



Clinical Laboratories West Virginia University Hospitals

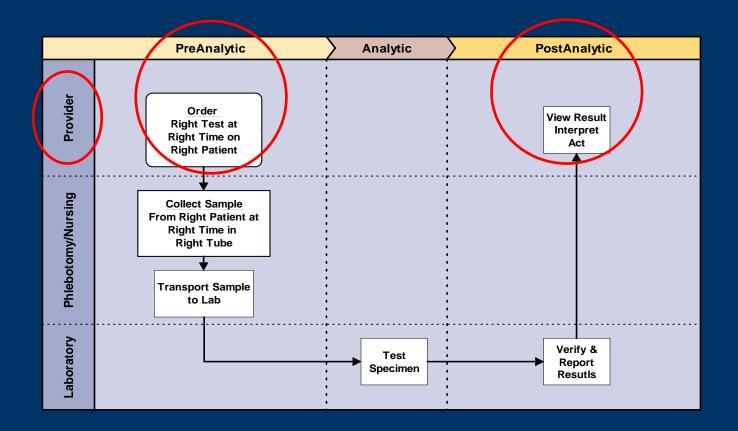
Resident Orientation

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> > **Revised June 2017**

Residents are IMPORTANT in Laboratory Testing Process



What were you taught about Lab Medicine in medical school?

Clinical Labs @ WVUH

24/7 Level 3 Ruby Staffed by supervisors, technologists, etc.

- Chemistry: Dr. Tacker
- Hematology & Coagulation: Dr. Esan
- Flow cytometry: Dr. Rosado
- Microbiology: Dr. LaSala
- Molecular Diagnostics: Dr. Smolkin
- Cytogenetics: Dr. Sasi
- Blood Bank: Dr. Perrotta

Problems are brought to supervisors & pathologists!

Regulatory Concerns

- Lab practice strictly regulated by federal (CMS, FDA) and other organizations (JC, CAP, AABB)
 – CLIA Medical Director = Dr. Perrotta
- MUST be a <u>computer-entered (written) order</u> for each test, and the test must be medically necessary
- Some tests require informed consent
 - Genetic tests
 - Blood transfusion
 - HIV no longer requires written consent

Technologists CANNOT deviate from policies/procedures without pathologist approval

Test Availability

- Tests needed for urgent care (& many others) are available 24/7
- Tests we don't do are sent to a reference lab far away
- Limited point-of-care testing

Testing Capabilities

- Chemistry & Hematology Automated Core
- Flow cytometry, FISH, cytogenetics
- Molecular (PCR): Many varieties
- Mass spectrometry
- MALDI-TOF Microbiology



Turnaround Times (TAT)

- <u>Routine</u>: < 4 hours (usually < 2 hours)
- "<u>STAT</u>": < 1 hour
 - 25-50% tests ordered "STAT"
 - Collected by unit/nurse
 - ED Tnl 30 minutes
- <u>Timed</u>
 - Collected 1 hour before or after time by phlebotomy

