Telemedicine Infectious Disease Case Potpourri

Allison Nazinitsky MD

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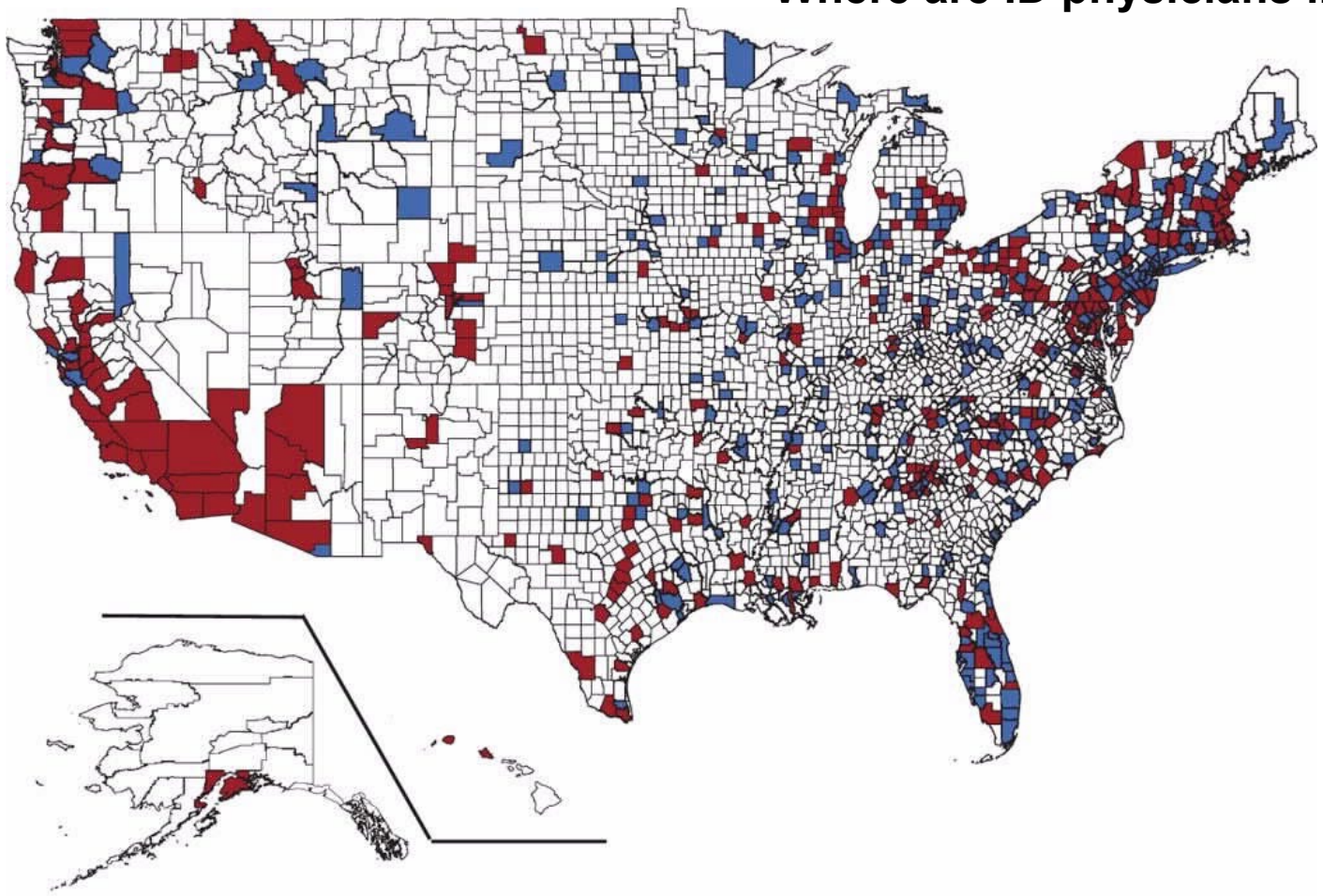
Allison Nazinitsky, MD

- Infectious Disease Fellowship 2013-2015
- 2017 - locums, telemedicine, stewardship
- Worked in >50 hospitals and >10 EMRs
- 16 state licenses: GA, IA, IL, KS, MI, MN, MO, NC, ND, NE, NM, OK, TX, VA, WA, WI
- Part of the team – hospitalists, PCPs, pharmacists, RNs, microbiology lab, radiology, tele presenters
- Actively follow from 1-30+ patients a day depending on which hospitals I am covering.

TeleID = Telemedicine Infectious Disease

- Infectious disease consults:
  - Synchronous and Asynchronous
  - Inpatient or Outpatient
- Stewardship MDstewardship Experts leading Experts
- Diagnoses: Cellulitis, osteomyelitis, diabetic foot infections, PJI, meningitis, bloodstream infections, pneumonia, UTI, abscesses, multiple drug allergies
- Reduce patient transfers, readmissions, length of stay
- Decrease hospital acquired infections
- Reduce antibiotic use – decreased cost, toxicities, oral options
- Patient safety

