

Intro to Carpenter

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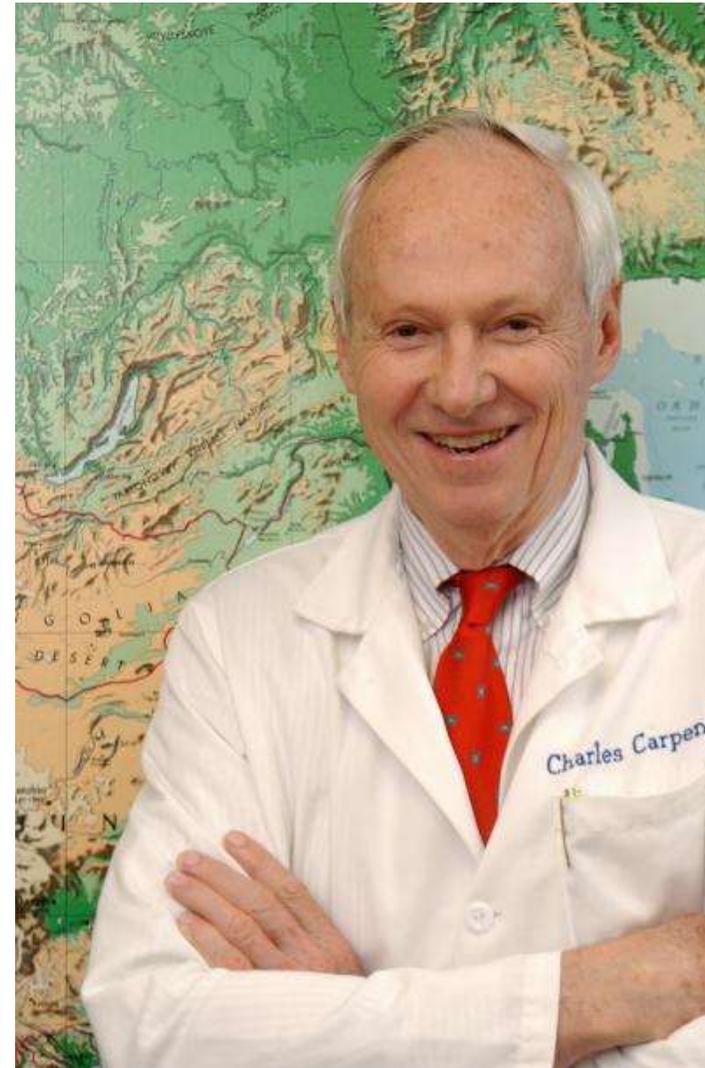
Med-Peds PGY-4

7/16/18

Dr. Charles Carpenter

- After completing his residency at Johns Hopkins Hospital, he began his career in international health in Kolkata, India, during a Cholera epidemic and became the director of the division of allergy and infectious diseases at Hopkins.
- He moved to Ohio in 1973, where he served as the department of medicine chair until 1986, and was a leading figure in the department of ID here, continuing his passion for international health.
- He is currently chair of the department of medicine at Brown.

*All credit to Nate Summers on this slide



The Setting and Cast

- Patients:
 - Complicated infectious reasons for admit (epidural abscess, fungal, FUO)
 - HIV patients who do not have a serious other primary pathology (ESRD, ADHF)
- Attendings:
 - ID or some are Pulm-Crit care trained but all very focused on ID
- Fellow:
 - Sometimes!
- Lerner Tower 8
 - Nurses are used to ID concerns and protocols
 - Care Coordinator and Social Work are used to the nature of ID, PICC lines, etc

Learning Objectives for this talk

- How to structure thinking about Infectious Diseases
 - Note: NOT a review of all ID content—other lectures will cover ABX, etc
- Apply that structure to a few cases
- Understand the setting and resources at UH, esp specific to Carpenter
- Learn new tools to help you accelerate your learning and practice

Let's warm up with a case

- 40yo woman being admitted for rapidly-spreading erythema on arm
- ED report states “bug bites several days ago, now 2d feeling feverish and the redness has spread far up her arm”

How to think about an ID case

Important Factors

- Host Factors
 - Immune status: HIV, DM, ESRD?
 - Hardware (lines, devices)
- Syndrome
 - Source of infection
 - Results of infection
- Common Bugs
 - What bugs do you expect?
 - Any reason for resistance?
- Drugs / Management
 - ABX or procedure to accomplish
 - With timing / duration

How to Gain Information

- History and Physical
 - Direction, usually most of a Dx
- Social History is key
 - Pets, travel, job, TB risk factors, Drug history (beyond IVDU)
- Recent Abx
 - What, when, duration, adherence
- Cultures—prep for success
- Prior infections
 - What does the patient know?
 - What does the EMR know?

Cellulitis

- Host:
 - Why do they have it? (prone to skin disease, injury, IVDU, DM etc)
- Source
 - Is it True Cellulitis? (vs venous stasis, allergy, CHF, edema, burn?)
- Environment
 - Where is the patient coming from? (Home, SNF, LTAC, Hospital, Travel, Homeless?)
- Resistance
 - MRSA risk factors?, Pseudomonas?
- Weird:
 - Animal Bite, hiking, woods, tick born illness, IVDU, etc
- Bugs:
 - Staph, Strep

Diagnostic Clues...