Routine priority for orders usually sufficient

Electronic Test Formulary

• Comprehensive

- Tests performed at WVUH
- Reference lab tests

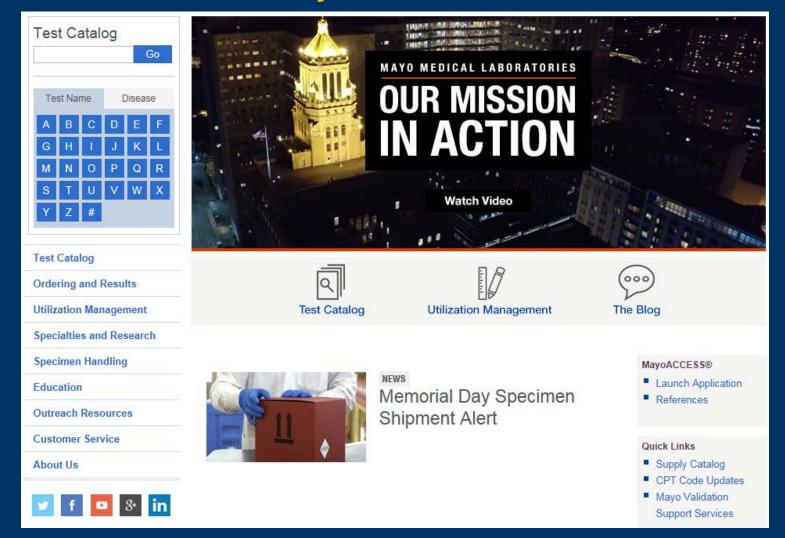
• Current/Accurate/Easily updated

- Includes educational material
 - Practice guidelines, algorithms, publications

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S	Т	U	V	W	X	West Virginia University Hospital, Inc. 1 Medical Center Drive	
Y	Ζ	#				Morgantown, WV 26506	
	ccredi CAP CLI/ CLI/ erson	Certi A Certi A Certi	ficate			Overview West Virginia University Hospitals (WVUH) Laboratories provides comprehensive Clinical Laboratory an Anatomic Pathology Services. We offer an extensive testing menu that assists healthcare providers in diagnosing and treating patients within WVU Healthcare and in the surrounding region. The majority of pa testing is performed in the highly automated, state-of-the-art chemistry and hematology core laboratori located within Ruby Memorial Hospital. More specialized testing is performed on-site in the molecular diagnostics, flow cytometry, cytogenetics, and mass spectrometry laboratories.	itient ies
• P U L	eques olicies inivers aborat	-West ity Ho tories	spital	s (WV		The Laboratories are fully accredited by the College of American Pathologists, The Joint Commission, th American Association of Blood Banks and a number of other federal, national and state specialty regulat bodies. Extensive internal and external quality assurance programs are maintained to assure high-quali patient testing.	ory
• S	• WVI Tesi pecim repara	t List en Co				Pathologists are available at all times to assist health care practitioners with unusual or difficult testing situations. The Department of Pathology is staffed by pathologists with training and certification in mar specialized areas including Hematology, Microbiology, Transfusion Medicine, Clinical Chemistry, Cytolog Neuropathology, and Forensics. The Department is also responsible for training Pathology residents an clinical laboratory science students.	ny gy,

http://wvuh.testcatalog.org/

Mayo Medical Labs is our Primary Reference Lab



Hyperlinks to Mayo website in Epic

Test Order Entry

Priorities & Frequencies

	TIBODY SCREEN WITH REFLEX TO HCV PCR lay at 1342 Until Specified, Unit Collect	
Priority:	STAT P Routine STAT	
Frequency:	ONE TIME For: Image: Occurrences O Hours O Days O Weeks Starting: 4/26/2015 Image: Today Tomorrow First Include Now As Scheduled Occurrence: Include Now As Scheduled First Occurrence: Totay 1342 Until Specified Image: There are no scheduled times based on the current order parameters.	
Class: Reference	Unit Collect Phlebotomy Rounds Unit Collect System Default 1. Ruby Lab Manual	
Links: Comments (F6	6): <u>Click to add text</u> Hyperlinks	
	Don't use "Comments"	
🕕 <u>N</u> ext Required	Link Order	



Lab Collect Times



- <u>AM Draw (0530)</u>
 - Results available early to mid-morning

• AFTERNOON Draw (1600)

- Results available later afternoon later afternoon

• NIGHT Draw (2200)

Results available around midnight

Best Practice Alerts & Pop-ups

BestPractice Advisory - Orders, Becca

Important (1 Advisory)

This test has been performed and resulted as negative within the past 7 days. Alternative etiologies of diarrhea should be considered. Test methods in use at WVUH have high negative predictive value; and, review of internal data has confirmed the low yield of repeat testing for C. difficile within a 7 day period. Last CDIFFTOX=negative on 9/12/2013

BestPractice Advisory - Orders, Becca

Important (2 Advisories)

This test has been performed and reported as positive within the past 14 days. Please do NOT continue placing order for C DIFFICILE DETECTION. Current guidelines recommend against testing for cure; and, recurrent disease cannot be confirmed or excluded based upon repeat testing during this time interval. Last CDIFFTOX=POSITIVE on 9/13/2013

BestPractice Advisory - Wvuhrxmaster, Colleen

1 Testing for Clostridium difficile is not recommended in this patient due to recent laxative use. Most patients infected with this organism experience diarrhea and do not require laxatives.

