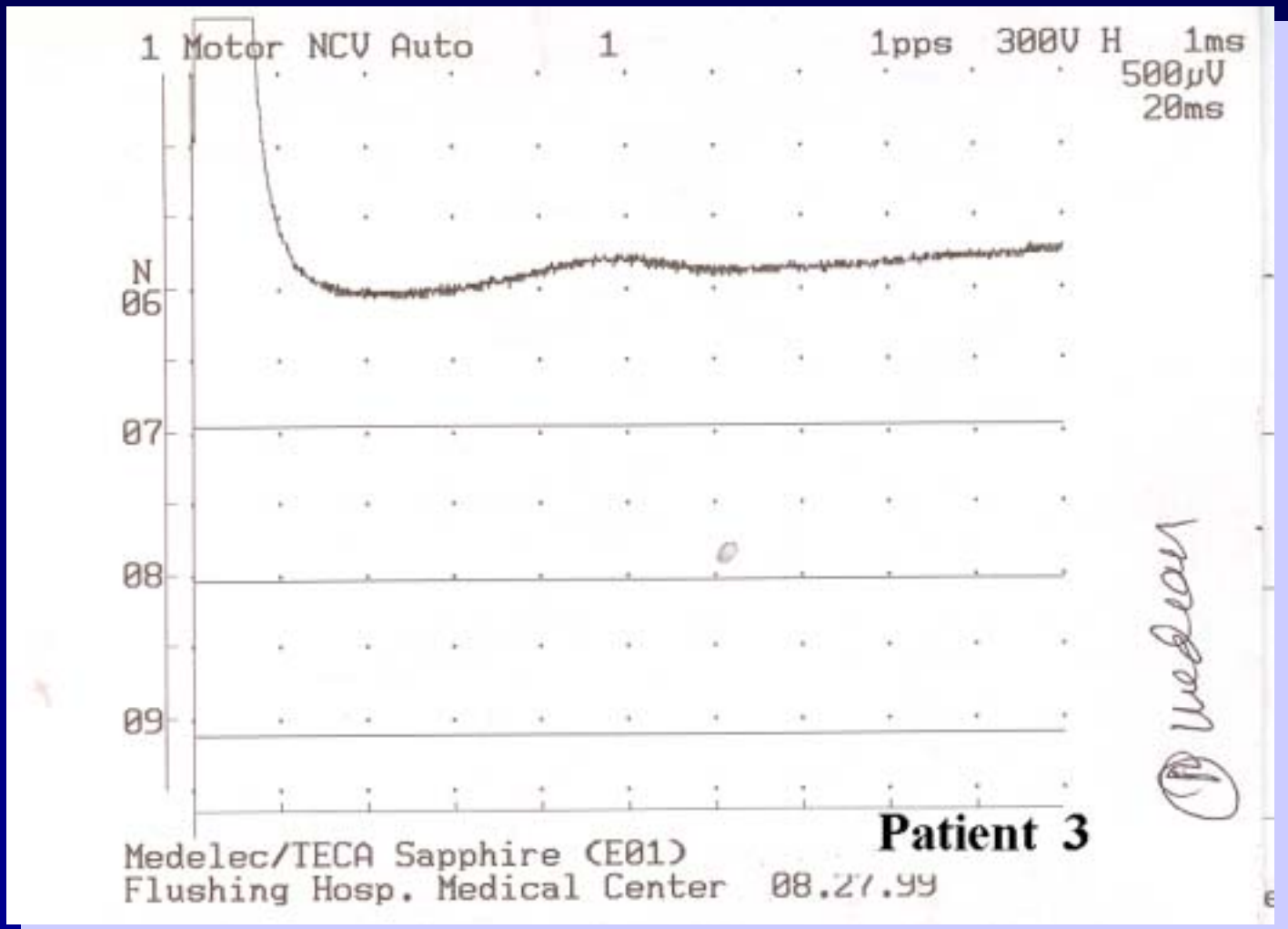
Medelec/TECA Sapphire (E01)
