

ORGAN DONATION: AN INTEGRATED APPROACH TO SAVING LIVES



Virginia EMS Symposium 2009

Elizabeth Spencer, MPH

Director of Hospital Services & Professional Education

Washington Regional Transplant Community

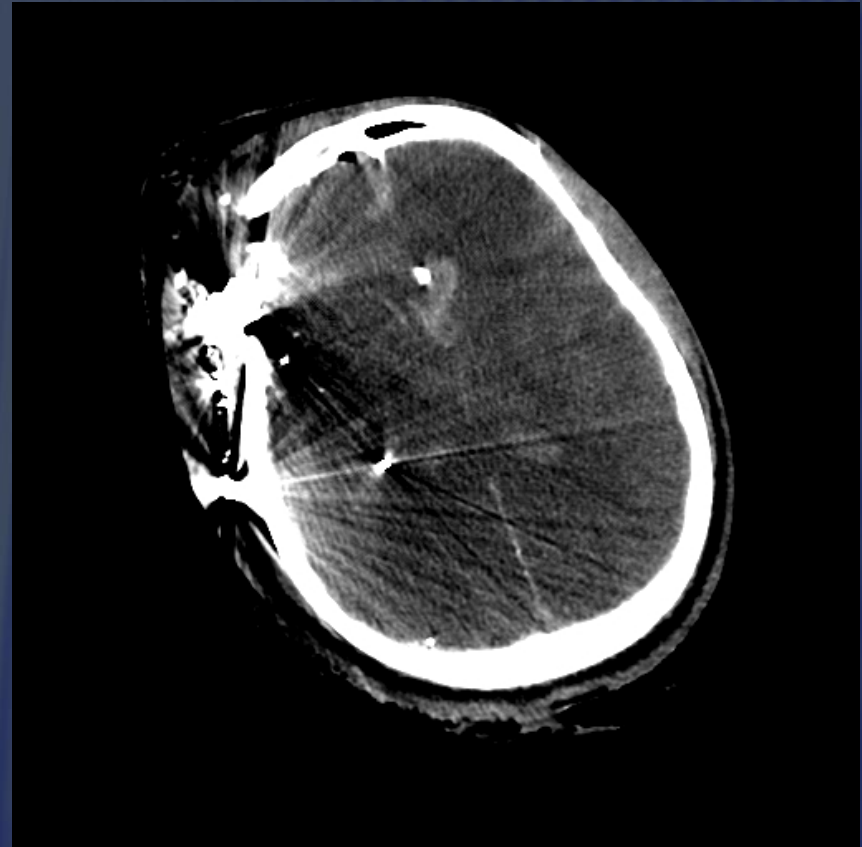
Christopher P. Michetti, MD

Medical Director, Trauma ICU

Inova Regional Trauma Center

CASE 1: FUTILE CARE?

- × 22 year old male with GSW to head
- × Large defect right frontotemporal skull, visible brain matter
- × Agonal breathing, weak pulse
- × Bleeding wound
- × BP 80's, O2 sat 88%
- × Pupils fixed, dilated



-
- ✗ Intubated without medications
 - ✗ Fluids bolused
 - ✗ Dressing on wound for hemostasis
 - ✗ Transported to Level 2 Trauma Center with BP 110 and O2 sat 99% after resuscitation
 - ✗ Still GCS 3 after 90 minutes



CASE 2: IS DONATION AN OPTION?

- ✗ Dispatched to home of a 68 year old female diabetic with heart disease
- ✗ Found on ground outside house, last seen an hour ago
- ✗ Unresponsive, dilated left pupil
- ✗ BP 160, shallow breathing
- ✗ Temperature 94°F
- ✗ Aspirated gastric contents, O2 sat 81%

-
- × Suctioned, has gag
 - × RSI performed
 - × Covered to preserve body temperature
 - × Transported to nearby hospital (stroke center)
 - × Cerebral edema worsens
 - × Prognosis poor after gag reflex lost, other pupil dilates



OVERVIEW



- × Clinical case presentations
- × The need for organ donors
- × National trends in organ donation
- × Goals and best practices of an effective organ donation process
- × Video: personal stories from an organ recipient and a donor family

OVERVIEW



- × The donation process
 - + Who can be a donor?
 - + What clinical conditions allow for donation?
 - + How is organ allocation determined?
- × How does early patient care in the field and the ER enhance donation potential?
- × Myths and Facts about organ donation
- × Audience feedback

LACEY'S STORY



THE NEED FOR ORGAN DONATION



- *For perspective, approximately 30,000 organ transplants occur per year in the US*

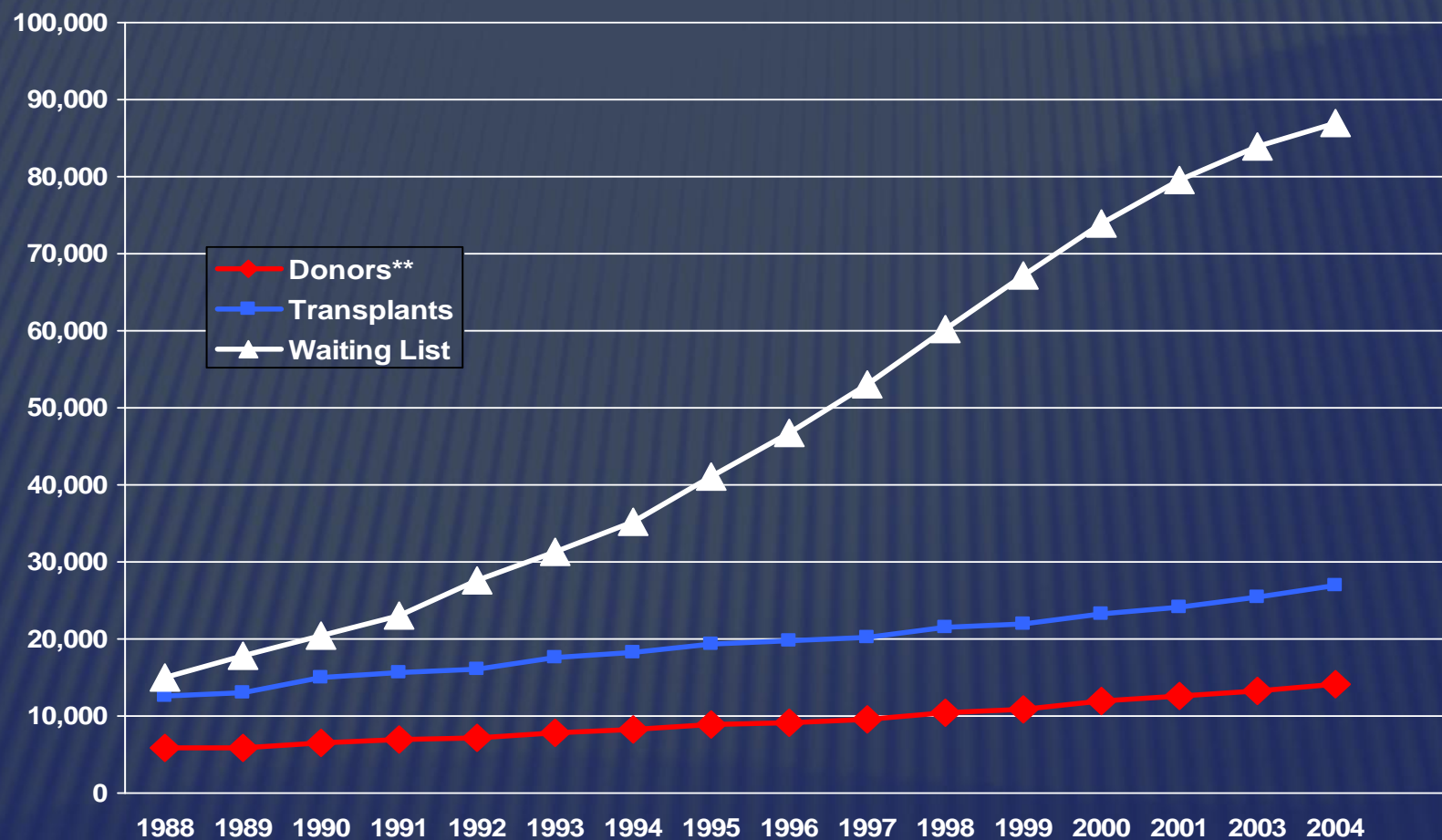
More than 105,000 patients wait nationally.