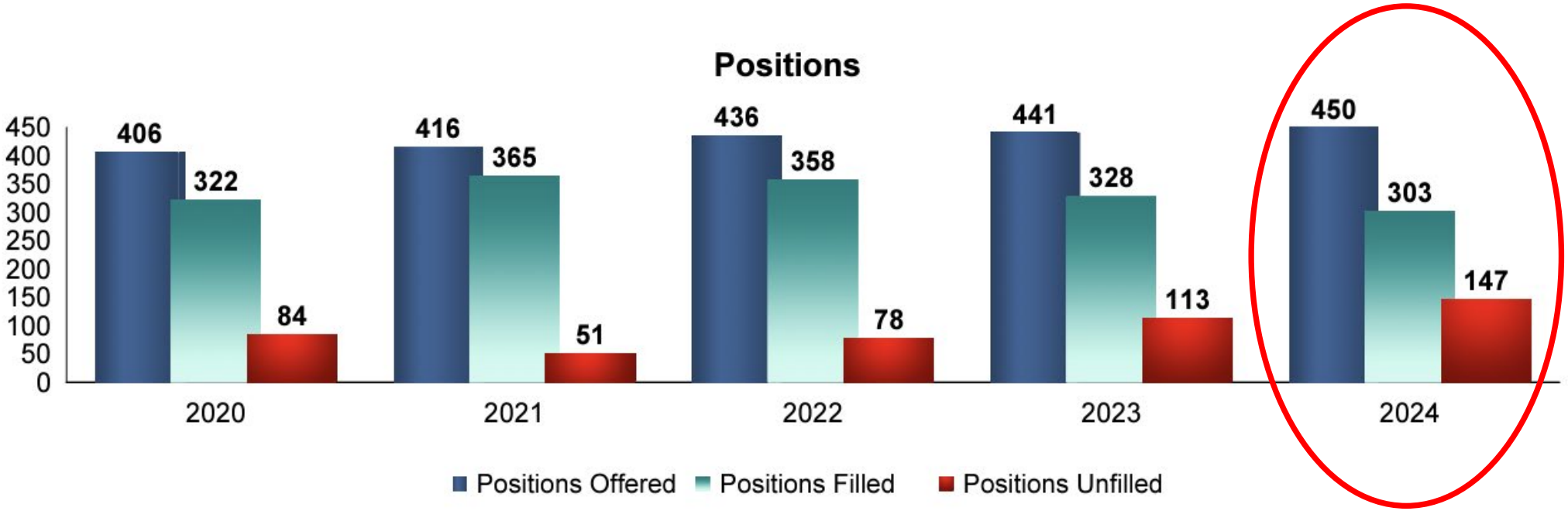
Where are ID physicians in US?



ID Physician Density per 100 000 Population, by County
- Above national average density (1.76 per 100 000 U.S. population)
- Below national average density (1.76 per 100 000 U.S. population)
- No ID physician

https://www.acpjournals.org/doi/10.7326/M20-2684

ID Fellowship



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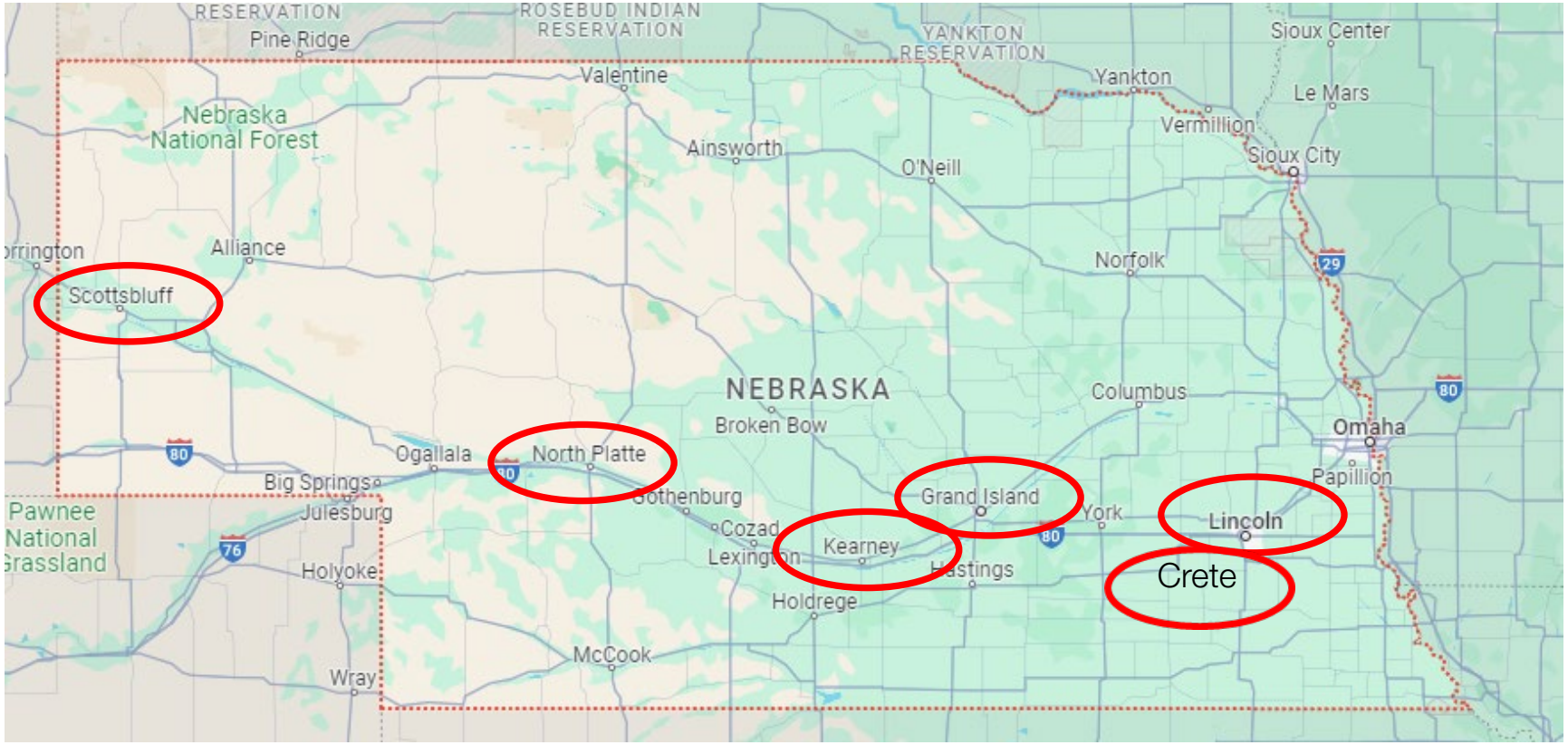
2024 EDUCATION SERIES