Flushing Hosp. Medical Center
Patient 1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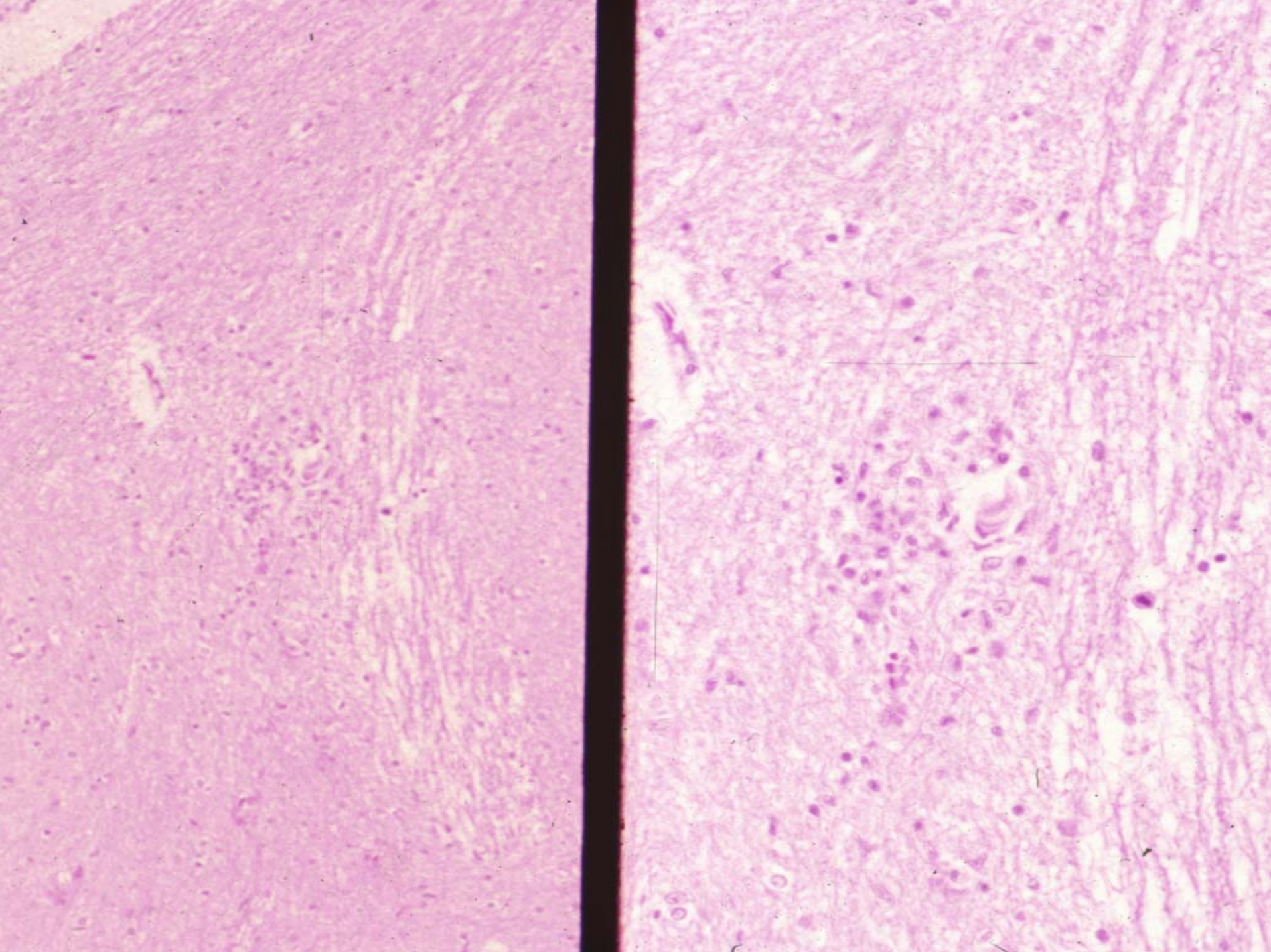
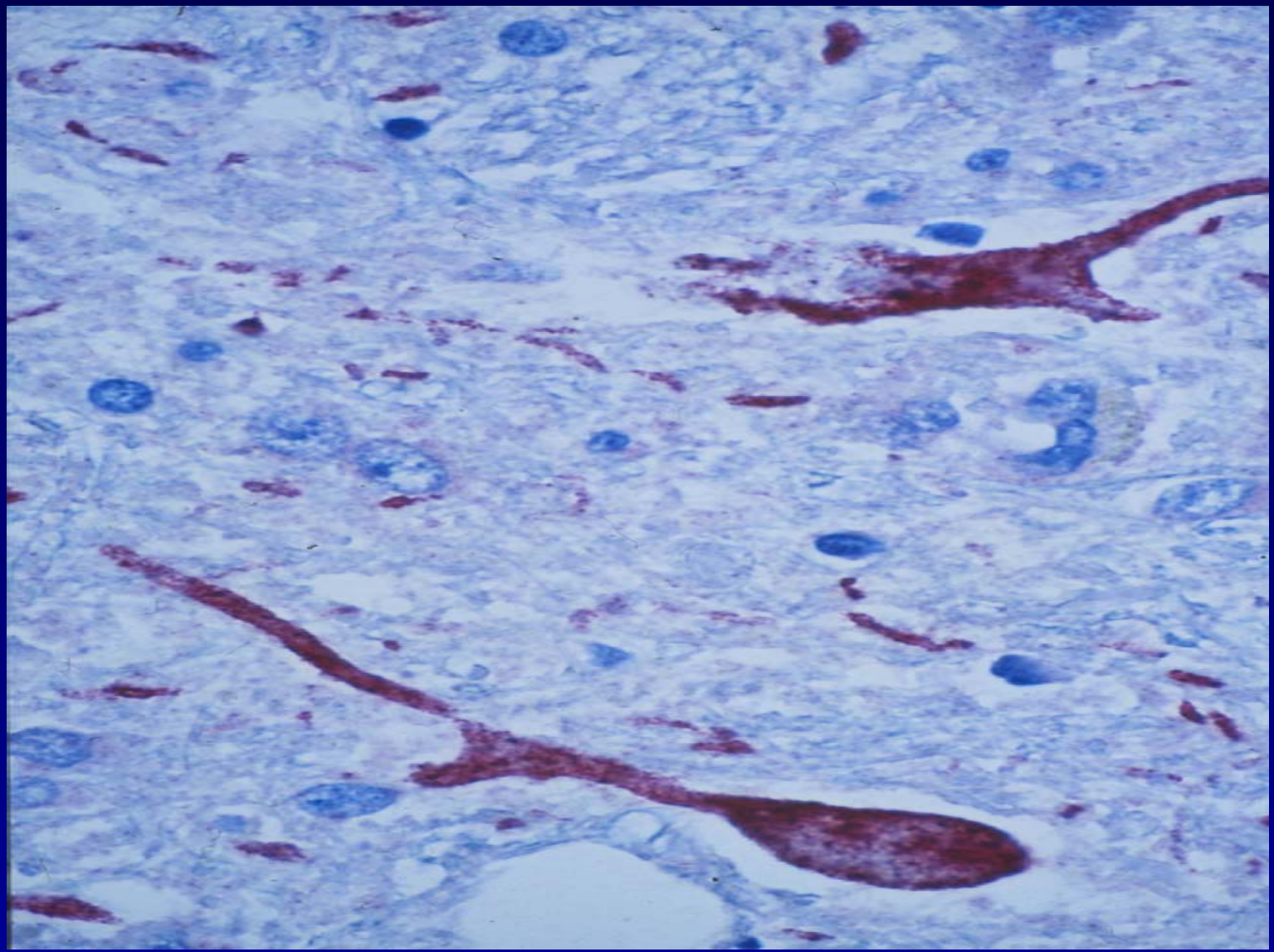