2,600 patients wait in Virginia.

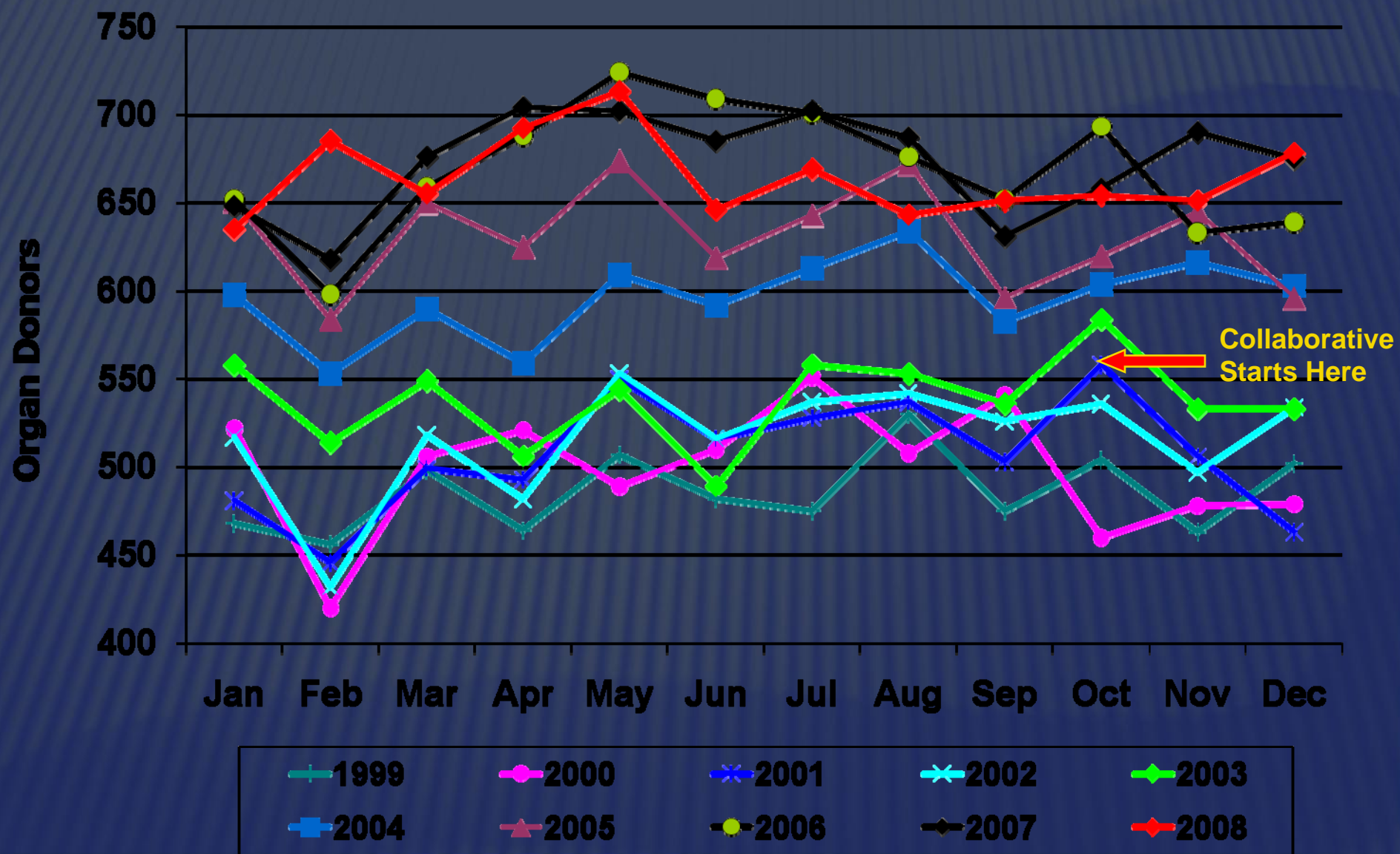


18 people die every day waiting for a life-saving transplant

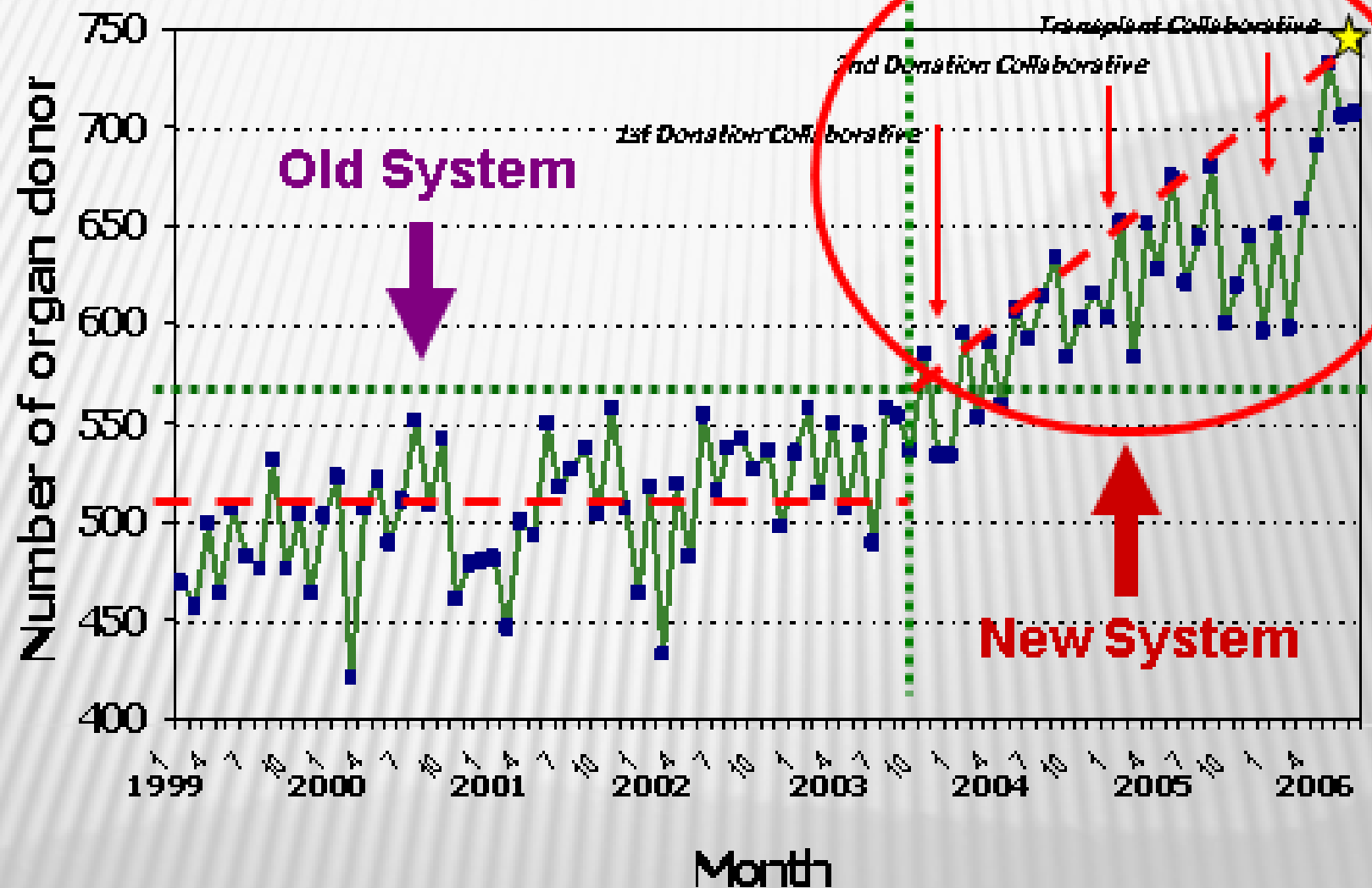
NATIONAL WAIT LIST AND DONORS 1988-2004