RESERVATION
Pine Ridge
ROSEBUD INDIAN RESERVATION
YANKTON RESERVATION
Sioux Center
Yankton
Le Mars
Valentine
Nebraska National Forest
Vermillion
Ainsworth
Sioux City
O'Neill
Alliance
Norfolk
Scottsbluff
NEBRASKA
Columbus
Broken Bow
Omaha
Ogallala
North Platte
Papillion
Big Springs
Grand Island
Gothenburg
York
Lincoln
Pawnee National Grassland
Julesburg
Cozad
Kearney
Lexington
Hastings
Holyoke
Crete
Holdrege
McCook
Wray

Infectious Disease Case One

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35y/o female presented to a CAH with headache, fever and confusion. Recently went hiking in Colorado Springs ~ 3 weeks prior.

Component	Ref Range & Units	4 mo ago
Tube Number, CSF		Tube 3
Color, CSF	Colorless	Colorless
Clarity, CSF	Clear	Clear
Total Nucleated Cells, CSF	<5 /µL	286 ^
RBC, CSF	<=0 /µL	508 ^
Total Volume, CSF	mL	8.0
Total Cells Counted, CSF		100
Neutrophils, CSF	0 - 6 %	22 ^
Lymphocytes, CSF	40 - 80 %	68
Monocytes, CSF	15 - 45 %	10 v
Glucose, CSF	40 - 70 mg/dL	60
Protein, CSF	15 - 45 mg/dL	114 ^^

Meningitis / Encephalitis PCR panel negative.
Gram stain: +4 WBC, no org seen. Culture negative

CT Brain – negative for acute findings

Fluid Path Review Predominantly mature lymphocytes including occasional reactive forms with occasional neutrophils and monocytes/macrophages.

Meningitis

- Physicians and patients want ID involved
- Expedited work up and management
- Can be managed locally with telemedicine if no complicating factors (EEG, hydrocephalus, mastoiditis etc)
  - Evaluate for involvement of mastoids, sinuses, teeth, genital lesions, body rash.
- Rapid diagnostics are very helpful
- CT scan
- CSF: Cell count, differential, protein, glucose, opening pressure

West Nile Meningitis / Encephalitis

WEST NILE VIRUS ANTIBODY (IGM), CSF

TEST NAME	RESULT	FLAG	UNITS	REF RANGE
WNV IgM CSF IA-aCnc	8.85	HH	index	

Index	Interpretation
<0.90	Antibody not detected
0.90-1.10	Equivocal
>1.10	Antibody detected

Supportive treatment, discharged home within 48 hours from tertiary care center

Results not available until after discharge

Could have been managed at the CAH without transferring

Component	Ref Range & Units	4 mo ago
West Nile Virus Antibody (IgG), Serum	index	<1.30
West Nile Virus Antibody (IgM), Serum	index	6.85 ^

Comment: REFERENCE RANGE: IgG <1.30
IgM <0.90
Interpretive Criteria:
IgG: <1.30 Antibody not detected
1.30 - 1.49 Equivocal
>1.49 Antibody detected

West Nile IgG antibodies are often not detectable until day 4 or 5 of illness. In a patient who is IgM positive but IgG negative, a convalescent phase specimen obtained 7-14 days after the initial specimen should be tested to document IgG seroconversion.
Interpretive Criteria:
IgM: <0.90 Antibody not detected
0.90 - 1.10 Equivocal
>1.10 Antibody detected