- Strep
 - More rapid onset
 - Rapid response to beta-lactams
 - No purulence

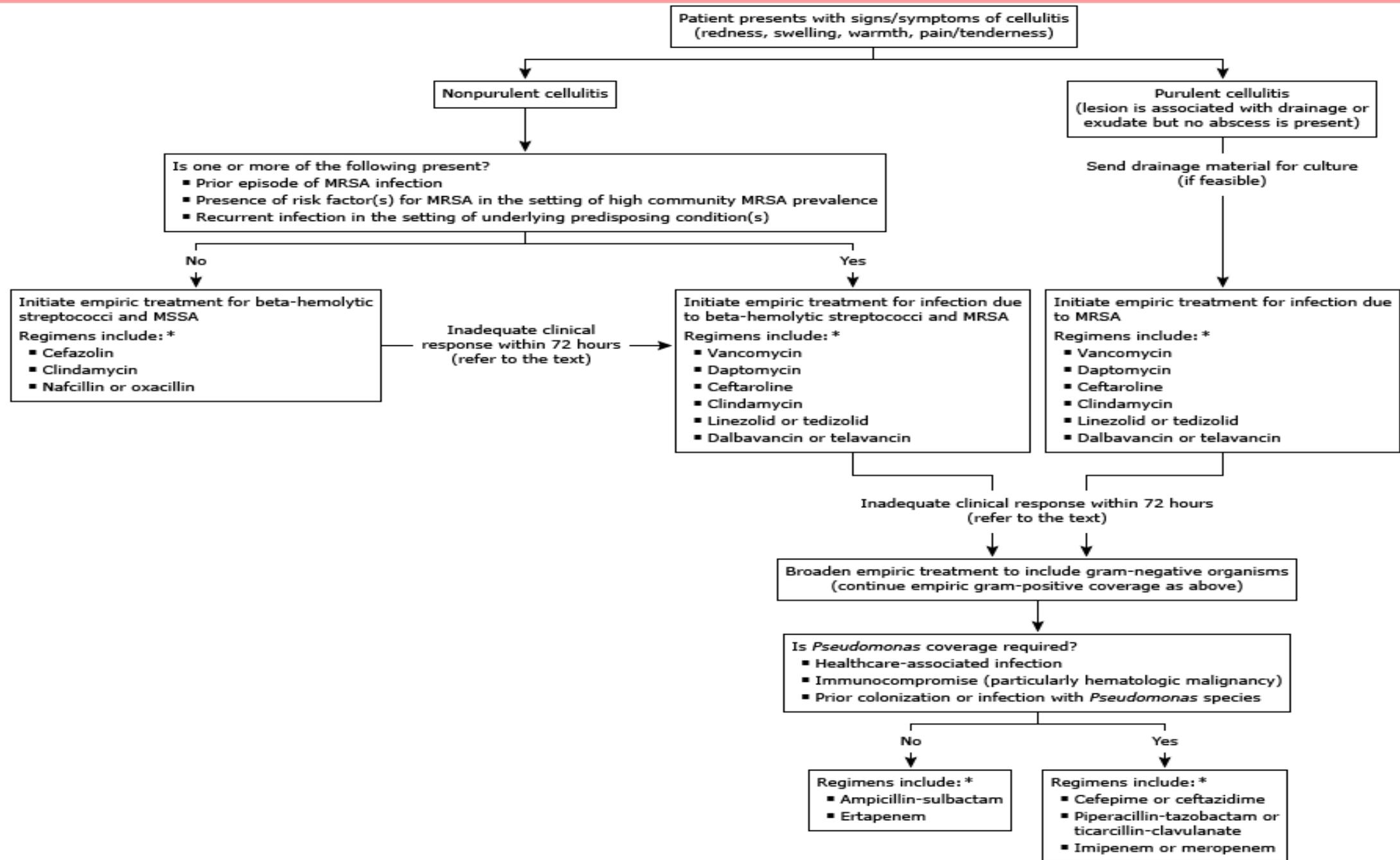


➤ Staph

- Often purulent
- May form abscesses
- Often multiple



Thanks to Nate Summers for the slide!



Next Case...

- 55yo patient w/ rapidly-spreading erythema on arm
 - ...and extensive Hx of IV drug use, with 3d shaking chills
 - Exam demonstrates significant new systolic murmur
 - One culture drawn in ED just before ABX
 - What's the best kind of culture?

Endocarditis

- Host:
 - Why do they have it?
 - IVDU, underlying infection, heart valve disease, prosthetic valve?
- Source
 - Where is the infection coming from
 - Skin, GI, abscess, GU etc
- Environment
 - Any reason to expect Resistance, e.g. MRSA, VRE?
- Bugs:
 - *Staph. aureus*, *Strep pyogenes*, *Strep viridans*, *Enterococcus*, *Staph Epidermidis*, HACEK

Side Note: Staph

- Always take Staphylococcal bacteremia seriously
 - Repeat blood cultures x2 before starting empiric treatment
 - *Staph aureus* is sticky and loves to hide in places. Examine the Pt for metastatic spread (spine, sternoclavicular joints, etc.)
 - Image if concerning physical exam findings
 - IDSA guidelines recommend at least 2 weeks of IV therapy for *Staph* bacteremia
 - Will Require ID Consult!!!! (They may self consult if they hear of it)

A quick note on cultures...

- The time of peak fever does not elevate yield of blood culture
- Amount of blood, timing regarding ABX, proper technique do
- Fever CAN indicate illness, though... on that note, is fever bad?
 - (Not always—it's a signal!)
 - Consider the use of antipyretics—needed? Rarely. And may mask fevers.
 - Do we need daily cultures? (Not always.) How about repeat cultures after a big positive that seems real? (Yes!)

Discharge Planning is in the Details!

- Discharge w/ PICC line... how?
 - When can we place a PICC?
 - "They report cultures at 11am—we won't know if it's clear until then"
- Discharge Profile 2
 - Hospital Course needs to be current
 - Gold Form / Home Care have different needs

Discharge Planning is in the Details!

- Discharge w/ PICC line... Discharge Profile 2

Document Info

Sections

Hospital Course

Hospital Courses include significant abnormal Lab values

Tahore

Infectious Disease:

PPD Status given... not given

MRSA yes... no

VRE yes... no

C. Diff yes no

Other Resistant Organism yes no

Isolation Type none Airborne... Contact... Droplet...