We are sensitive to pop-up fatigue and limit whenever possible

Duplicate Testing (includes duplicate alerts)

- Providers pressured to improve diabetes care lead to increased duplicate HbA1c testing (up to 10% for inpatients)
- Limit every 3 months (per physiology & Medicare)
- Coordinated effort to decrease to <1% duplicates:
 - Alerts: Appeared more effective when embed previous results
 - Phlebotomy: Combining orders
 - Diabetes care managers

	OBIN A1C WITH EST AVG GLU rst occurrence Today at 1430, Syst			_	<u>A</u> ccept	<u>C</u> ancel
Priority:	Routine 🔎 Routine STA	T				
Frequency:		ETIME				
	Starting: 11/8/2013 Today	Tomorrow At: 1430				
	First Occurrence: Today 1430					
	Scheduled Times: Hide Schedul	e				
	11/8/13 1430					
Class:	System Def: Phlebotomy R	ounds Unit Collect System Default				
Reference Links:	1. Ruby Lab Manual					
Comments (F6)	Click to add text					
Last Resulted:	Order #87983059	Component	Value	Units	Flag	
	Ordered: 11/6/13 9:16 AM	1. HEMOGLOBIN A1C	5.0	%		
	Resulted: 11/6/13 11:03 AM Collected: 11/6/13 1:30 AM	2. ESTIMATED AVERAGE GLUCOSE	97	mg/dL		
	Collected. 11/0/13 1.30 AM					

Test Formulary Can Help Select the Correct Test

	🛃 Preference List Search - Bullock	,Sandra		
	HYDROXYVIT	Search	<u>B</u> rowse (F4) <u>P</u> reference List (F5) <u>F</u> acility List (F6) <u>D</u> atabase Lookup (F7
	🗹 🦨 During visit 🛛 🔲 🟠 After vis	sit	Medications 🗹	P <u>r</u> ocedures 🔽 Order Panels 🔲 Split
	Code	Name		Pref List
Right	LAB3041219 LAB536	VITAMIN D, SERUM (25 HYDROXYVITAMIN D2 VITAMIN D: 1.25 HYDROXYVITAMIN D	AND D3 BY MS)	WVU IP FACILITY PROCEDURE F WVU IP FACILITY PROCEDURE F
test 1 st				WOILTACIENTINOCEDOILET
	Alternative Selection			
		OXYVITAMIN D: STAT, starting		cified, Collected, This test is
		nts with renal failure and hyperc		
Real-time		VITAMIN D test is RARELY indicated for se nptomatic calcium imbalance in absence of othe	acci pauciii populations 📄 👘 🚥	Links additional information.
Information		droxylase or end-organ resistance to 1,25-dihydr		
	For ROUTINE vitamin D testin	g, select the order below.		
Reduce user			v	
burden	Alternative	Details		Cost
			ONE TIME, Starting 4/29/15, Systen	

Ordersets & Preference Lists

- We have too many
- Poorly controlled
- Some labs "autochecked"

	ALL MEALO, Otarting today
LABS	
LABS	
CBC/DIFF	STAT, ONE TIME For 1 Occurrences, Collected
PT/INR	STAT, ONE TIME For 1 Occurrences, Collected
PTT (PARTIAL THROMBOPLASTIN TIME)	STAT, ONE TIME For 1 Occurrences, Collected
BUN	STAT, ONE TIME For 1 Occurrences, Collected
CREATININE	STAT, ONE TIME For 1 Occurrences, Collected
ETHANOL, SERUM	STAT, ONE TIME For 1 Occurrences, Collected
☑ TYPE AND SCREEN	STAT, ONE TIME For 1 Occurrences, Collected, Specimens for type and sceen are only good for three days. Please call blood bank at 74239 to see if there is a current specimen in lab, if so, do not draw this lab and discontinue the order. If over three days, please draw specimen. If you need further instructions, refer to the Laboratory Manual.
URINALYSIS	STAT, ONE TIME For 1 Occurrences, Unit Collect, Urine, This test includes ONLY a MACROSCOPIC urinalysis. A microscopic analysis will NOT be performed.
DRUG SCREEN, HIGH OPIATE CUTOFF, WITHOUT CONFIRMATION, URINE	STAT, ONE TIME For 1 Occurrences, Unit Collect, Urine
VENOUS BLOOD GAS/COOX/LYTES/LAC	Routine, ONE TIME, Starting today For 1 Occurrences, Collected Type of Specimen: Venous
ARTERIAL BLOOD GAS/COOX/LYTES/LAC	STAT, ONE TIME, Starting today For 1 Occurrences, Collected Type of Specimen: Arterial
SERUM PREGNANCY TEST	
HCG, SERUM QUANTITATIVE, PREGNANCY	STAT, ONE TIME, Starting today For 1 Occurrences, Collected, This is a sensitive quantitative test used to diagnose pregnancy, investigate suspected ectopic pregnancy, and to monitor invitro fertilization patients. For tumor marker testing please order LAB3041228 (HCG, SERUM QUANTITATIVE, TUMOR MARKER)