Infectious Disease Case Two

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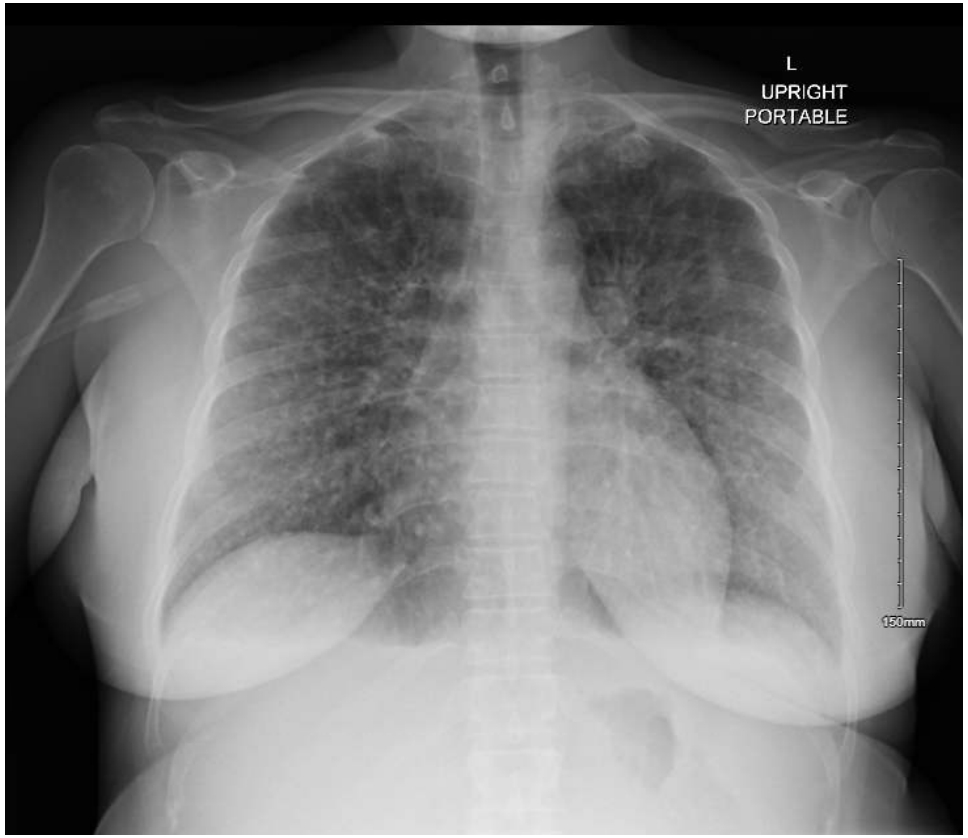
45 y/o female with PMHx of hypothyroidism and hx MRSA boils who presented to outside hospital with shortness of breath, fever, cough. Treated with steroids and sent home

- Progressive hypoxia down to 90% at home. Represented to ER and was given levofloxacin and had a CT chest. Given more prednisone and sent home
  - Husband and son also had a cough / SOB
- Represented again to the ER with progressive hypoxia down to 70%.
- Labs: WBC 11.2, Cr 0.46 and Alk phos 246, AST 126 and ALT 306.
- Transferred for pulmonary and infectious disease consultations.

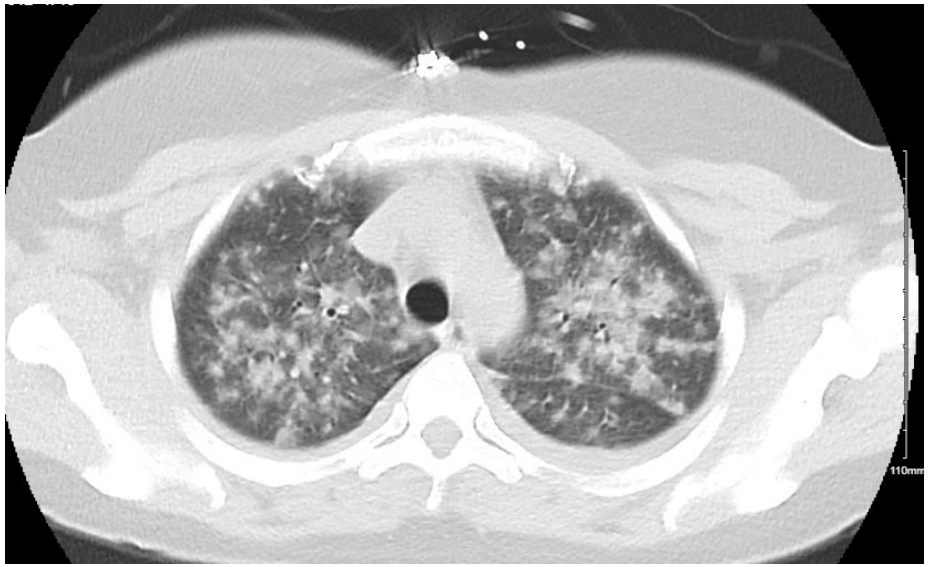
45 y/o female with PMHx of hypothyroidism and hx MRSA boils who presented to outside hospital with shortness of breath, fever, cough. Treated with steroids and sent home