Immunizations Immunizations given during the hospital stay will automatically display in Significant Events. You may also document additional immunization history in the Significant Events section.

Additional Information

Document Info

Sections

Line Care (Homecare ONLY)

Homecare ONLY Lines Adult... Pediatric... Neonatal...

Line Care (Gold Form or Patient Managed)

Adult... Pediatric... Neonatal...

Discharge Planning is in the Details!

The screenshot displays a medical software interface for 'Face to Face Certification'. The interface includes a toolbar with options like 'Copy Forward', 'Refer to Note', 'Preview', 'Modify Template', and 'Acronym Expansion'. The main form is titled 'Face to Face Certification' and contains several sections:

- Home Care Consult Information:** A text field containing 'Place Home Care Consult via Order Entry'.
- Home Care Services Needed:** A blue bar with a checkbox labeled 'yes...'.
- Example for Medical Necessity (CMS requires patient specific information):** A text area containing medical and surgical examples for Skilled Nursing (SN) and Physical Therapy (PT).
- Example for Homebound (CMS requires patient specific information):** A text area containing medical and surgical examples for homebound care.
- Home Care Services:** A section with various checkboxes for services like 'assessment...', 'bi...', 'foley catheter...', 'new diagnosis teachi...', 'trach care...', 'tu...', 'diabetes management...', 'drain care...', 'maternity...', 'medication compliance...', and 'Rehab (PT/OT/SP eval and treat)...'.

An 'SCM Notice' dialog box is overlaid on the form. The dialog box has a green circular icon with the number '1' and the title 'SCM Notice'. The text inside the dialog box reads: 'Infusions/Injectables must be ordered 24 hrs before discharge. Enter infusion/injectable/medication name only in the section below. All other prescribing detail must be entered in the Medication Reconciliation section.' There is an 'OK' button at the bottom right of the dialog box.

Discharge Planning is in the Details!

Medication Name *Generic: ampicillin-sulbactam*

ampicillin-sulbactam 2 g-1 g injection 

Dose Unknown Dosage Units Route Frequency PRN
3.0000 g injectable every 6 hours

Last Dose Taken Date Last Dose Taken Time

Follow Up Reason Info Source

Start Date End Date Indication
17-Jul-2018 Approx 01-Aug-2018 Approx

[Instructions](#) Auto Edit [Clear](#)

3 gram(s) injectable every 6 hours through 8/1/18

Internal Memo

[Need Help?](#)

Save

Cancel

Next Case...

- 60yo pt w/ IDDM-2 presents after coming back from vacation w/ drainage from his foot
- What more do you want to know?
- What do you think is going on, and how thorough can you be?
 - Yes, right now.

The factors, applied to that case

- Host?
 - Diabetic, uncontrolled, Hx of foot ulcers
- Syndrome?
 - Purulent cellulitis? Osteomyelitis? Necrotizing Fasciitis? Go assess!
- Bug?
 - Staph/Strep? Pseudomonas? Venturing into Anaerobes—*Clostridium et al?*
- Drug?
 - Broad coverage at first—usually Vanc/Zosyn here
 - Total duration of treatment?
 - How do we get therapeutic and keep them that way for entire course?

How to Differentiate

- Clinical Exam is Crucial
 - Demarcated borders and shallow?
 - Depth hard to measure?
 - Wound is directly overlying / can probe to bone?
 - Crepitus, subcutaneous emphysema?
- Break the tie: Imaging can help!
 - What if you suspect Osteo?

How to Differentiate

- Break the tie: Imaging can help!
 - What if you suspect Osteo?
 - Select a study... what resources exist?
 - ACR Appropriateness Criteria!

Suspected Osteomyelitis of the Foot in Patients with Diabetes Mellitus	Narrative & Rating Table	Evidence Table	
Suspected Osteomyelitis, Septic Arthritis, or Soft Tissue Infection (Excluding Spine and Diabetic Foot)	Narrative & Rating Table	Evidence Table	Lit Search
Suspected Spine Trauma	Narrative & Rating Table	Evidence Table	
Neurologic			
Topic Name	Narrative & Rating Table	Evidence Table	Lit Search

American College of Radiology ACR Appropriateness Criteria®

Clinical Condition: Suspected Osteomyelitis of the Foot in Patients with Diabetes Mellitus

Variant 2: Soft-tissue swelling with neuropathic arthropathy without ulcer.

Radiologic Procedure	Rating	Comments	RRL*
X-ray foot	9	Initial study. Radiographs and MRI are complementary, and both are indicated. The results of initial x-ray examination do not preclude the necessity for additional studies.	☼
MRI foot without and with IV contrast	9	Radiographs and MRI are complementary, and both are indicated. MRI is useful preoperatively to identify the extent of involvement and to map devitalized areas.	O
MRI foot without IV contrast	9	Radiographs and MRI are complementary, and both are indicated.	O
CT foot without IV contrast	5	For neuropathy or if MRI contraindicated.	☼
Labeled leukocyte scan foot (In-111 or Tc-99m)	3	May be appropriate in certain circumstances such as if MRI is contraindicated or unavailable.	☼☼☼☼
Labeled leukocyte scan (In-111 or Tc-99m) and Tc-99m sulfur colloid marrow scan foot	3	May be appropriate in selected clinical circumstances.	☼☼☼☼
CT foot without and with IV contrast	1		☼
CT foot with IV contrast	1		☼
Tc-99m 3-phase bone scan foot	1		☼☼☼
Tc-99m 3-phase bone scan and labeled leukocyte scan (In-111 or Tc-99m) foot	1		☼☼☼☼
Tc-99m 3-phase bone scan and labeled leukocyte scan (In-111 or Tc-99m) and Tc-99m sulfur colloid marrow scan foot	1		☼☼☼☼
US foot	1		O
FDG-PET/CT foot	1		☼☼☼☼
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Appropriateness Criteria ACR