Test Result Review

	Results Review (Last refresh: 5/31/20		1	_			1			(11-11) (11-1	Resize
Patient Summary	🗘 🔁 Back 🛋 Eorward 🛛 🚰 View 👻 🖬 H	ide Tree 🗧 🔁 R <u>e</u> f Range	Load <u>A</u> II	Flo	wsheet 🔛	Graph	Time N	lar <u>k</u> 🙆 <u>R</u> efresh		Lege <u>n</u> d 🚝	<u>O</u> ptio
Chart Review	Search:	Hide data prior to:	9/3/2004	P	Use Date F	lange	Wizard				
Results Review	ALL TOPICS		5		4		3	2		1	j
Synopsis	e-LABORATORY RESULTS		5/30/2011 0816		5/30/2011 1357		5/30/2011 2022	5/31/2011 0032		5/31/2011 0319	
Problem List	HEMATOLOGY-BLOOD	CHEM 1									
Allergies	E CHEMISTRY-BLOOD	SODIUM	140		141			140			
	BLOOD BANK TESTS	POTASSIUM	3.3	!-	3.8	2006		4.0	2156		
History	B. IMMUNOLOGY-BLOOD B. TUMOR MARKERS	CHLORIDE	115	14	116	1-		118	1*		
Immunizations		CARBON DIOXIDE	16	!-	17	!-		17	!-		
	BESPIBATORY	BUN	55	1-	50	1-		44	1-		
Demographics	B-MICROBIOLOGY	CREATININE	8.10	14	7.45	1*		6.70	1*		
en e	B REFERENCE SPECIMENS	GLUCOSE,NONFAST	107 *		116 *			134 *			
Order Set	B POINT OF CARE TESTS	ANION GAP	10		9			7			
Order Entry	ADIOLOGY/IMAGING	BUN/CREAT RATIO	7	-	7			7			
	B GENERAL DIAGNOSTIC	ESTIMATED GLOME	7*	1-	7*	1-		8*	1-		
Navigators	B CT SCAN	CALCIUM	6.7 *	-	6.7*	-		6.7 *	-		
Meds Review	B- ULTRASOUND	MAGNESIUM	1.2	!-	1.2	!-		1.9	_		
moderion	B NUCLEAR MED	PHOSPHORUS	2.9 *		2.6 *	_		3.4 *			
MAR	■ PET/CT	CARDIAC MARKERS									
more		TROPONIN-I	!! ≏ 0.313 *	11*	0.268 *	<u> 11-</u>	0.227 *	11 *	_	0.222 *	
Doc Flowsheets		ANTIBIOTICS									
Intake/Output		VANCOMYCIN			7.7	1					
Constant of the second s	- OTHERS										
Images	- MISC PATIENT INFO										
Notes	PATIENT NUMBER										
Images Notes	MISC PATIENT INFO										
	Flags										
	👭 Critical	🕴 Abnorm	al		2	Hig	h Off-Sca	le			
	II- Low Critical	! ↓ Low			7	Oth					
	👫 High Critical	! 🕈 High			p	pre	liminary				
	😼 In Process	🔻 Low Off	-Scale		C	cha	inged				

House staff are *critical* in the Post-analytical testing phase

- Results must be retrieved and acted upon
- <u>Critical results ("panic values"</u>) are phoned to you & require *immediate action* (if you are not sure what to do, ask!)

– "<u>Readback</u>" required by JC

 Unexpected/unexplained results may need confirmation

> Let the lab know if you think there is a problem with a result!