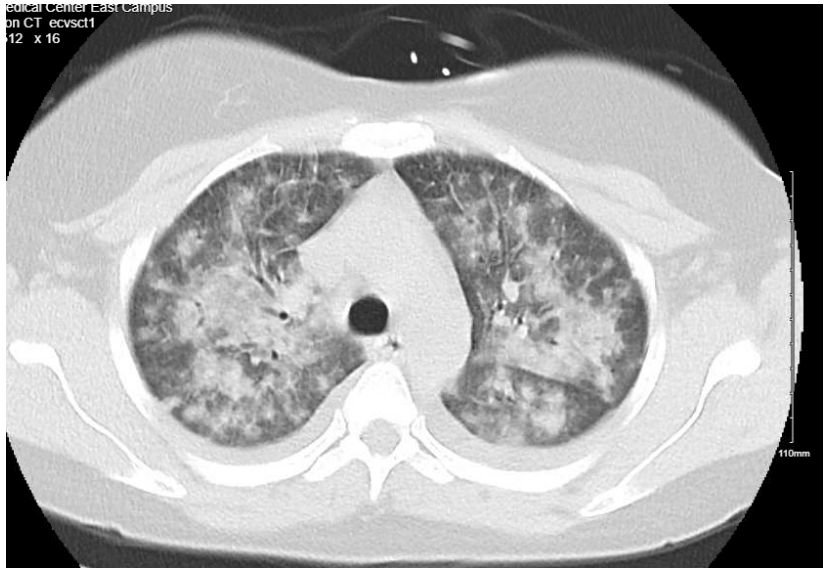
CXR: Moderate diffuse pulmonary opacities
This can be seen with pneumonia, edema or ARDS.



45 y/o female with PMHx of hypothyroidism and hx MRSA boils who presented to outside hospital with shortness of breath, fever, cough. Treated with steroids and sent home

- Works as a nurse
- Lives on a farm and they recently cleaned out her barn





45 y/o female with PMHx of hypothyroidism and hx MRSA boils who presented to outside hospital with shortness of breath, fever, cough. Treated with steroids and sent home

- Differential: Viral vs bacterial vs fungal vs non-infectious
- Barn exposure, concerned for histoplasmosis or cryptococcus
- Started on Ambisome
- Bronchoscopy done with BAL
  - Pneumonia PCR panel positive for coronavirus

- Hospital day #2 down to Airvo 50L at 50%
- Hospital day #3 down to 4-5L NC
- Hospital day #4 down to 2L NC

Acute Disseminated Histoplasmosis

Histoplasma Galactamannan Antigen Quant, Urine

Status: Final result Visible to patient: Yes (seen) Next appt: None

0 Result Notes

Component Ref Range & Units	3/13/23 1947
Histoplasma Galactomannan Ag Quant, Urn	> 24.0
Histoplasma Galactomannan Ag Interp, Urn Not Detected	Detected !

Component Ref Range & Units	3/14/23 1740
Histoplasma Galactomannan Antigen ng/mL	Positive ALQ !

Histoplasma capsulatum !

Acute Disseminated Histoplasmosis

- Hospital day #6 discharged to complete 2 weeks of Ambisome and then itraconazole

Infectious Disease Case Three

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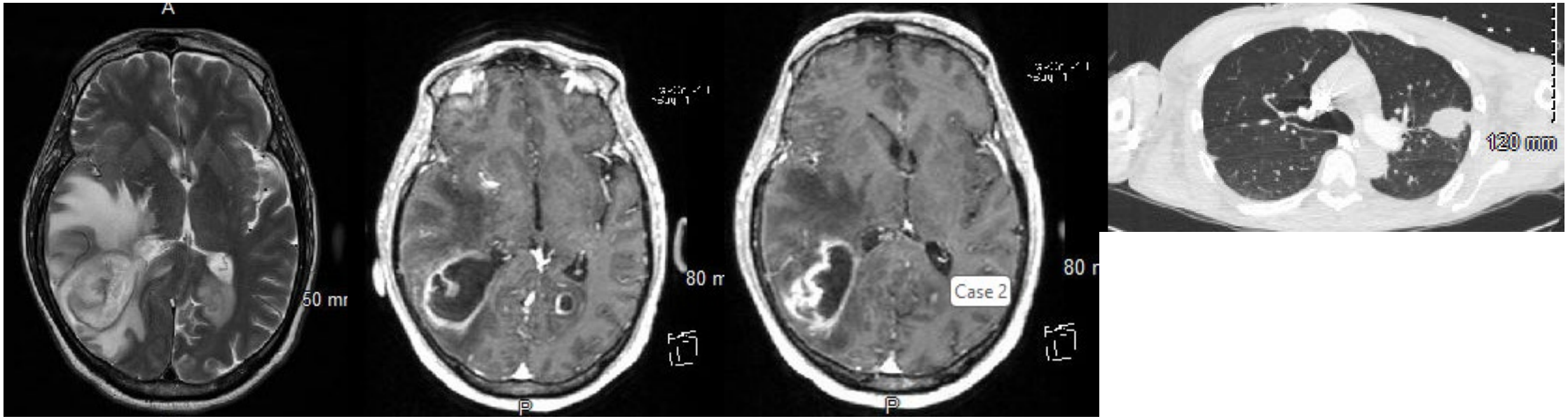
60y/o male with methamphetamine use, poor dentition, no other history, presents to tertiary care center with AMS, headache, neck pain, fever and vomiting

- WBC 17.0, hemoglobin 9.9, sodium 136
- Chest x-ray shows small infiltrate in the left upper lobe

60y/o male with methamphetamine use, poor dentition, no other history, presents to tertiary care center with AMS, headache, neck pain, fever and vomiting



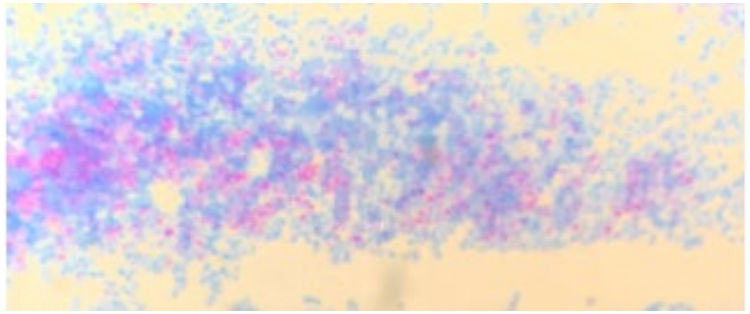
MRI Brain “peripherally enhancing irregular lesion centered in the right parietal lobe and posterior right temporal lobe. This measures approximately 4.7 x 3.2 x 4.0 cm extending to the margin of the right lateral ventricle trigone. There is a second similar-appearing lesion within the medial left occipital lobe measuring 1.1 x 1.0 cm.”