AC List

Panel Type: Panels: Filter Clear

Diagnostic			
Breast			
Topic Name	Narrative & Rating Table	Evidence Table	Lit Search
Breast Cancer Screening	Narrative & Rating Table	Evidence Table	Lit Search
Breast Imaging of Pregnant and Lactating Women	Narrative & Rating Table	Evidence Table	Lit Search
Breast Implant Evaluation	Narrative & Rating Table	Evidence Table	Lit Search
Breast Pain	Narrative & Rating Table	Evidence Table	Lit Search
Evaluation of Nipple Discharge	Narrative & Rating Table	Evidence Table	Lit Search
Evaluation of the Symptomatic Male Breast	Narrative & Rating Table	Evidence Table	Lit Search
Monitoring Response to Neoadjuvant Systemic Therapy for Breast Cancer	Narrative & Rating Table	Evidence Table	Lit Search
Palpable Breast Masses	Narrative & Rating Table	Evidence Table	Lit Search
Stage I Breast Cancer: Initial Workup and Surveillance for Local Recurrence and Distant Metastases in Asymptomatic Women	Narrative & Rating Table	Evidence Table	Lit Search
Cardiac			
Topic Name	Narrative & Rating Table	Evidence Table	Lit Search
Acute Chest Pain — Suspected Aortic Dissection	Narrative & Rating Table	Evidence Table	

Next Case...

- 78yo w/ mild dementia presenting with severe fatigue, chronic cough
 - Not a very good historian, but no complaints other than fatigue and cough
 - Appears dehydrated on examination
 - UA ordered—mod LE, no nitrites, WBC 18, RBC 8, Squamous 1+, Mucus 1+
 - Culture is...
 - Wait, what culture? (Neither blood nor urine sent... we could add on; do you WANT to?)
- Should we treat?
- Someone from the ED mentions they thought they saw history of resistant pathogens... so they started treatment

Pyelonephritis / UTI

- Host:
 - Concerning findings
 - Male/Female, Age, Comorbidities
- Source
 - How did they get it?
 - Recent Urologic procedure, catheterization, “spontaneous”, Sexual
 - Is it really a “UTI”: PID, STD, GI infection/abscess, Seeding from elsewhere
- Environment
 - Where is the patient coming from? Home, SNF, able to care for self, can tolerate PO?
- Resistance
 - Hx of resistant organisms? MDR, XDR
 - Other common issues: ESBL, MRSA, Pseudomonas
- Weird:
 - Fungal
- Bugs:
 - Ecoli, enterococcus, staph, other GI/GU flora

Let's take a quick aside to review portal

- Patient Portal can help a LOT

Exit Portal
LOGOUT

Informational Links
UHDoctor.org
Guide to Clinical Data
Locations
UH Policies and Procedures

Important Clinical Information
FDA REMS Resource (on-site)
PASS Reports
VAD Guidelines and Management

Portal Features
E-mail
Phone Directory
Send a Text Page
Portal Support (On-site Only)
External - Portal Support
Personal Settings
Logout

Clinical Data
Patient Search
Patient History Archive

Clinical Systems
Electronic Signature (eSig)
PACS - IDS7 (on-site)
Radiology User Guide

UHCare (on-site)
Physician Resources (on-site)
UHCare Home Page (on-site)

SUMMARY PAGE **Clinical Data**

Results List

07/05/2018 17:41 BASIC METABOLIC PANEL UHC
06/09/2018 18:25 BASIC METABOLIC PANEL UHC
10/16/2017 22:08 BASIC METABOLIC PANEL UHC
10/16/2017 14:59 BASIC METABOLIC PANEL UHC
06/21/2017 04:51 BASIC METABOLIC PANEL UHC
06/16/2017 23:54 BASIC METABOLIC PANEL UHC
05/31/2017 10:25 BASIC METABOLIC PANEL UHC
06/04/2016 00:26 BASIC METABOLIC PANEL UHC
02/23/2016 14:27 BASIC METABOLIC PANEL UHC
12/07/2015 11:20 BASIC METABOLIC PANEL UHC
11/02/2015 12:49 BASIC METABOLIC PANEL UHC
06/23/2015 07:49 BASIC METABOLIC PANEL UHC
06/22/2015 07:38 BASIC METABOLIC PANEL UHC
06/21/2015 05:47 BASIC METABOLIC PANEL UHC
06/20/2015 06:59 BASIC METABOLIC PANEL UHC
06/19/2015 07:05 BASIC METABOLIC PANEL UHC
06/17/2015 06:49 BASIC METABOLIC PANEL UHC
06/16/2015 17:45 BASIC METABOLIC PANEL UHC
06/16/2015 01:23 BASIC METABOLIC PANEL UHC
06/15/2015 07:22 BASIC METABOLIC PANEL UHC
06/15/2015 07:18 BASIC METABOLIC PANEL UHC
06/12/2015 07:59 BASIC METABOLIC PANEL UHC
06/10/2015 07:45 BASIC METABOLIC PANEL UHC
06/09/2015 10:17 BASIC METABOLIC PANEL UHC
06/05/2015 07:25 BASIC METABOLIC PANEL UHC
06/04/2015 12:52 BASIC METABOLIC PANEL UHC
06/03/2015 05:40 BASIC METABOLIC PANEL UHC
06/01/2015 05:39 BASIC METABOLIC PANEL UHC
05/31/2015 05:51 BASIC METABOLIC PANEL UHC
08/19/2014 11:02 BASIC METABOLIC PANEL UHC
02/07/2014 16:25 BASIC METABOLIC PANEL UHC
12/20/2013 18:37 BASIC METABOLIC PANEL UHC
10/02/2013 22:55 BASIC METABOLIC PANEL UHC

Result Detail

Comments associated with tests will be listed below and must be reviewed.