MORE MONTHLY U.S. DONORS

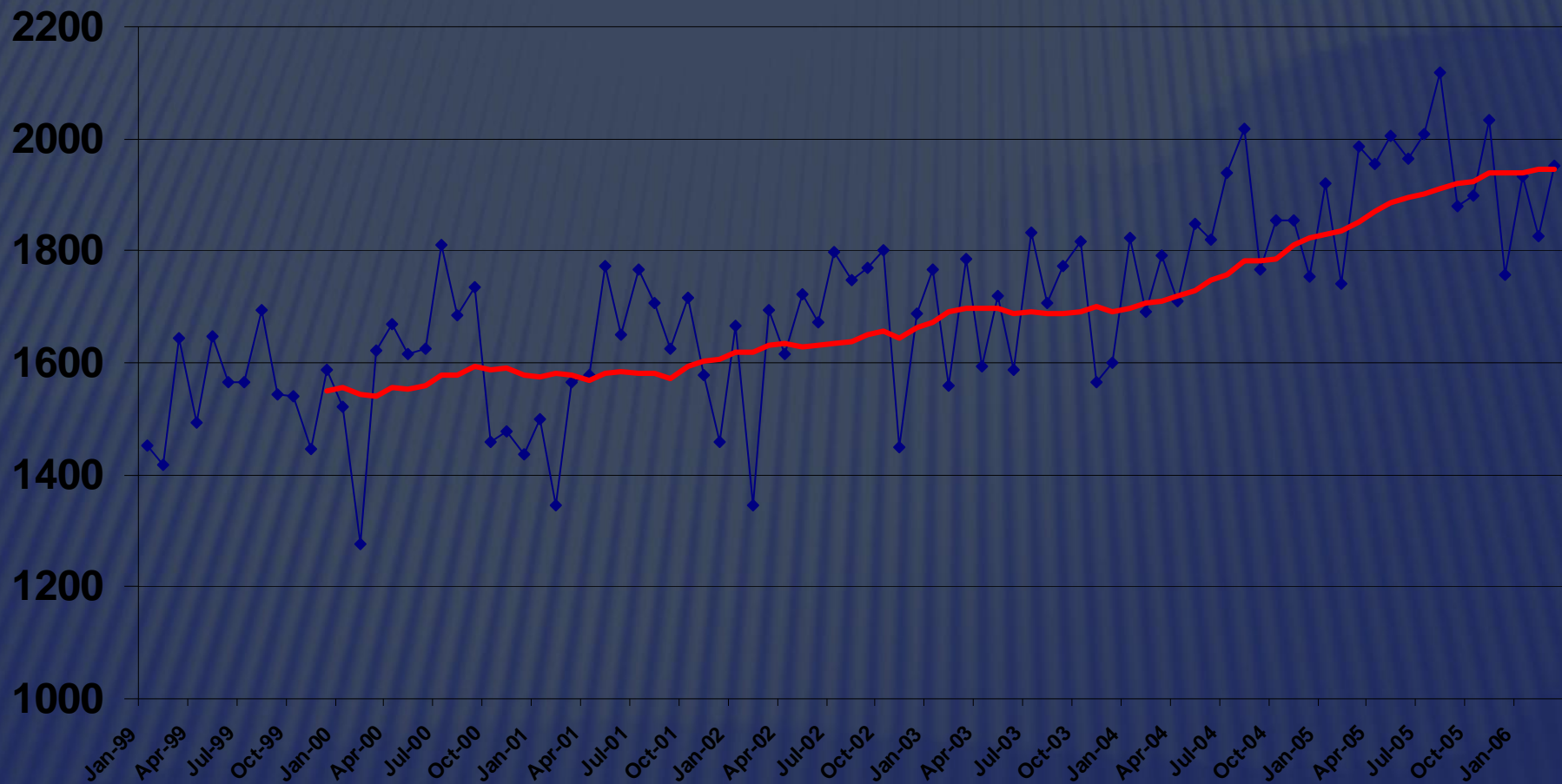


NUMBER OF U.S. DONORS BY MONTH

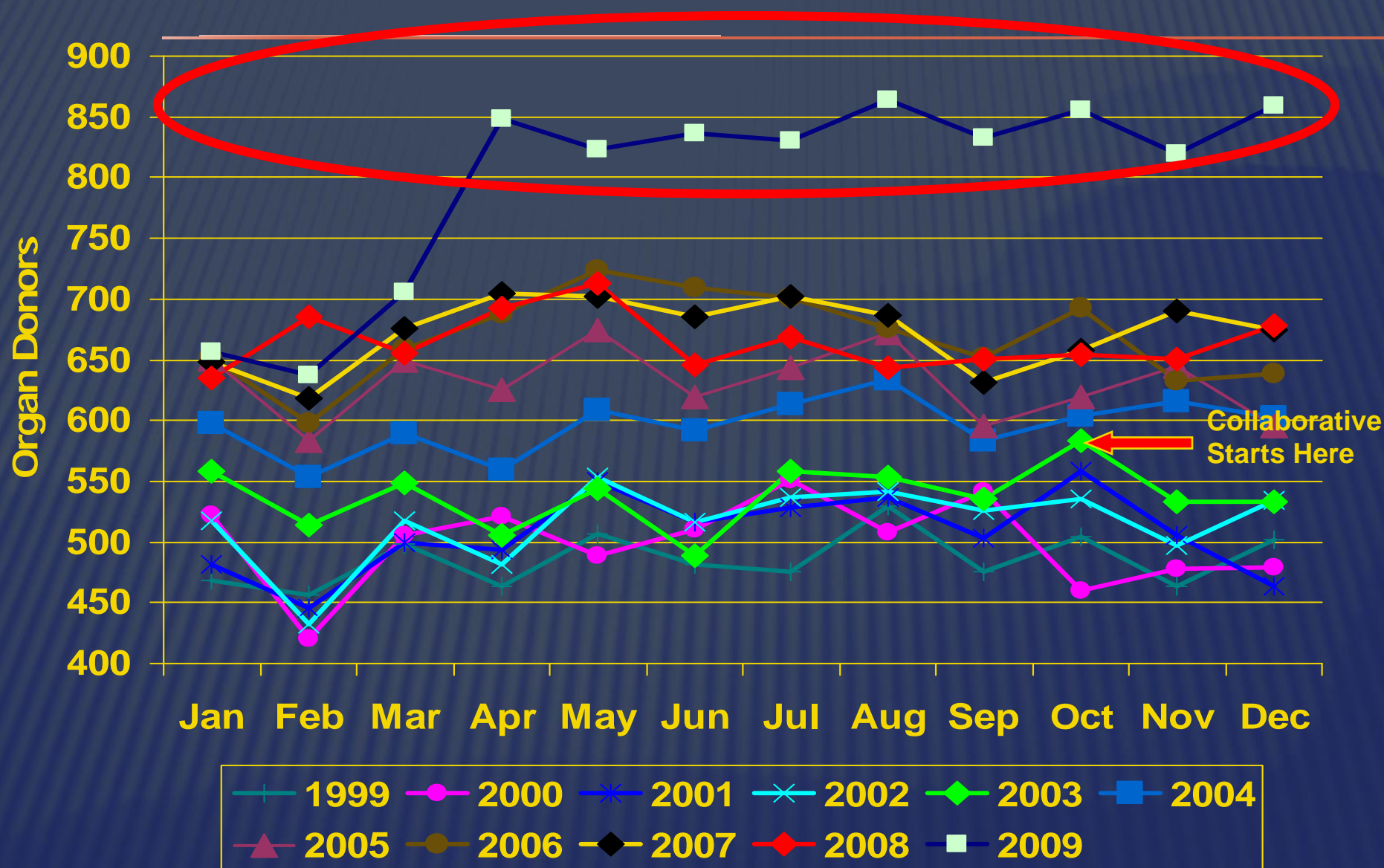


ORGANS TRANSPLANTED PER MONTH

(12 Month Moving Average)



WHERE WE NEED TO BE...