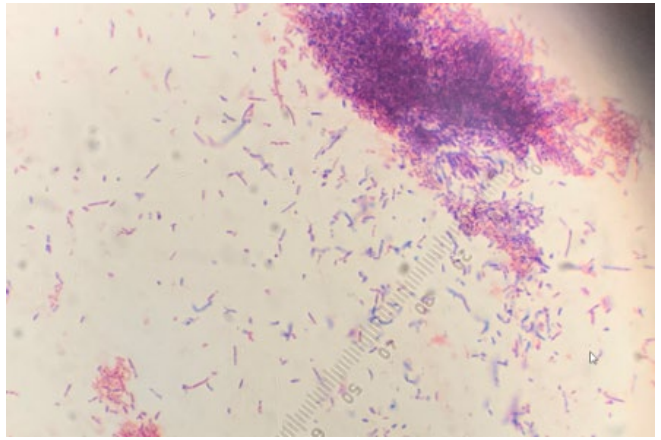
60y/o male with methamphetamine use, poor dentition, no other history, presents to tertiary care center with AMS, headache, neck pain, fever and vomiting

- Left frontal ventriculostomy
- Gram stain: Many PMN, Many RBC, no organisms seen.

CSF	
Clarity CSF	Turbid (A)
Color CSF	See Comment
TNC CSF	57,890.0 (H)
RBC CSF	147,000.0 (H)
Mono CSF	36.0 (L)
Tube Num CSF	1 *
Protein CSF	>600.0 (H)
Glucose CSF	41
Poly CSF	64.0 (H)
Protein CSF App	See Comment

- Right posterior temporal/parietal craniotomy for resection of brain abscess





Hospital course

- Remained in ICU
- Surgical cultures with heavy growth gram positive rods.
- Pathology with “marked acute inflammation with some tissue destruction”, “gram positive branching filamentous organisms on gram stain suspicious for nocardia”. Possible nocardia versus corynebacterium.
- Placed on broad spectrum antibiotics pending send out to reference lab

60y/o male with methamphetamine use, poor dentition, no other history, presents to tertiary care center with AMS, headache, neck pain, fever and vomiting

- Brain abscess: Abiotrophia defectiva + Granulicatella adiacens
- CSF: Nocardia farcinica / kroppenstedtii

60y/o male with methamphetamine use, poor dentition, no other history, presents to tertiary care center with AMS, headache, neck pain, fever and vomiting

- Nutritionally variant streptococci (NVS): Abiotrophia spp and Granulicatella spp
- Normal flora of the human upper respiratory, gastrointestinal, and urogenital tracts
- Challenging to culture and identify
    - Morphology can vary to include pleomorphic, gram-variable coccobacilli, bacilli, or typical chains of gram-positive cocci.

Nocardia

- Gram positive infection caused by aerobic actinomycetes in the genus *Nocardia*.
- Can cause localized or systemic infection and can disseminate to any organ, particularly the CNS
- 2/3 are immunocompromised
- Can relapse or progress despite appropriate therapy.
- >90 species - at least 54 cause disease in humans
  - *N. nova* complex (28 percent)
  - *N. brasiliensis* (14 percent)
  - *N. farcinica* (14 percent)

Infectious Disease Case Four

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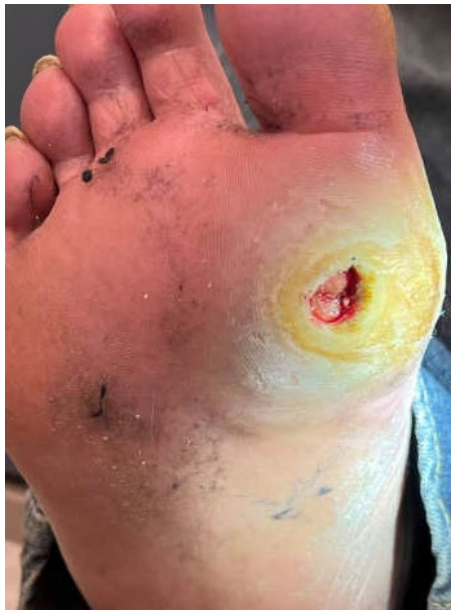
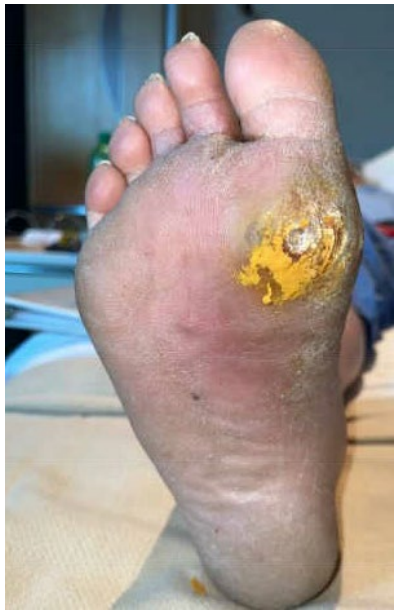
62y/o male with diabetes (A1C 8%), hypertension, CKD3, peripheral vascular disease and right foot ulcer x 3 months who presented to clinic at a CAH with pain in his right foot and cellulitis