Test Name	Flags	Result	Units	Ref.Range	Result Date	Status [Key]	Test Site [Key]
GLUCOSE	H	301	mg/dL	74 - 99	07/05/2018 18:03	F	UHC
SODIUM		138	mmol/L	136 - 145	07/05/2018 18:03	F	UHC
POTASSIUM		3.7	mmol/L	3.5 - 5.3	07/05/2018 18:03	F	UHC
CHLORIDE	L	96	mmol/L	98 - 107	07/05/2018 18:03	F	UHC
BICARBONATE		30	mmol/L	21 - 32	07/05/2018 18:03	F	UHC
ANION GAP		16	mmol/L	10 - 20	07/05/2018 18:03	F	UHC
UREA NITROGEN	H	70	mg/dL	6 - 23	07/05/2018 18:03	F	UHC
CREATININE	H	1.77	mg/dL	0.50 - 1.05	07/05/2018 18:03	F	UHC
GFR-NON AFRICAN AM.	A	28	mL/min/1.73m2	>60	07/05/2018 18:03	F	UHC
GFR-AFRICAN AM.	A	34	mL/min/1.73m2	>60	07/05/2018 18:03	F	UHC
CALCULATIONS OF ESTIMATED GFR ARE PERFORMED USING THE MDRD STUDY EQUATION FOR THE IDMS-TRACEABLE CREATININE METHODS. CLIN CHEM 2007;53:766-72							
CREATININE		10.1	mg/dL	8.6 - 10.6	07/05/2018 18:03	F	UHC

Let's take a quick aside to review portal

- Patient Portal can help a LOT

Result Comparison

Back to Results History

Test Information

Facility	UHCMC	UHCMC	UHCMC	UHCMC	UHCMC	UHCMC						
Collected	01/09/2006 15:52:00	06/02/2006 14:23:00	11/21/2007 10:37:00	01/05/2008 05:55:00	01/06/2008 06:55:00	01/10/2008 18:14:00	02/19/2008 01:21:00					
Result	01/09/2006 19:52:00	06/02/2006 17:58:00	11/21/2007 13:13:00	01/05/2008 08:32:00	01/06/2008 08:50:00	01/10/2008 19:33:00	02/19/2008 02:23:00					
Order #	F7093287	G2022671	H9211813	I1050270	I1060447	I1104255	I2190516					

Tests

Results	UHCMC						
GLUCOSE	183 (H)	84	163 (H)	212 (H)	177 (H)	158 (H)	267 (H)
GFR-AFRICAN AM.							
SODIUM	140	143	140	137	138	143	134 (L)
POTASSIUM	4.5	4.2	3.5 (L)	3.6	3.8	3.3 (L)	2.8 (L)
CHLORIDE	107	108 (H)	102	101	106	104	95 (L)
BICARBONATE	21	22	21	19 (L)	19 (L)	25	28
UREA NITROGEN	17	17	20	21 (H)	17	17	14
CREATININ	1.4 (H)	1.0	0.90	1.20	1.15	1.07	1.12
GFR-NON AFRICAN AM.	8.7	8.9	8.7	7.6 (L)	7.6 (L)	8.6	8.1 (L)

Chart

Date range (optional): From to

Group by units

BASIC METABOLIC PANEL

Time	CREATININE (mg/dL)
01-01-16 00:01	1.4
07-01-16 00:01	1.0
01-01-17 00:01	0.90
07-01-17 00:01	1.20
01-01-18 00:01	1.15
07-01-18 00:01	1.07
01-01-19 00:01	1.12

Let's take a quick aside to review portal

Results List View by Month

- BETA-HYDROXYBUTYRATE
- BILIRUBIN, ICTOTEST
- BILIRUBIN, DIRECT
- BLOOD CULTURE (12)**
 - 02/20/2008 19:32 BLOOD CULTURE UHCMC
 - 02/20/2008 19:31 BLOOD CULTURE UHCMC
 - 02/19/2008 01:51 BLOOD CULTURE UHCMC
 - 02/19/2008 01:48 BLOOD CULTURE UHCMC
 - 12/22/2005 14:03 BLOOD CULTURE UHCMC
 - 12/21/2005 22:59 BLOOD CULTURE UHCMC
 - 12/08/2005 23:03 BLOOD CULTURE UHCMC
 - 12/08/2005 21:23 BLOOD CULTURE UHCMC
 - 12/05/2005 19:35 BLOOD CULTURE UHCMC
 - 12/05/2005 19:33 BLOOD CULTURE UHCMC
 - 11/30/2005 03:56 BLOOD CULTURE UHCMC
 - 11/30/2005 03:55 BLOOD CULTURE UHCMC
- BLOOD CULTURE, BACTERIAL (48)**
 - BLOOD CULTURE, BACTERIAL UHCMC
 - BLOOD CULTURE, BACTERIAL UHCMC
 - 06/06/2018 11:05 BLOOD CULTURE, BACTERIAL
 - 06/06/2018 11:05 BLOOD CULTURE, BACTERIAL
 - 10/16/2017 17:33 BLOOD CULTURE, BACTERIAL
 - 10/16/2017 09:10 BLOOD CULTURE, BACTERIAL
 - 06/17/2017 02:13 BLOOD CULTURE, BACTERIAL
 - 06/17/2017 02:11 BLOOD CULTURE, BACTERIAL
 - 07/14/2016 16:23 BLOOD CULTURE, BACTERIAL
 - 07/14/2016 16:04 BLOOD CULTURE, BACTERIAL
 - 07/08/2016 11:12 BLOOD CULTURE, BACTERIAL
 - 07/08/2016 11:10 BLOOD CULTURE, BACTERIAL
 - 06/22/2016 19:46 BLOOD CULTURE, BACTERIAL
 - 06/22/2016 19:45 BLOOD CULTURE, BACTERIAL
 - 06/08/2016 12:37 BLOOD CULTURE, BACTERIAL
 - 06/08/2016 12:36 BLOOD CULTURE, BACTERIAL
 - 06/07/2016 12:53 BLOOD CULTURE, BACTERIAL