THREE PATHWAYS TO ORGAN DONATION

- Living Donation
 - Related or non-related living donors.
- Organ Donation After **Brain Death (DBD)**
 - Patients who are declared dead via neurological criteria.
 - “Typical” Organ Donors
- Organ Donation After **Cardiac Death (DCD)**
 - Patients who are declared dead via cardiac criteria.
 - Pt is vent dependent
 - Family has decided to withdraw life support.

LIVING DONATION

WHAT ORGANS CAN BE DONATED BY LIVING PATIENTS?

Whole organs:

- × Kidney

Portions of organs:

- × Liver
- × Lung
- × Intestine
- × Pancreas

LIVING VS. DECEASED ORGAN DONORS

	1988	2008	Cumulative (through Aug '09)
Living Donors	1,829	6,218	101,414
Deceased Donors	4,080	7,990	128,397

Deceased organ donors account for approximately $\frac{3}{4}$ of the organ transplants performed annually in the U.S.

LIVING ORGAN DONOR CANDIDATES

- × Good overall physical health
- × Good mental health
- × Fully informed
- × Compatible with intended recipient
 - + Or part of an alternative pairing process

THE LIVING DONATION PROCESS

- ✗ Potential donor contacts recipient's transplant center
- ✗ Initial screening and information
- ✗ Evaluation / work-up



- ✗ Donation and transplantation

WHAT ARE THE ALTERNATIVE PATHWAYS TO LIVING DONATION?

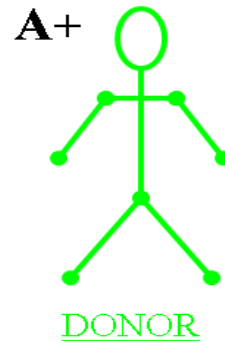
- ✗ Non-designated, a.k.a. “altruistic” donors
 - + No specific recipient in mind
- ✗ Potential donor and intended recipient are not clinically compatible matches
 - + Referred by transplant center to participating OPOs



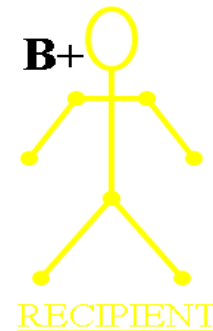
Waiting List
1. Jane Doe
2. Mary Smith
3. John Brown

Non-Designated Donation

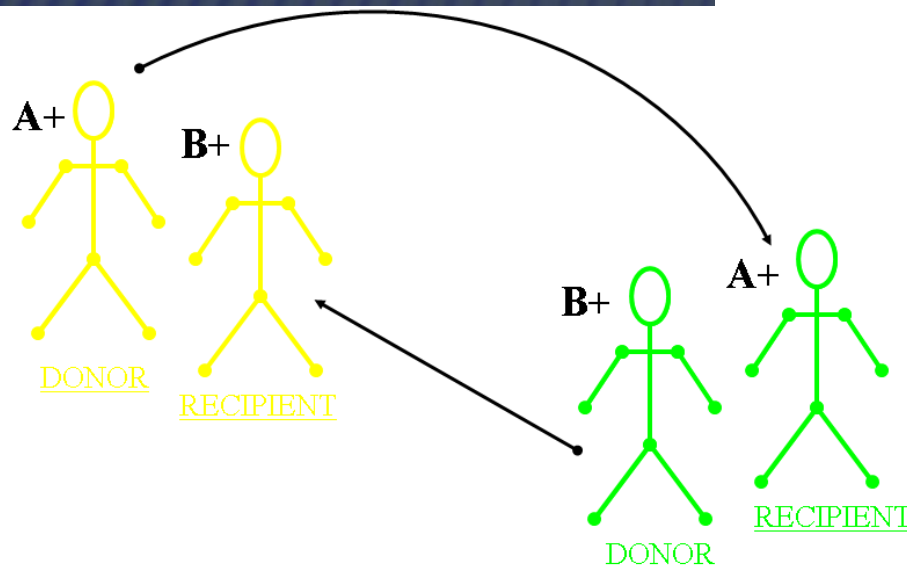
Living/Deceased Donor Swap



Waiting List - A recipients
1. *Jane Doe*
2. *Mary Smith*
3. *John Brown*



Waiting List - B recipients
1. RECIPIENT!!!
2. *Fred Jones*
3. *Susan Hall*
4. *Tim Frank*



Paired Exchange

DBD:

ORGAN DONATION AFTER BRAIN DEATH



DONATION AFTER BRAIN DEATH

- × Brain death definition
- × How brain death is determined
- × How organ donation occurs after brain death

BRAIN DEATH

- × Irreversible loss of brain function, including the brainstem
- × Circulation continues
 - + Heart beat, pulse, rhythm, perfusion
- × Determined primarily by clinical exam
- × Recognized medically and legally as death since 1968
 - + DBD allowed by every state by 1980s
- × Large majority Stroke and TBI

BRAIN DEATH

× Cardinal findings

- + Coma
- + Loss of brainstem reflexes
- + Apnea

× Prerequisites

- + evidence of compatible CNS condition
- + absence of confounders
- + absence of drug intoxication
- + normal BP & core temperature $>32^{\circ}\text{C}$ (90°F)

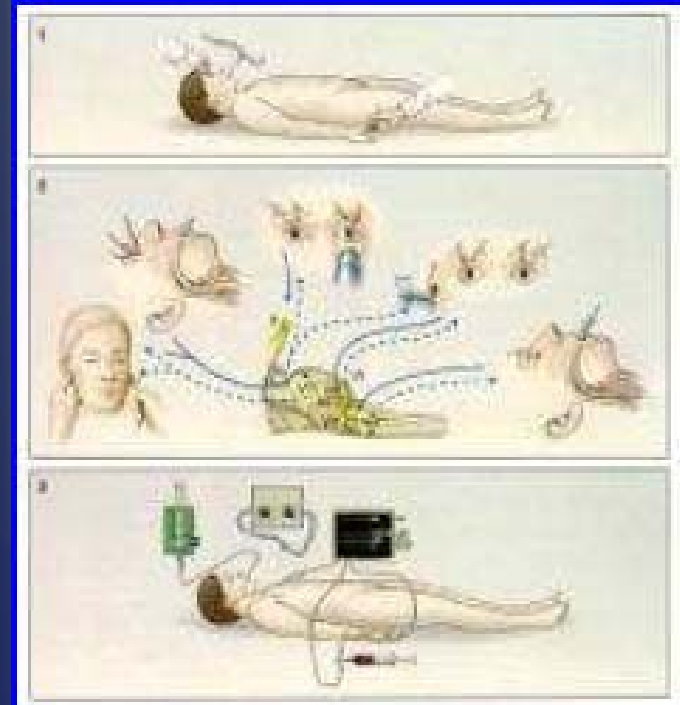
BRAIN DEATH DECLARATION

Virginia Law 54.1-2972

- × Requires examination by 2 licensed physicians
- × One physician must be in a neurological specialty

BRAIN DEATH EXAMINATION

- ✗ Coma: no response to pain in all 4 extremities and supraorbital area
- ✗ Absent brainstem reflexes
 - + Pupils
 - + Corneal
 - + Gag
 - + Cough
 - + Vestibulocochlear
 - + Oculocephalic
- ✗ Apnea test...