Laboratory Resource Utilization "Testing Wisely"

- Lab testing ~5% cost of healthcare
- Routine labs relatively inexpensive *per test* but costs add up
 - Does every patient need large # daily labs?
 - Option to order daily labs (e.g. "daily x 7 days") has been removed
 - PT/INRs can be ordered daily x7 days
 - Troponin Q4h x2 or x3
- No more CK-MB testing for myocardial injury
- Some tests only needed once (genetic, \$\$\$)
- Some tests are limited to outpatients & specialists

Blood Utilization



- Use of RBCs, platelets, FFP, factors is monitored by the Blood Utilization Committee
- Blood components are a finite resource (and very expensive)
- Recognize transfusion reactions
 - Transfusion Manual online
- Hemolytic transfusion reactions are caused by giving the wrong blood to the wrong patient

Transfusion Medicine

- We use apheresis platelets: An adult dose of platelets is "1 dose" (not 2, 3, 6, 10, etc)
- Order irradiated blood products appropriately

 NOT every patient with cancer
- We won't accept mislabeled specimens
- We have policies for emergency blood release
- We have a massive transfusion protocol

LABORATORY SERVICES

Blood Bank/Transfusion Services

Bone Marrow Processing Laboratory Manual

Contact Us

Clinician Resources

Lab Employee Resources

Lab Manual

Laboratory Policies

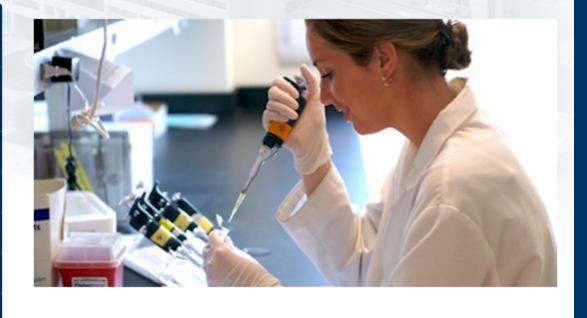
Point of Care Testing

Quality and Performance Improvement

Research Protocol Support

Staff Directory

Test Catalog



S

Laboratory Services provides comprehensive laboratory testing for WVU Healthcare patients. The department also serves regional healthcare providers through University Medical Laboratories. A wide variety of routine and specialized tests are performed in the labs – tests that are used to help diagnose disease and guide treatment.

The labs are staffed by professionals trained in laboratory sciences and by pathologists from the WVU Department of Pathology.



Laboratory Concerns

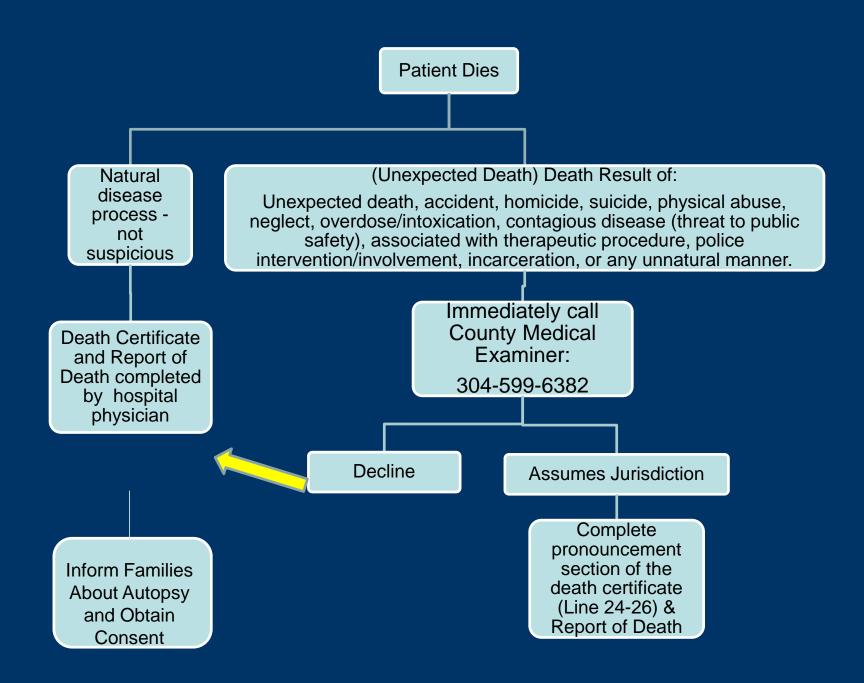
- Direct to supervisors and/or Medical Directors – We take MD complaints/concerns VERY SERIOUSLY
- Pathology residents and attendings on call 24/7 for both Anatomic & Clinical Pathology
- We are always happy to help with test selection, test interpretation, etc.

Autopsy Tid Bits

Why do we perform autopsies? Who gets an autopsy? When should an autopsy be performed? What needs to be completed prior to autopsy? How to fill out a death certificate?