Result Detail

Source: BLD
Site: SET 1-N/A PERIPHERAL
BLOOD CULTURE
02/21/08 No Growth at 1 days

Source: BLD
Site: SET 1-N/A PERIPHERAL
BLOOD CULTURE
02/21/08 No Growth at 1 days
02/22/08 No Growth at 2 days

Source: BLD
Site: SET 1-N/A PERIPHERAL
BLOOD CULTURE
02/21/08 No Growth at 1 days
02/22/08 No Growth at 2 days
02/23/08 No Growth at 3 days

Source: BLD
Site: SET 1-N/A PERIPHERAL
BLOOD CULTURE
02/21/08 No Growth at 1 days
02/22/08 No Growth at 2 days
02/23/08 No Growth at 3 days
02/24/08 No Growth at 4 days

Source: BLD
Site: SET 1-N/A PERIPHERAL
BLOOD CULTURE
02/21/08 No Growth at 1 days
02/22/08 No Growth at 2 days
02/23/08 No Growth at 3 days
02/24/08 No Growth at 4 days
02/25/08 NO GROWTH - FINAL REPORT

Collected: 02/20/08 18:00

portal.uhospitals.org

Informational Links

- UHDoctor.org
- Guide to Clinical Data
- Locations
- UH Policies and Procedures
- Important Clinical Information**
- FDA REMS Resource (on-site)
- PASS Reports
- VAD Guidelines and Management
- Portal Features**
- E-mail
- Phone Directory
- Send a Text Page
- Portal Support (On-site Only)
- External - Portal Support
- Personal Settings
- Logout
- Clinical Data**
- Patient Search
- Patient History Archive
- Clinical Systems**
- Electronic Signature (eSig)
- RACS - IDS7 (on-site)
- Radiology User Guide
- UHCare (on-site)**
- Physician Resources (on-site)
- UHCare Home Page (on-site)
- UHCare Downtime
- Procedures (on-site)
- Cardiovascular Systems**
- Heart Failure
- Guidelines/Algorithms (on-site)
- Anticoagulation Monitoring
- Service Referral
- EKG Muse Web Viewer

Result Comparison

Source: BLD
Site: K2085433
Order#: K2085433
BLOOD CULTURE, BACTERIAL
18/09/09 No Growth at 1 days
18/10/09 No Growth at 2 days
18/11/09 No Growth at 3 days
18/12/09 No Growth at 4 days

Collected: 10/08/09 00:00
Received: 10/08/09 22:22

FINAL 10/12/09 23:42 UR

Test Information

Facility	UHCMC	UHCMC	UHCMC
Collected	03/24/2008 13:05:00	04/18/2008 17:20:00	03/04/2009 14:22:00
Result	03/29/2008 16:42:00	04/23/2008 20:42:00	03/09/2009 20:42:00
Order #	13242721	14183683	15043430

Tests

Results
BLOOD CULTURE, BACTERIAL [comment]

Chart

Date range (optional): From to

Group by units

Onward with that case...

- That patient with the “UTI” was given IVF and Cipro, sent back to SNF
- She comes back to ED 14 days later, same sort of condition
 - Dehydrated
 - Profuse diarrhea
- What’s her situation?
 - What’s the most common cause?
- What’s the solution?

IDSA Guidelines are Great!

• C Diff? Gotcha!

Table 1. Recommendations for the Treatment of *Clostridium difficile* Infection in Adults

Clinical Definition	Supportive Clinical Data	Recommended Treatment ^a	Strength of Recommendation/ Quality of Evidence
Initial episode, non-severe	Leukocytosis with a white blood cell count of $\leq 15,000$ cells/mL and a serum creatinine level < 1.5 mg/dL	• VAN 125 mg given 4 times daily for 10 days, OR	Strong/High
		• FDX 200 mg given twice daily for 10 days	Strong/High
		• Alternate if above agents are unavailable: metronidazole, 500 mg 3 times per day by mouth for 10 days	Weak/High
Initial episode, severe ^b	Leukocytosis with a white blood cell count of $\geq 15,000$ cells/mL or a serum creatinine level > 1.5 mg/dL	• VAN, 125 mg 4 times per day by mouth for 10 days, OR	Strong/High
		• FDX 200 mg given twice daily for 10 days	Strong/High
Initial episode, fulminant	Hypotension or shock, ileus, megacolon	• VAN, 500 mg 4 times per day by mouth or by nasogastric tube. If ileus, consider adding rectal instillation of VAN. Intravenously administered metronidazole (500 mg every 8 hours) should be administered together with oral or rectal VAN, particularly if ileus is present.	Strong/Moderate (oral VAN); Weak/Low (rectal VAN); Strong/Moderate (intravenous metronidazole)
First recurrence	---	• VAN 125 mg given 4 times daily for 10 days if metronidazole was used for the initial episode, OR	Weak/Low
		• Use a prolonged tapered and pulsed VAN regimen if a standard regimen was used for the initial episode (eg, 125 mg 4 times per day for 10–14 days, 2 times per day for a week, once per day for a week, and then every 2 or 3 days for 2–8 weeks), OR	Weak/Low
		• FDX 200 mg given twice daily for 10 days if VAN was used for the initial episode	Weak/Moderate
Second or subsequent recurrence	---	• VAN in a tapered and pulsed regimen, OR	Weak/Low
		• VAN, 125 mg 4 times per day by mouth for 10 days followed by rifaximin 400 mg 3 times daily for 20 days, OR	Weak/Low
		• FDX 200 mg given twice daily for 10 days, OR	Weak/Low
		• Fecal microbiota transplantation ^c	Strong/Moderate

Abbreviations: FDX, fidaxomicin; VAN, vancomycin.