APNEA TEST

- ✗ Start with normal BP, temperature, pCO₂
- ✗ Preoxygenate
- ✗ Disconnect ET tube from ventilator
- ✗ Reconnect for breathing, unstable BP or O₂
- ✗ After 10 minutes, draw ABG and reconnect
- ✗ Apnea confirmed by
 - + No respiratory movement
 - + Rise in pCO₂ to 60mmHg or
 - + 20mmHg above normal baseline

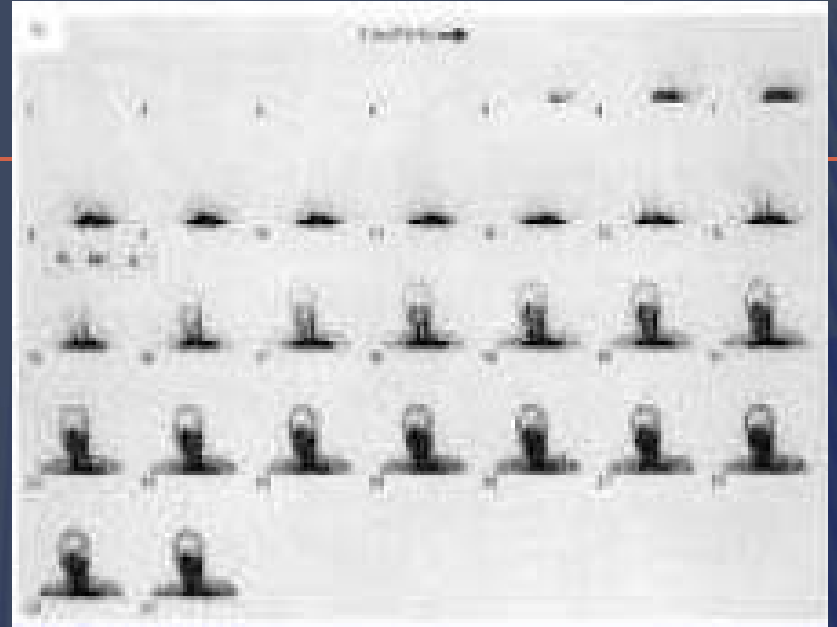


BRAIN DEATH: AN IN-HOUSE DIAGNOSIS

- × 2 exams needed, often separated in time
- × Apnea test requirement
- × Shock reversed
- × Drugs or alcohol metabolized
- × Temperature corrected
- × Cause reasonably determined

CONFIRMATORY TESTS

- × Confirm equivocal exams
- × Aid diagnosis where accurate or complete exam not possible
 - × severe facial trauma
 - × high spinal cord injury
- × Nuclear brain flow study
- × Cerebral angiogram



AFTER THE DIAGNOSIS

- × Preparation of family *before* the exam
- × Discussion with family after exam
 - + Understanding of brain death as death
- × Patient transferred to OPO service
 - + Maintenance of normal physiology
 - + Assessment of organ suitability
 - + Allocation
- × Organ Recovery...

ORGANS AVAILABLE FOR TRANSPLANTATION

- + Heart
- + Lung(s)
- + Liver
- + Kidney(s)
- + Pancreas
- + Small Intestine



Potential Lives Saved From 1 Organ Donor = 8

ORGAN RECOVERY IN DBD

- ✗ Up to 8 organs may be recovered
- ✗ In OR; Sterile procedure
- ✗ Organs flushed with solution
 - + Clear blood & metabolic waste
 - + Rapid cooling of tissues
 - + Preserve cell homeostasis until reperfused
- ✗ Organs removed with vessels/tissues
- ✗ Packaged sterilely in cold storage (ice) or machine perfusion (kidneys)



DCD:

ORGAN DONATION AFTER CARDIAC DEATH



DONATION AFTER CARDIAC DEATH

- × Donation after irreversible cessation of circulatory and respiratory function
 - + “usual” death
- × Method of organ donation prior to 1968
- × Process
 - + Candidate selection
 - + Life-sustaining interventions withheld
 - + Organs recovered after death pronounced

WHO IS ELIGIBLE FOR DCD?

- × Devastating non-recoverable condition
- × Mechanically ventilated
- × Likely to die within 60” of withdrawal of care
- × Legal next of kin and medical team decide (based on patient’s wishes) to withhold support: *Comfort Care*
- × *After* the decision for comfort care, OPO approaches family with donation option

WITHDRAWAL OF LIFE SUPPORT

- × In operating room (rarely, ICU)
- × Full support continues until withdrawal
- × Medical team accompanies patient
- × Patient prepped and draped in OR
- × Preparation
 - + heparin, steroids, bicarbonate, mannitol given

WITHDRAWAL OF LIFE SUPPORT

- × No member of transplant team present
- × Family *may* be present
- × Palliative care
 - + Fluids, drips, medications stopped
 - + Extubation
 - + Sedation and analgesic drips + PRN doses
- × Death pronounced
 - + EKG leads correct + apnea + coma + pulselessness by arterial line
 - + 5" nonperfusing rhythm: asystole, Vfib, PEA

60 MINUTES

- ✗ Death confirmed within 60 minutes allows organ recovery
- ✗ Depending on ischemia time
 - + Kidneys
 - + Liver
 - + Pancreas
 - + Lungs
- ✗ If >60", back to ICU

Criteria	Assigned points	Pt. score
Spontaneous respirations after 10 min.	-	
Rate >12	1	
Rate <12	3	
TV >200 cc	1	
TV <200 cc	3	
NIF >20	1	
NIF <20	3	
No spontaneous respirations	9	
BMI		
<25	1	
25-29	2	
>30	3	
Vasopressors		
No vasopressors	1	
Single vasopressor	2	
Multiple vasopressors	3	
Patient age		
0-30	1	
31-50	2	
51+	3	
Intubation		
Endotracheal tube	3	
Tracheostomy	1	
Oxygenation after 10 minutes		
O ₂ sat >90%	1	
O ₂ sat 80-89%	2	
O ₂ sat <79%	3	
Final score		
Date of extubation	Time of extubation	
Date of expiration	Time of expiration	
Total time		
Scoring: 8-12 High risk for continuing to breath after extubation 13-18 Moderate risk for continuing to breath after extubation 19-24 Low risk for continuing to breath after extubation		
Abbreviations: BMI, body mass index; NIF, negative inspiratory force; O ₂ sat, oxygen saturation; Pt, patient; TV, tidal volume. Reprinted with permission from the University of Wisconsin Hospitals and Clinics Authority.		

GOALS AND BEST PRACTICES

- × Best practices = effective practices
- × Goals set to define best practice and allow measurement and comparison
- × You treasure what you measure
- × Sharing data and ideas nationwide
 - + What are others doing to achieve results?
 - + How can we use those strategies at home?

BENCHMARKS

- × 100% referral rate
- × 100% appropriate requestor rate
- × 75% conversion rate
- × 3.75 organs transplanted per donor
- × $\geq 10\%$ of donors from DCD

REFERRAL RATE

- × Refer 100% of deaths and impending deaths
- × Timely referral is key
 - + Time to evaluate suitability, OPO/ clinician collaboration, prepare family, allocate organs
 - + Progression of brain death to somatic death
 - + Prolonged management of brain dead patients risks organ suitability

KEY TO TIMELY REFERRAL: TRIGGERS

To Comply With Hospital Policy, State & Federal Law
CALL WRTC ON EVERY DEATH OR IMMINENT DEATH
WASHINGTON REGIONAL TRANSPLANT CONSORTIUM
703-641-0100

Please call WRTC for a patient on mechanical ventilation and meeting any of the following triggers:

Glasgow Coma Scale of 5 or less with brain injury or non-traumatic SAH

Brain death testing to be initiated

Patient being made DNR or family considering comfort care measures

Life sustaining therapy to be withdrawn pursuant to the family's decision (Call PRIOR to D/C of Vent Support)

- ✗ Every death or imminent death
- ✗ Mechanical ventilation and any of:
 - + GCS ≤ 5 off sedation with traumatic brain injury or nontraumatic SAH
 - + brain death testing to be initiated
 - + patient made DNR or comfort care measures considered
 - + care to be withheld per wishes

THE REQUEST:

RIGHT PERSON AT THE RIGHT TIME

- × Family must understand brain death
- × Temporal dissociation between death discussion & donation discussion
- × No mention of donation before the formal request
- × Experienced and trained requestors (OPO) get more positive decisions

WHY NO MENTION OF DONATION?