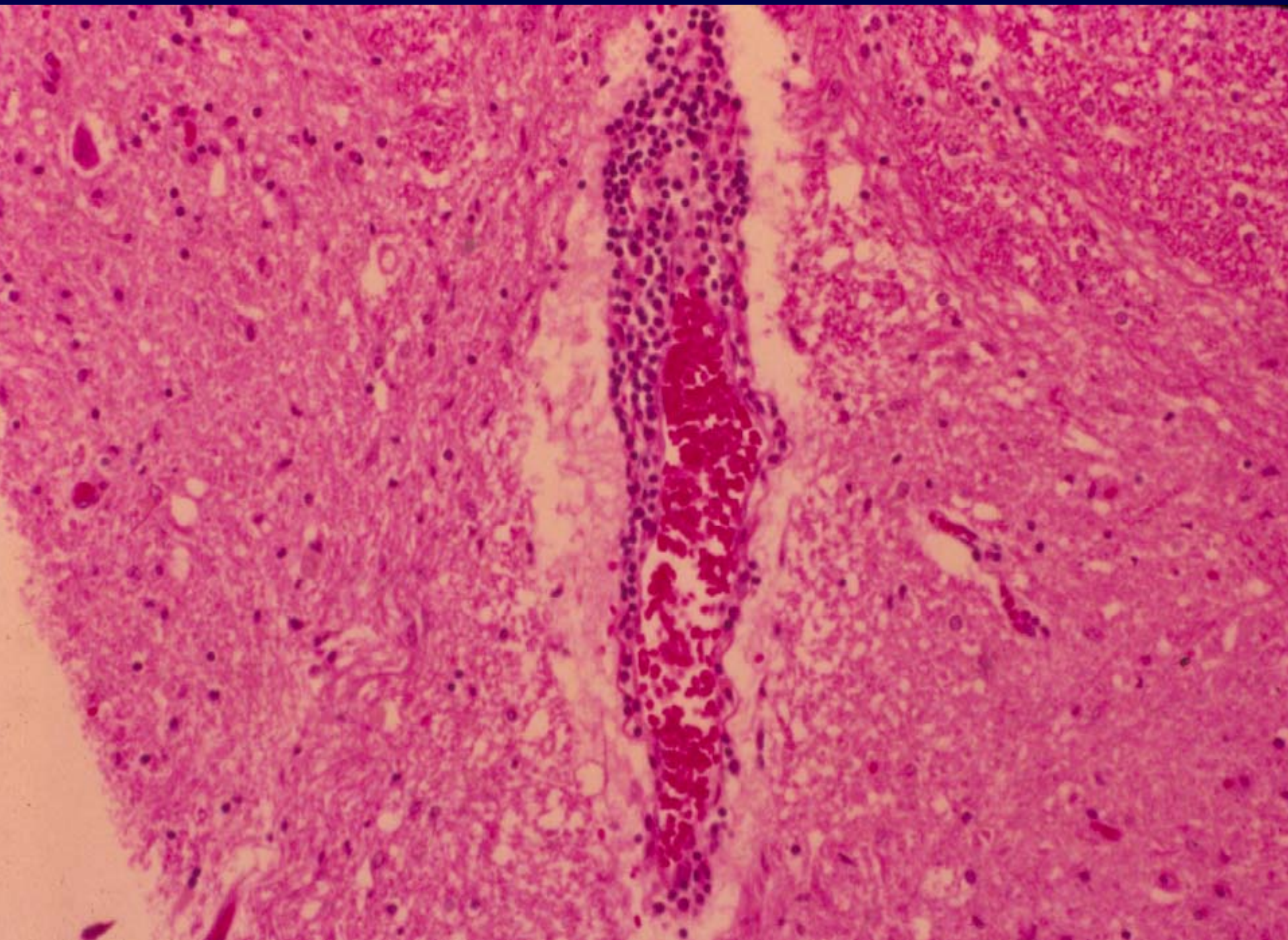
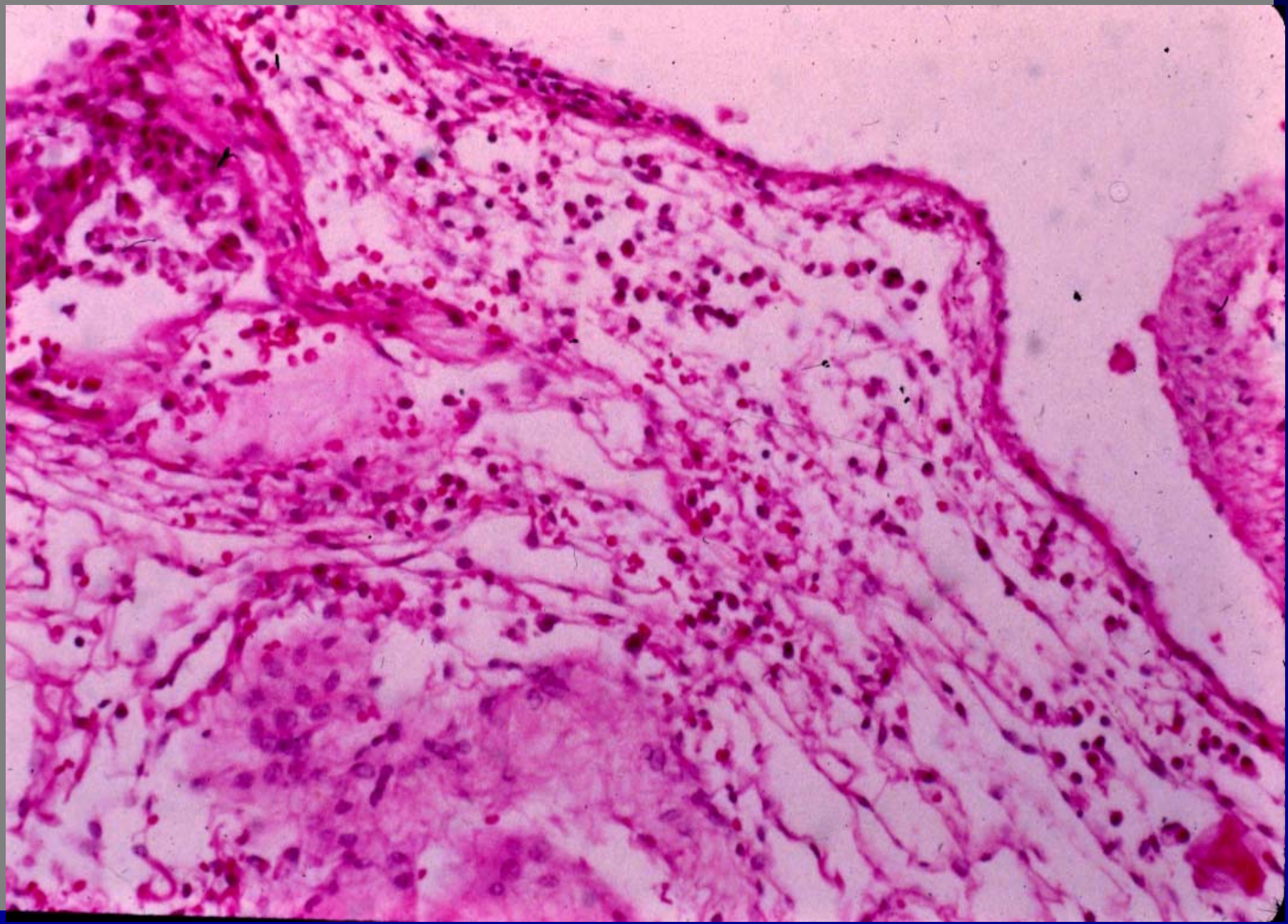