Importance of Autopsies

- Provides information to families, clinicians, public, etc.
 - Inheritable, preventable, infectious disease
- Establish a cause of death or document clinical suspicions/findings
- Pathology residents *require* 50 autopsies to sit for boards
- Medical student, resident, PA student, and other field education
- Research
- No charge to WVUH hospital patients (yes, FREE)
 If they have ever been seen here



W			
WVUHealthcare			
WEED Hampitals and the versity Head & Association			
Morgantown, WV 26506			
AUTOPSY CONSENT			
NS-034			
CNSTS (R12/11)			
DATE://			
Autopsy Consent for (Name of deceased):			
Date of Birth://	Date of Death:	1	1

I centry that I have the legal right to authorize an autopy and/or dispose of the body of the decedent as next-of-kin according to West. Virginia Statute. The complete autopy report is part of the permanent medical record and must be obtained from the WVUH Medical Records Department. My relationship to the deceased is (PIEASE INITIAL ONLY ONE):

medical power of attorney representative

2) surviving spouse of the deceased

IF THERE IS NO MEDICAL POWER OF ATTORNEY REPRESENTATIVE (N.B. COMMON LAW MARRIAGES ARE NOT RECONGIZED BY WEST VIRGINIA AND SPOUSE IS CONSIDERED NEXT OF KIN EVEN AFTER PROTRACTED LEGAL SEPARATION).

3) child of the deceased over the age of 18

IF THERE IS NO MEDICAL POWER OF ATTORNEY REPRESENTATIVE OR SURVIVING SPOUSE. HOWEVER THE CHILD'S PERMISSION SHALL NOT BE VALID IF ANY OTHER CHILD OF THE DECEASED OVER THE AFE OF 18 OBJECTS PRIOR TO SAID AUTOPSY AND OBJECTION SHALL BE MADE KNOWN IN WRITING TO THE PHYSICIAN WHO IS TO PERFORM THE AUTOPSY.

parent of the deceased

IF THERE IS NO MEDICAL POWER OF ATTORNEY NOR SURVIVING SPOUSE NOR ADULT CHILD OF THE DECEASED.

5) health care surrogate

IF THERE IS NO MEDICAL POWER OF ATTORNEY NOR SURVIVING SPOUSE NOR ADULT CHILD OF THE DECEASED AND ONE IS APPOINTED.

_____6) the duly appointed and acting fiduciary of the estate

IF THERE IS NO MEDICAL POWER OF ATTORNEY NOR SURVIVING SPOUSE NOR ADULT CHILD OF THE DECEASED NOR PATENT OF THE DECEASED NOR HEALTH CARE SURROGATE.

____7) the person, firm, corporation or agency legally responsible for the financial obligation incurred in disposing the body of the deceased.

IF THERE IS NO MEDICAL POWER OF ATTORNEY NOR SURVIVING SPOUSE NOR ADULT CHILD OF THE DECEEASED NOR PARENT OF THE DECEASED NOR HEALTH CARER SURROGATE NOR DULY APPOINTED AND ACTING FIDUCIARY OF THE ESTATE.

IN THE EVENT THAT THE MEDICAL POWER OF ATTORNEY REPRESENTATIVE, THE SPOUSE, CHILD, PARENT OR HEALTH CARE SURROGATE OF THE DECEASED IS MENTALLY INCOMPENENT, THE PERSON AUTHORIZED TO CONSENT TO SUCH AUTOPSY SHALL BE THE NEXT IN THE ORDER OF PRIORITY AS ABOVE DEFINED, BROTHERS AND SISTERS OF THE DECEASED ARE NOT RECOGNIZED SPECIFICALLY IN THE WEST VIRGINIA STATUTE FOR LEGAL AUTHORIZATION OF AN AUTOPSY.

CONTINUED ON NEXT PAGE

Autopsy Consent for (Name of deceased):

In order to verify the cause of death and to aid in the diagnosis and treatment of other persons, I, the undersigned, request and permit the physician (s) authorized by the hospital to perform a (PLEASE INTIAL ONLY ONE):

 1) Complete autopsy
2) Examination limited to (Please specify)
 3) Restrictions (Please specify)

I authorize the presence of such other persons as the physician(s) and their discretion, permission to use the autopsy as an education resource. As to any tissue, body part, fluids or organs ("specimens") removed during or incidental to the autopsy, I authorize the physician(s) and/or WVUH to retain. Preserve and/or dispose for such tissues according to hospital policy for diagnosis, teaching, and/or research with the following exceptions: _______, as they may deem proper.