- × Perceived conflict of interest
- × Donation suitability not known – false hope?
- × Family needs time to process death
- × Donor designation should be determined first
 - + family request vs. patient's wishes

DESIGNATED REQUESTORS

Inova Fairfax Hospital 2006

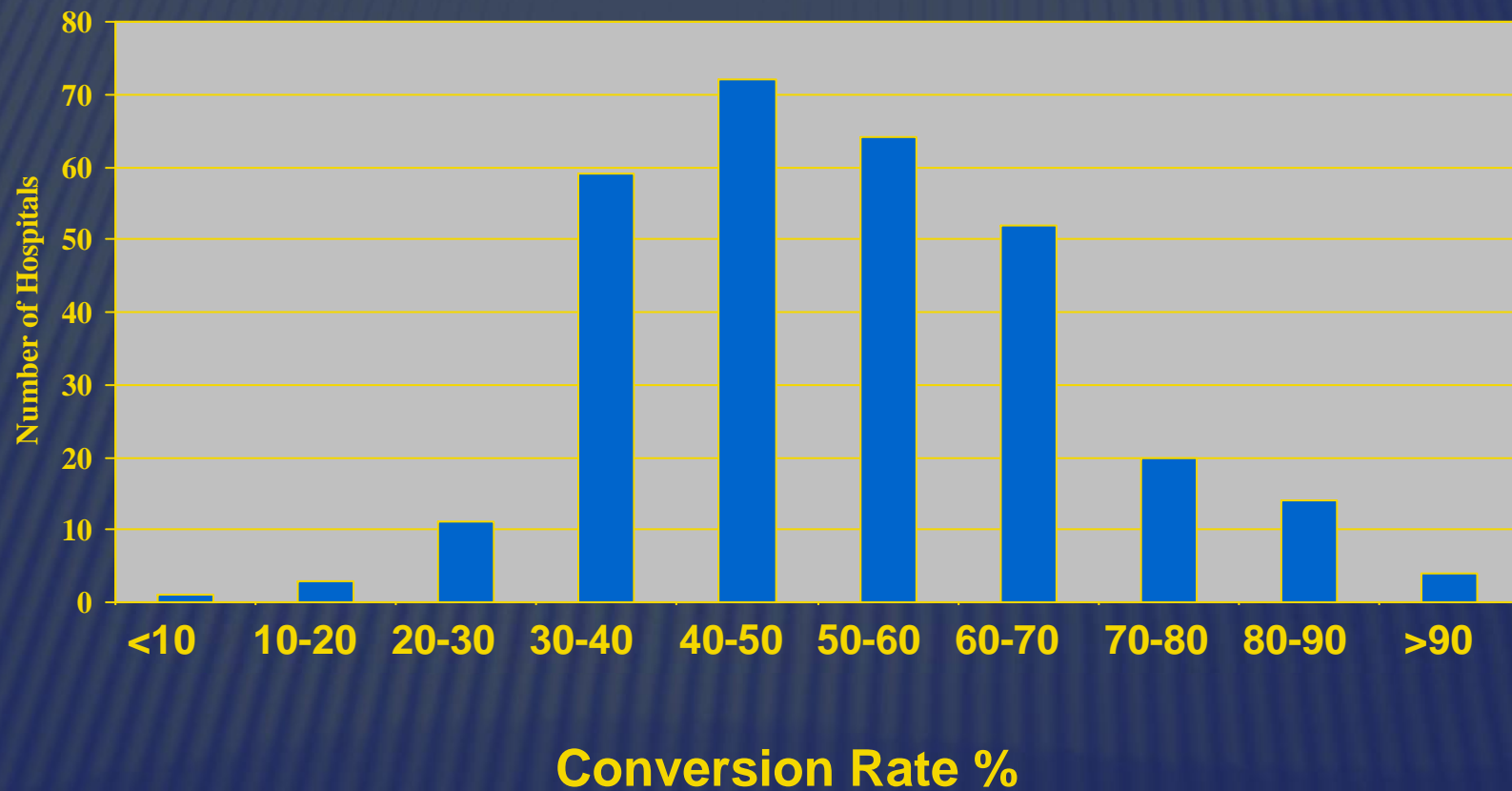
<u>Requestor</u>	<u>Success Rate</u>
Physician	25%
Other hospital staff	37.5%
All non-WRTC	30%
WRTC	66%

CONVERSION RATE

- × $CR = \#actual / \# \text{“eligible” organ donors}$
- × Core measure of success
- × 2003 WSJ/Harris poll: 63% Americans want their organs donated after death
- × National CR confirms majority opinion
- × Medical professionals work to provide this option for those who want it
- × An eye toward improvement

VARIATION IN DONATION CONVERSION RATES

Nation's 300 Largest Hospitals: 2003



ORGANS TRANSPLANTED PER DONOR

- × Potential 8 organs donated per BD donor
- × Want to maximize OTPD – but how?
- × Modifiable factors affecting organ suitability
 - + Ischemia
 - + Hypoxia
 - + Infection

MINIMUM 10% DCD RATE

- × Rate of DCD increasing
 - + 189 DCD donors in 2002
 - + 645 DCD donors in 2006
 - × 8% of all deceased donors

447 DCD donors in 2009*

**Jan – June alone*

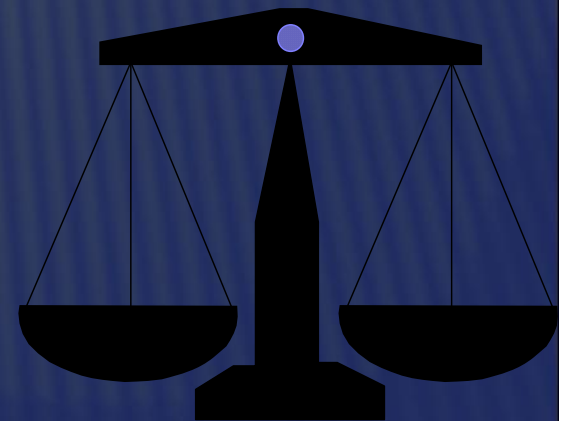
- × Concerted effort to increase DCD
 - + Triggers!
- × DCD policy made a Joint Commission standard in 2007

HOW ARE ORGANS ALLOCATED?

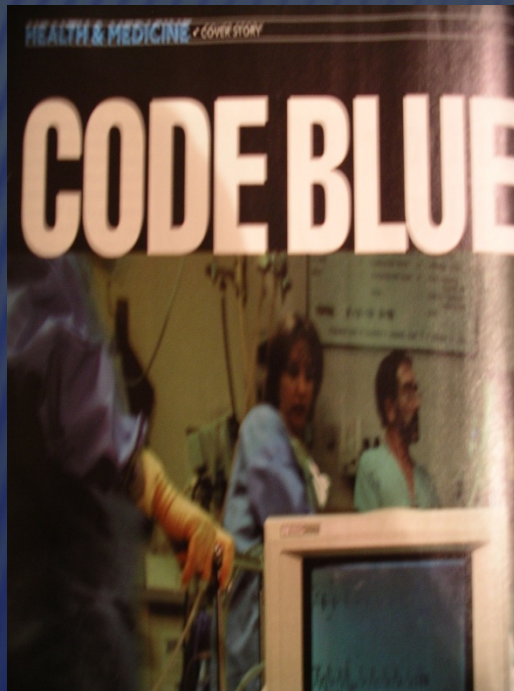
- ✗ Potential recipients are listed through United Network for Organ Sharing (UNOS).
- ✗ OPO generates lists for each potentially transplantable organ for each donor.
- ✗ Organs are offered based on the list.
 - + Local allocation
 - + Regional allocation
 - + National allocation

WHAT DETERMINES POSITION ON THE UNOS WAITING LIST?