^aAll randomized trials have compared 10-day treatment courses, but some patients (particularly those treated with metronidazole) may have delayed response to treatment and clinicians should consider extending treatment duration to 14 days in those circumstances.

^bThe criteria proposed for defining severe or fulminant *Clostridium difficile* infection (CDI) are based on expert opinion. These may need to be reviewed in the future upon publication of prospectively validated severity scores for patients with CDI.

^cThe opinion of the panel is that appropriate antibiotic treatments for at least 2 recurrences (ie, 3 CDI episodes) should be tried prior to offering fecal microbiota transplantation.

Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults and Children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA)

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UH Order Sets are Great! (Usually)

- C Diff? Gotcha!

Acute nosocomial diarrhea / C. difficile infection [10 orders of 26 are selected]

Relevant Results

Combined Measurements
 Height (cm) 178
 Weight (kg) 61.3
 BSA 1.76

Link to Micromedex Link to Up to Date Link to Lexicomp Link to UHHS Policies
 Requesting Physician Contact # 32299

PLEASE SELECT ONE:

- INITIAL episode or FIRST RECURRENCE of C. difficile, MILD to MODERATE disease (e.g. WBC < 15,000 and creatinine < 1.5 x baseline level)
- INITIAL episode or FIRST RECURRENCE of C. difficile, SEVERE disease (e.g. WBC >= 15,000 or creatinine >= 1.5 x baseline level)
- INITIAL episode or FIRST RECURRENCE of C. difficile, SEVERE and COMPLICATED disease (e.g. hypotension, ileus, toxic megacolon)
- SECOND OR ADDITIONAL RECURRENCES of C. difficile infection

Clinical Instructions

Clinical Instructions: early recognition and avoiding spread of C. difficile infection

- 1) Identify patients with possible C. difficile infection: diarrhea (e.g. >=3 unformed stools in < 24 hours) and/or other findings (e.g. leukocytosis) and no other reasonable explanation for diarrhea
- 2) Patients at high risk for C. difficile infection include: Antibiotic use in past 3 months, hospitalization or long term care facility stay in past 3 months, or recent treatment for C. difficile infection
- 3) If suspect C. difficile infection, initiate immediate Contact Plus isolation precautions & send loose stool sample to lab for C. difficile
- 4) Follow strict Contact Plus isolation precautions to avoid spread of C. difficile spores from colonized patients and their environment to other patients:
 - Before entering room, perform hand hygiene and put on gloves and gown
 - Use dedicated/disposable equipment (e.g. stethoscope, penlight, etc.) if unable, then clean equipment with a sporicidal agent between uses
 - Before exiting room, remove gown/gloves and wash hands with soap and water
- 5) Discontinue any unnecessary antibiotics. If unable to stop other non-C. difficile antibiotics, use the most narrow spectrum antibiotic possible and the shortest antibiotic duration possible.

Drug Info

Acute nosocomial diarrhea / C. difficile infection [11 orders of 26 are selected]

Initial / Test Recurrence Mild - Moderate

Order	BRAND	Dose	Units	Rate	Route	Frequency	Reference Info	Requested Date	Priority	Stop After (Duration)	Clipboard Notes Tab & eMAR
<input type="checkbox"/>	metronIDAZOLE	500	mg		Oral	Every 8 Hours		17-Jul-2018	Routine		x 10-14 days

Initial / Test Recurrence, Severe disease

Order	BRAND	Dose	Units	Rate	Route	Frequency	Reference Info	Start Date	Priority	Stop After (Duration)	Clipboard Notes Tab & eMAR
<input checked="" type="checkbox"/>	Vancomycin Oral Liquid	125	mg		Oral	Every 6 Hours		17-Jul-2018	Routine		x 10-14 days

Initial / Test Recur: Severe/Complicated

Order	BRAND	Dose	Units	Rate	Route	Frequency	Reference Info	Requested Date
<input type="checkbox"/>	Vancomycin Oral Liquid	500	mg		Oral	Every 6 Hours		T
- DR - 1 item(s)								
<input type="checkbox"/>	Vancomycin Oral Liquid	500	mg		NasoGastric	Every 6 Hours		T
- And - 1 item(s)								
<input type="checkbox"/>	metronIDAZOLE 500 mg / 5PB				Infra/Venous	Every 8 Hours		T
- Consider if complete ileus - 1 item(s)								
<input type="checkbox"/>	Vancomycin Rectal Enema 500 mg	500	mg		rectally	Every 6 Hours	If patient has complete ileus and enema is not contraindicated	T

Second / Additional recurrence

Order	BRAND	Dose	Unit	Rate	Route	Frequency	Reference Info	Start Date
- Please review reference info - 1 item(s)								
<input type="checkbox"/>	Vancomycin Oral Liquid	125	mg		Oral	Every 6 Hours	Recommend tapered / pulse regimen. Consider Infectious Diseases consultation. For	T

Laboratory and Blood Bank

Order	Clinical Instructions	Collection Date	Collection Priority	Flow to Collect	Time	Priority	# of Units	Source
- Laboratory - 3 item(s)								
<input type="checkbox"/>	Clostridium Difficile Toxin PCR	Sample must be sent within 2 hours of collection	T	<input checked="" type="checkbox"/>		Routine		

Drug Info

OK Cancel

A couple of variants to finish up:

- 22yo home from college campus, 2d of fever, headaches, now a fall
 - Generally healthy
 - Altered mentation since yesterday after going out with friends despite illness
- 22yo from long-term care campus, 2d fever, headaches, now a fall
 - s/p VP shunt 2 months ago
 - Baseline cognitive impairment but seems more uncomfortable to providers
- 22yo patient w/ HIV presents w/ 2d fever, headaches
 - Well-known to Carpenter attendings, does not take medications
 - No neuro changes, just his standard irritability
- For each variation...
 - What workup? Need a tap? (Yes!)
 - Need imaging (yes, but which kind for which case?),
 - Who could you call for each of these, and what do you say? (For LP help or further workup)
 - What meds do you start for each?