- History of femur fracture with rod placement remotely, placed on lifelong chronic suppressive doxycycline
- Vitals: Temp 36.8C, Pulse 83, BP 88/60
- Labs: WBC 18, Cr 2.06 (baseline 1.4)





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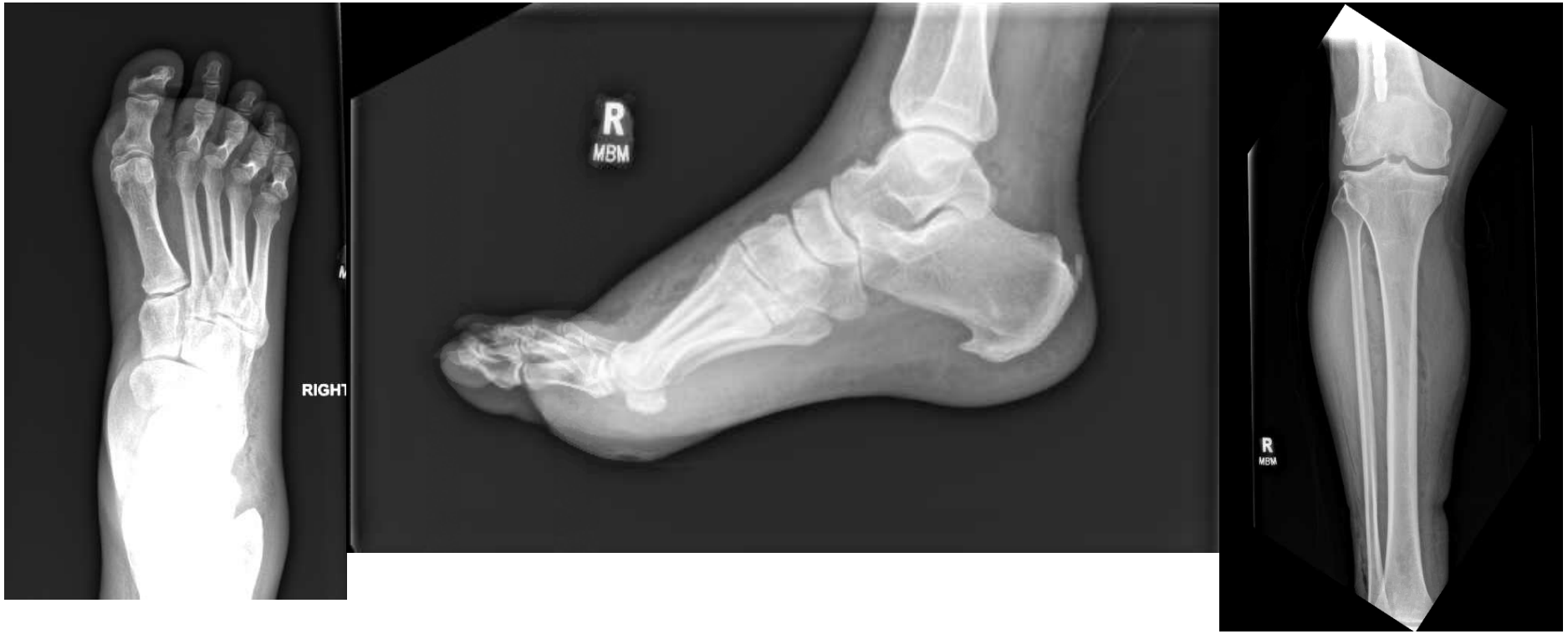

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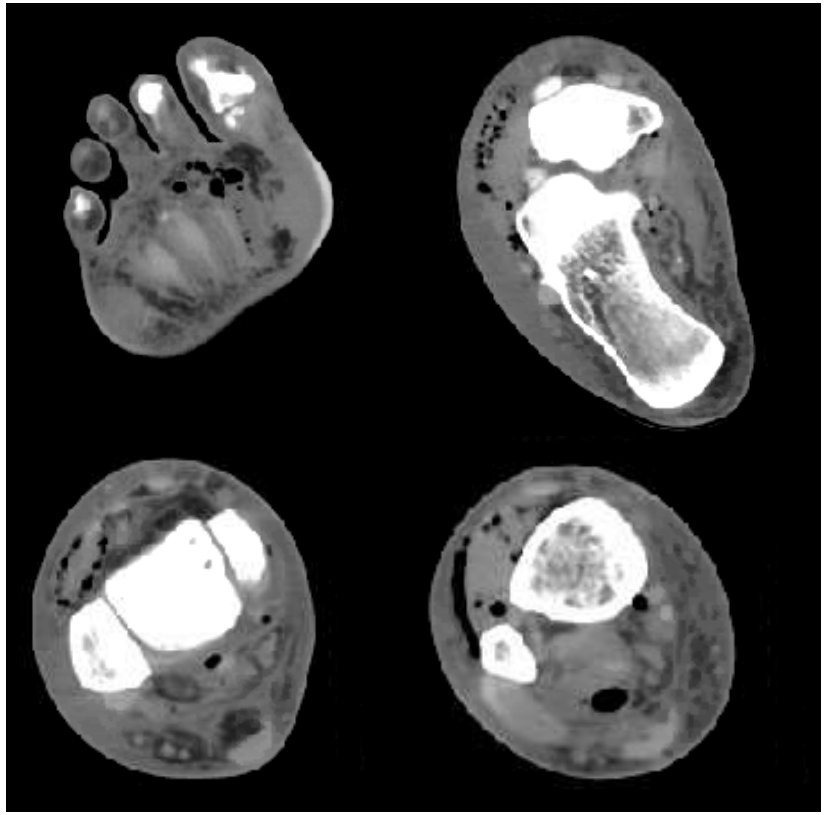