- ✗ Organ allocation is based on three criteria:
 - + Medical urgency
 - + Medical match
 - ✗ Blood type
 - ✗ Height
 - ✗ Weight
 - + Time on the waiting list.



ROLE OF EMS IN THE ORGAN DONATION PROCESS



FROM THE FIELD TO THE ICU

How does treatment of 1 patient by pre-hospital providers enable multiple lives to be saved?

- ✗ Pre-hospital care directly influences the 2 main determinants of organ suitability
 - + Oxygenation and Perfusion
- ✗ Timely TBI resus = 2 good outcomes

EMS INFLUENCE ON DONATION OUTCOME

- × Does the patient you're treating want to be a donor?
- × Every response to a devastating "nonsurvivable" condition means you might be saving up to 8 lives
- × Not theoretical!
 - + 18 people die each day waiting for an organ transplant

EMS INFLUENCE ON DONATION OUTCOME

- × Shock resuscitation
- × Reverse/prevent hypothermia
- × Treating hypoglycemia
- × Short transport
- × Transport to appropriate facility for definitive care
- × Accurate documentation: timing of sedatives, narcotics, paralytics
- × Promoting education & public awareness



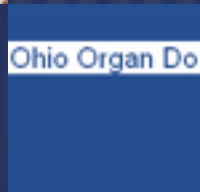
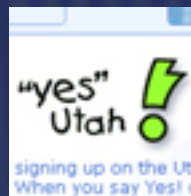
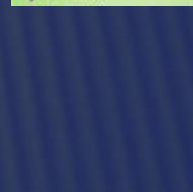
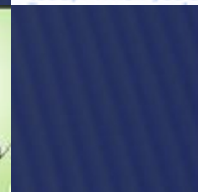
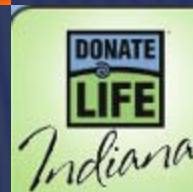
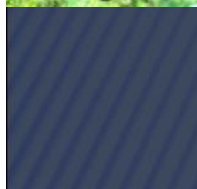
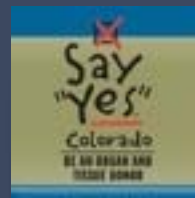
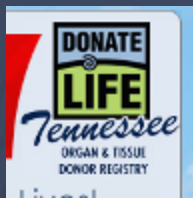
EMS INFLUENCE ON DONATION OUTCOME

Through organ donation,
resuscitation in seemingly futile cases
is *not* ultimately futile

- ✗ Does this benefit anyone but the organ recipients?
- ✗ Is thinking about donation potential a conflict of interest?



RAY OF HOPE



FIRST PERSON CONSENT

✗ Donor Designation

A documented, legally binding commitment by an individual to make an anatomical gift that can be revoked only by that individual

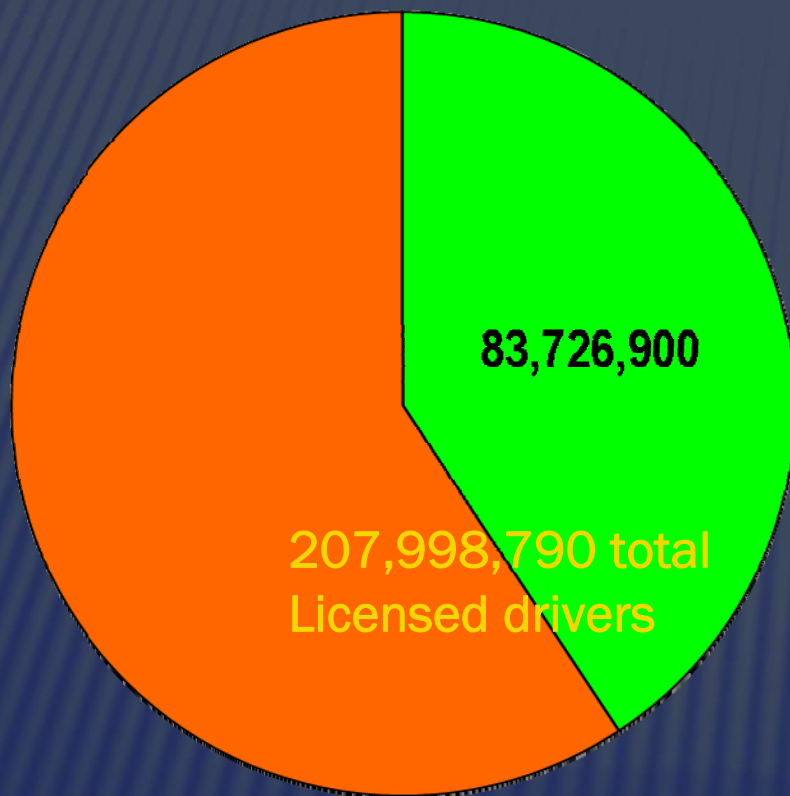
✗ Donor Designation Rate

The rate of increase in registered donors out of all new and renewing licensed drivers/IDs



NATIONWIDE DONOR DESIGNATIONS OF LICENSED DRIVERS

(50 STATES AND DISTRICT OF COLUMBIA)