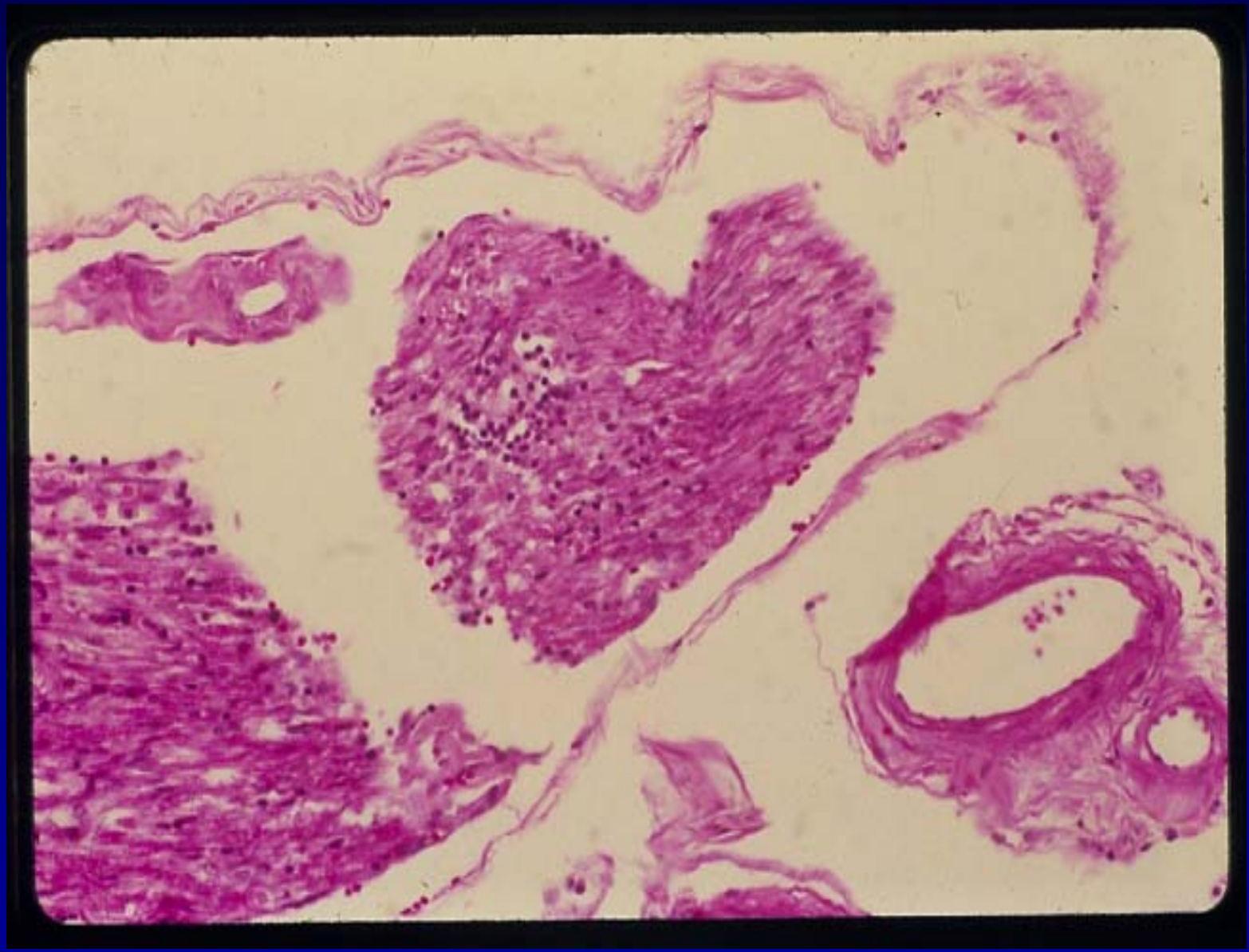
Patient 3