Meningitis

- Host:
 - Immune status, Age, surgical hx, cancer hx
- Source
 - How did they get it?
 - Spontaneous, Seeded from elsewhere, IVDU, Neurologic procedure
 - Is it true infection or could it be cancer?
- Environment
 - Where is the patient coming from?
 - Home, SNF, able to care for self, can tolerate PO
- Resistance
 - Really an issue if associated with Neurologic Procedure, IVDU etc
- Weird:
 - Fungal, MRSA,
- Bugs:
 - *Neisseria meningitidis*, *Strep. pneumoniae*, *H. flu*, *Listeria monocytogenes*, enteroviruses, arboviruses, TB, *Cryptococcus neoformans*

HIV patients

- For CHF, we have a system, right?
 - “50yo w/ HFrEF, (LVEF 35% by TTE 11/2017, recovered from 20%, Cardiologist is Dr. Longenecker)
- What do you think is important for HIV patients?
 - Most recent CD4 and Viral Load
 - Nadir, any Hx of Opportunistic Infections, any Prophylaxis
 - HIV physician
 - Resistance: can ask UH SIU (Special Immunology Unit) for their “packet”/chart

HIV patients

- 40yo w/ HIV (CD4 600, VL undetect, nadir CD4 of 128 at Dx 2017, adherent on Stribild, pt of Dr. Hirsch, admitted from clinic w/ CAP)
- 62yo w/ HIV (CD4 89, VL 2k, nadir CD4 of 5 in 1996, actively on 4-agent HAART and TMP-SMX, pt of Dr. Hirsch, last visit 4 mos ago)
- 22yo w/ HIV (CD4 of 8, VL 384k, at nadir, not taking HAART due to pill burden s/p failing three regimens, pt of Dr. Hirsch, recent no-show)

Pneumonia

- Host:
 - Concerning findings
 - Elderly, AMS, dysphagia, DM, ESRD, immunosuppressed
- Source
 - What kind of pneumonia
 - CAP, HCAP, HAP, VAP, Aspiration?
- Environment
 - Where is the patient coming from?
 - Home, SNF, LTAC, Hospitalized, Homeless, HD, air conditioners
- Resistance
 - MRSA risk factors?, Pseudomonas?
- Weird:
 - TB, Fungal, anthrax, viral, legionella
- Bugs:
 - *Strep pneumoniae*, *H. influenza*, *M. catarrhalis*, *Chlamydia pneumoniae*, *Mycoplasma pneumoniae*, *Staph aureus*, *Legionella pneumophila*

What Kind

➤ HCAP:

- Hospitalization for 2+ days w/ in past 90 days
- HD w/ in 30 days
- NH or LTAC w/ in 30 days
- IV therapy (chemo, Abx) w/in 30 days
- Wound care w/ in 30 days
- Family member w/ MDR pathogen

➤ CAP

- Community Acquired

➤ HAP

- Occurs 48 hours or more after admit (and not present/brewing at time of admission)

➤ VAP

- 48-72 hours post intubate

➤ Aspiration

- Dysphagia key

Think carefully your choice of type has implications in terms of billing, inpatient criteria, severity score, and reimbursement

References / Works Cited

- Dr. UpToDate's page on cellulitis
- ACR on Soft Tissue Infection
<https://acsearch.acr.org/docs/69340/Narrative/>
- IDSA update on C diff, 2017
http://www.idsociety.org/Guidelines/Patient_Care/IDSA_Practice_Guidelines/Infections_By_Organ_System-81567/Gastrointestinal/Clostridium_difficile/
- Riedel S, et al. *Timing of specimen collection for blood cultures from febrile patients with bacteremia.* J Clin Microbiol. 2008;46(4):1381. Epub 2008 Feb 27.

Allergies

- Is it real?
 - “My throat closes up” – YES!
 - “I get swelling” – Maybe? Need to know more
 - “Itchy” – Probably not, find out more
 - “Nausea” - nope

Allergies

- Key things to find out
 - What was the reaction and do we have it documented
 - How serious is the reaction
 - Ie if PCN is only option pt can deal with itching
 - Has patient had this medication/class before
 - Check EMR have they had X or a similar family?
 - Note history of EBV and amoxicillin
 - But difficult to prove this
 - Is it the nature of the med
 - Do you expect the “allergy” as a common effect of the abx
 - Ex: Red man syndrome, GI upset, etc

OK so it's real

- Allergy to PCN
- Cephalosporin (5-10% Cross reactivity)
- Carbapenem (2-5%)
- Monobactam (0%)

- Think of severity of reaction
 - Itchy: may risk trying cephalosporin
 - SOB: don't risk it and go to monobactam
- Overall weight risk/benefits and discuss w/pt

No Other Options?

- Are you sure?
 - Lots of old meds not used recently
 - Several “ID controlled” abx you can use
- Call Allergy!
 - Confirm allergy and desensitize if needed

Back up plans

- What are you missing
 - Should you broaden abx
 - Beware gaps in coverage: Ertapenem no PSA
- Re-culture
 - Is there unexpected resistance
- Do you need to switch classes
 - IE PCN to Carbapenem?
- Is really an infection?
 - All that is SIRS is not ID

Tips/Tools

- Choosing an antibiotic with all things equal
 - Think of ease of use for pt
- Up To Date
 - Great for dosing
- Sanford Guide
 - Best 20 bucks you'll ever spend
- Antibigram: On the Intranet at UH!
<https://intranet.uhhospitals.org/RedirectToDWP.aspx#>
 - Specific resistances at your hospital
- Call your friendly pharm D
 - Help with dosing, other abx suggestions to add
- Call your friendly Microlab
 - May help with resistance panels (they know more than they release)