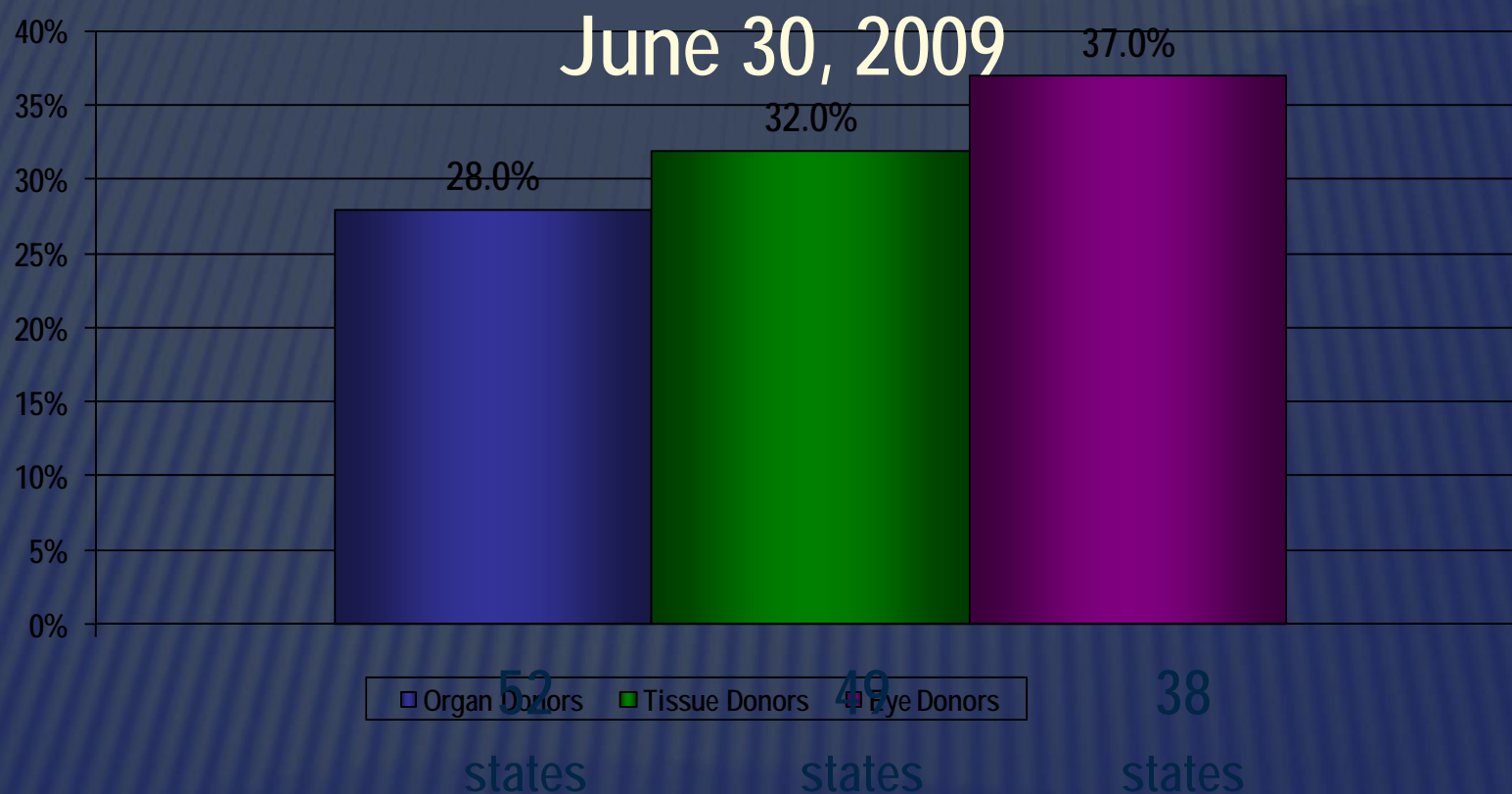
- 40.7%
- Goals: 100 million
50%

■ Designated
Donors

Period ending 6/30/09

NATIONAL IMPACT ON DONATION

Designated Donors as % of Recovered Donors



TOTAL DONOR DESIGNATIONS BY STATE

AS OF JUNE 30, 2009

8th

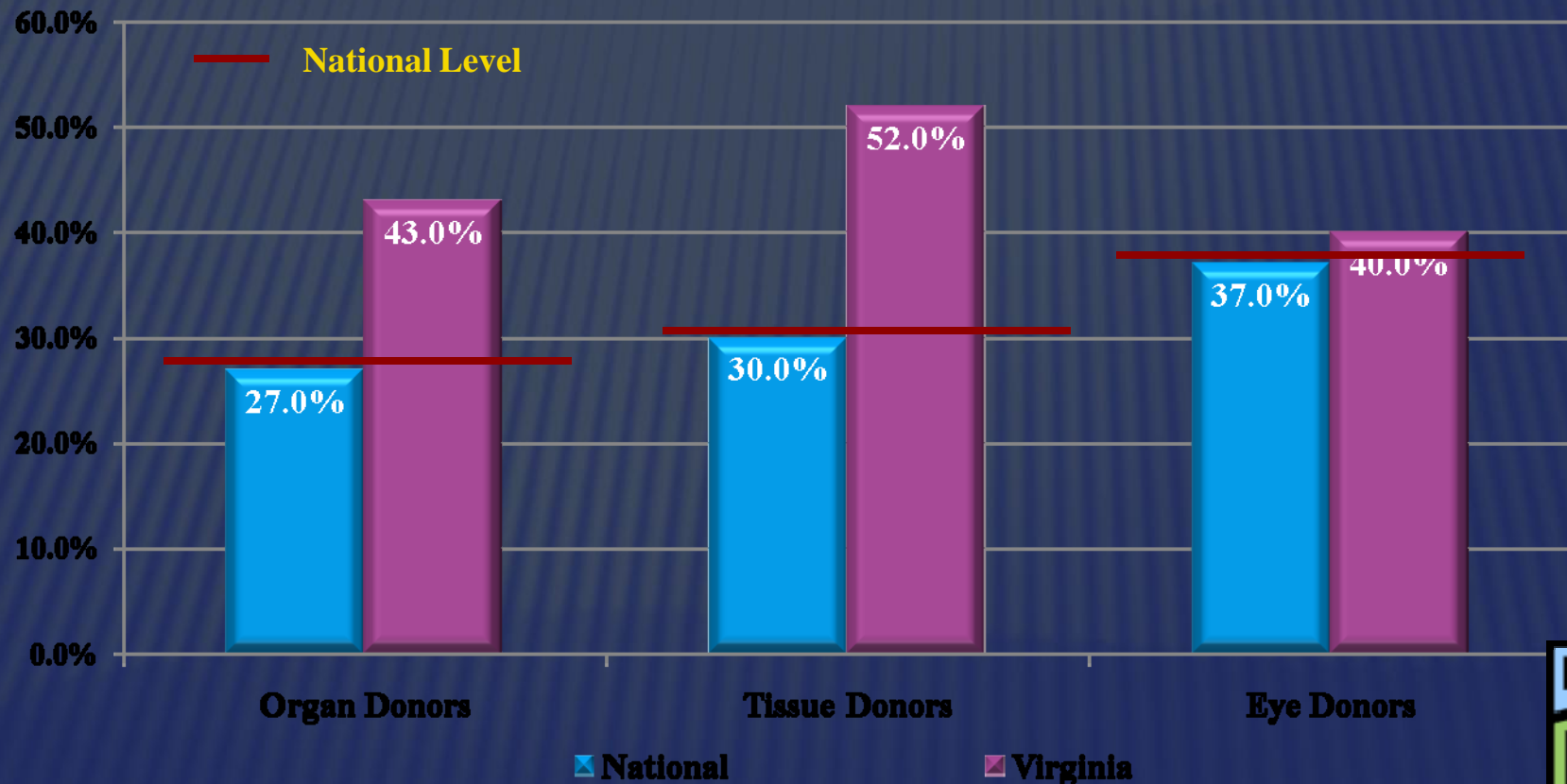
State	# Designated
FL	5,366,317
CA	5,104,371
OH	4,825,594
NC	4,644,663
IL	4,592,622
PA	4,187,410
GA	3,486,526
VA	3,371,730
WA	3,222,566
IN	3,190,000*

State	# Designated
MO	2,574,471
WI	2,338,600
MN	2,234,936
CO	2,200,000*
OR	2,044,017
MA	2,036,033
MD	2,000,000*
NJ	1,945,698
NY	1,808,180
LA	1,757,406

***Estimated**

NATIONAL VS VIRGINIA IMPACT

June 2009: National vs. Virginia
% of Recovered Donors from Save7lives Registry



DONOR DESIGNATION RATE BY STATE

Q2 2009

State	# Designated	ADL Issued	Desig Rate
AK	9,126	18,601	49%
IN	55,454	113,497	49%
SC	77,937	160,363	49%
PA	309,041	685,261	45%
NE	58,829	136,157	43%
HI	13,585	33,289	41%
OR	46,389	117,218	40%
CT	84,655	231,536	37%
MO	585,811	1,654,674	35%
DC	9,065	26,399	34%
VA	35,542	116,308	31%
TN	139,473	459,119	30%

20th

MYTHS & FACTS



MYTH OR FACT?

- ✗ If they know I am a registered donor, doctors won't do everything they could to save my life in the hospital.

MYTH!

MYTH OR FACT?

- ✗ If someone has hepatitis they can not be an organ donor.
- ✗ If someone has hepatitis, they can not receive an organ transplant.

MYTHS!

MYTH OR FACT?

- ✗ A lot of religions won't allow people to donate organs.

MYTH!

MYTH OR FACT?

- ✗ People who don't really want to donate are often coerced or pressured into donating organs.

MYTH!

MYTH OR FACT?

- ✗ Even if someone is a full organ donor, an open casket funeral is possible without obvious signs of a donation.

FACT!

MYTH OR FACT?

- ✗ The family of a donor will have to pay some substantial fees in order for their loved one to donate.

MYTH!

MYTH OR FACT?

- ✗ Sometimes fame or wealth can purchase someone a higher position on the organ donation waiting list.

MYTH!

MYTH OR FACT?

- ✗ Recipients will be told everything possible about their organ donor so that they know who gave them a second chance at life.

Trick Question...

BOTTOM LINE

Most people would opt for organ donation. Assume that your patients would.

From the moment medical intervention starts, you can deliver care that preserves the option of donation for patients and families in a time of tragedy.

Excellent pre-hospital and early acute care is the foundation of an excellent organ donation system!

THOUGHTS & QUESTIONS



save7lives.org

BeADonor.org