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

WNV surveillance (CHI) 5/01 Vol 20:1-8

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

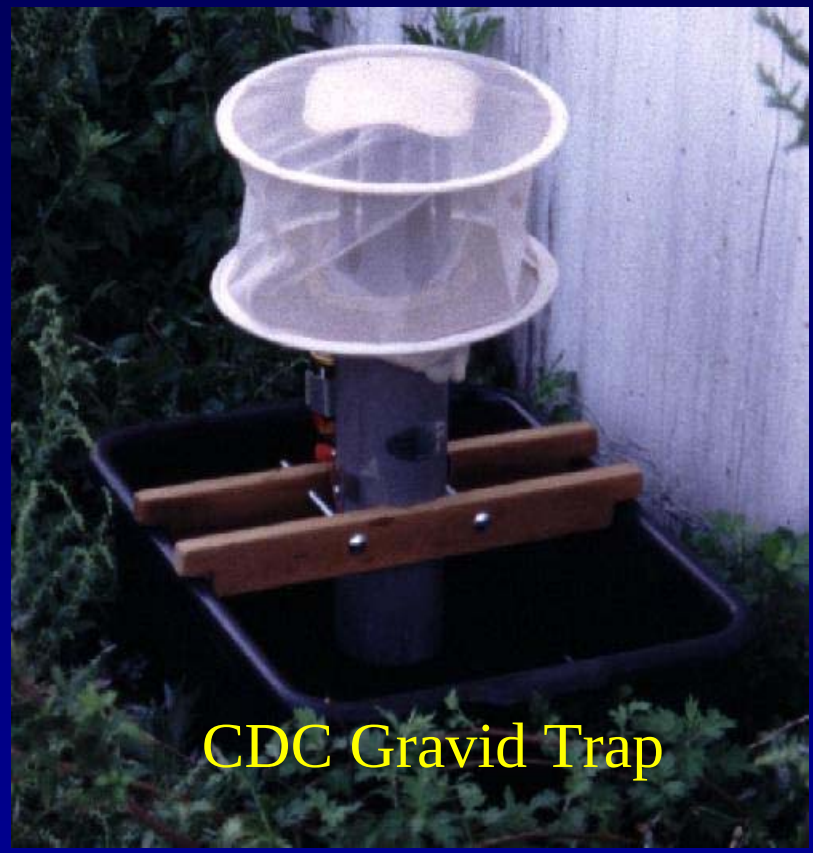
Roger Csencsits, an exterminator for the city's Department of Health, dropped larvicide pellets into storm drains in the Glen Oaks section of Queens yesterday as part of the city's campaign to prevent another outbreak of West Nile virus by inhibiting mosquito breeding in standing water.

Eliminate Standing Water Around the House

Keep swimming pools and birdbaths clean

Throw away used tires

CO_2-Baited CDC
Miniature Light Trap


CDC Gravid Trap

Dead Bird Surveillance

I'M WORRIED FRED HAS A DEATH WISH. HE LEFT THE HOUSE WITHOUT MOSQUITO REPELLENT....
BITE ME
W. NILE
MIKE LUCKOVICH

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.

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

CSF analysis in patient one

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