Name

Address

Tal	nhono	
Ten	epnone	

Signature: ______ Date/Time: ______ (Signature of person authorizing the autopsy)

WITNESSES

This was signed in my presence (or I have received faxed, telegraphic or verified telephonic or other verbal authorization) after complete disclosure and explanation of this document.

Verified telephone consent to AUTOPSY (ch	neck one)	YE\$NO
Signature of person and/or physician Obtaining consent	Pager #	Signature of Witness
Printed name of person obtaining consent	-	Printed name of Witness
		Date: Time:

Instructions: To be valid, this document 1) must be dated, 2) must be signed by the person authorizing autopsy, 3) must be signed by the person and/or physician obtaining permission, AND 4) signed by witness.

WEST VIRGINIA DEPARTMENT OF HEALTH AND HUMAN RESOURCES BUREAU FOR PUBLIC HEALTH - VITAL REGISTRATION PHYSICIAN'S/MEDICAL EXAMINER'S CERTIFICATE OF DEATH 350 CAPITOL STREET, ROOM 165, CHARLESTON, WV 25301

													RILE NUMBER
IN PERMANENT BLACK INC	1. DECEDENT'S NAME (First, M	odle, Last)								2. SEX	3. DATE	OF DEJON AN	enth, Daye Yaway
	4. SOCIAL SECURITY MUMBER	Sa. AGE-La (Mart)	ut Bitthday	Store La	NDER 1 YEAR	Hours	Se. UNDER 1	DAY	6. DATE OF DATE OF	BIETTH Adoreth,	7. BARTH Form	PLACE (City a pr Country)	nd State or
DECEDENT	8. WHIS DECEDENT EVER IN U.S ARMED FOROEST (Hear No) Rb. FACULTY NAME (If not install		11.00	siert [] BYDupan		ICA STH		ner ave Jastus neing Home CATION OF E	dons on other sk	and the second second	er (Specify)	XINTY OF DEATH
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INFORMANT	194. INFORMANT'S NAME (Upper	Pitriq			19b. MAELDK	ADDRESS (lowed and Nuc	nber of Runal	Route Numbe	er, City or Town, S	Rami, Zip Code	Ø	
		C Removal I	tom State	200. FLA	CE OF DISPOS In place)	STICH (Natio	of camelery, a	cravaetory; or		20c. LOGATION	I-City or Taxe	n, State	
DISPOSITION	Donation Other (Spec 21. SIGNATURE OF FUMERAL SE PERSON ACTING AS SUCH	rm Fince licensee	OR					22. NAME	AND ADORE	SS OF FACILITY			
	•			vietos de	eth occumed at	The time, dat	and place n	fulled.				235. 047	ESIGNED
PRONOUNCING Physician only	Complete thema 23a-b only when certifying physician is not available at time of death to certify cause of death	Signature an	er 1200 🕨									Allo	ith, Days, Maary
ITEMS 24-26 MUST BE COMPLETED BY, PERSON WHO PRONOLINCES DEA	24. TIME OF DEATH	25. DATE PR	ROWCUNCED	DEAD (Mon	et, Dey, Yber)			ć	28.	WAS CASE REFE	EVALED TO ME	DICAL EXAMIN	ERICORONERT
1	27, PART L Enter the dissecon, i one cause on each line.	njuries, or compile	ctione that cla	and the de	neth. Do do not	enter the mo	de al dylog, e	with as cards	sc er næpilæ	rty arrest, shock,	or heart failur	e. List only	Approximale interv Between Onest an Death
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	Sequentially list conditions, If any, leading to immediate cause. Enter UNDERUTING CAUSE (decare influty that initiated events meuting in death) LAST	1-	DUE TO)	DRASAO	ONSEQUENCE	09:							
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FORM VS-002 (Rev. 5/2016)

Questions???

- ANY questions, concerns, issues, regarding autopsy consent forms, family inquiries, death certificates, what should get called into the medical examiner, etc.
- FEEL FREE TO CONTACT THE AUTOPSY SERVICE
 - Morgue: 285-7095 (M-F 7:30a-4:30p)
 - Pathology resident on call (24/7)
 - My office: 293-9789
 - jadeltondo@hsc.wvu.edu

Please feel free to contact myself or any of the other pathologists

We look forward to working with you at WVUH

Thank you and Good Luck!