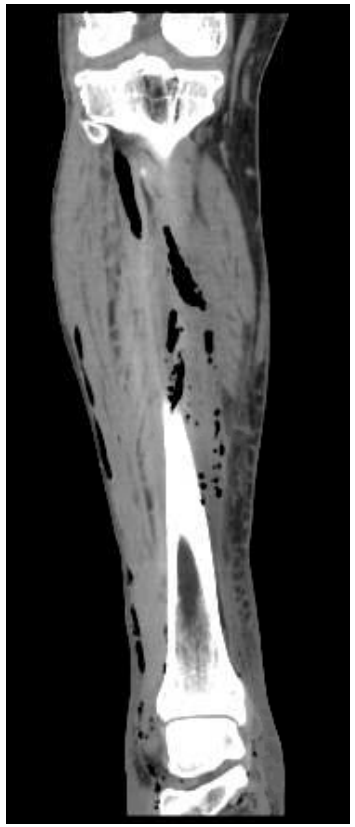

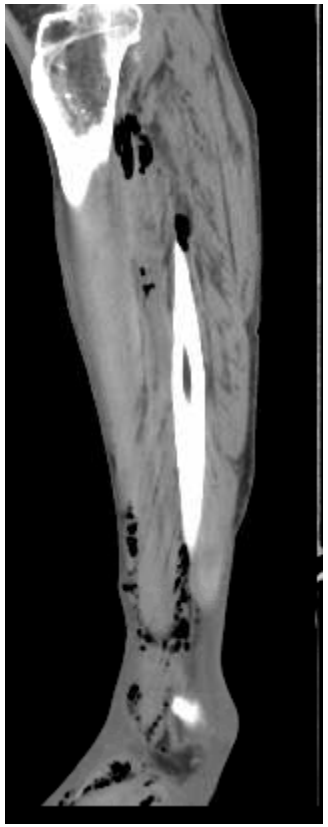

62y/o male with diabetes (A1C 8%), hypertension, CKD3, peripheral vascular disease and right foot ulcer x 3 months who presented to clinic at a CAH with pain in his right foot and cellulitis

- Given Vancomycin, Pip/Tazo, Clindamycin.
- Transferred to tertiary care center
- Taken to OR for I&D R leg with fasciotomies. Deep posterior compartment was opened and purulent purple red pus identified. Necrotic tissue and muscles
- Blood cultures negative
- Wound Gram stain: many WBC, many GNR, mod GPC.
- Surgical Culture with Streptococcus anginosus and group B strep

Infectious Disease Case Five

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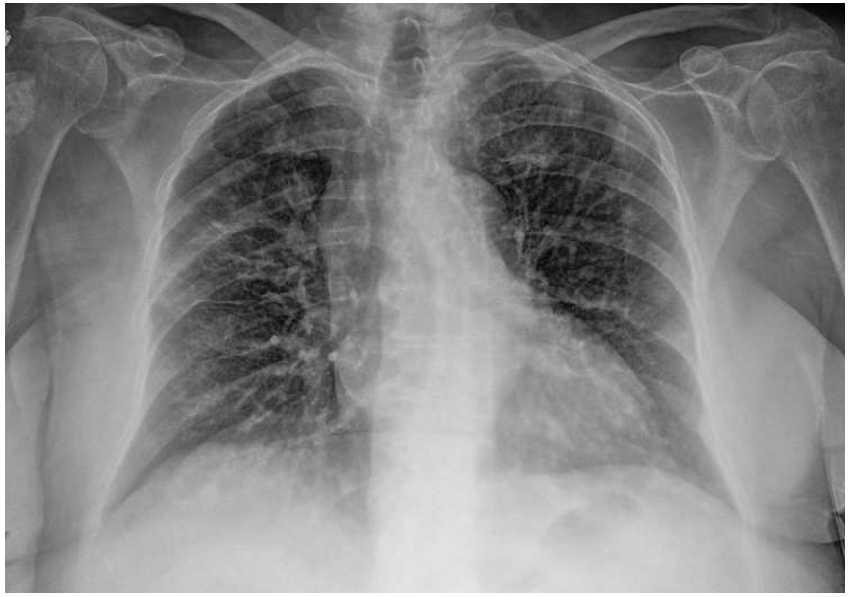
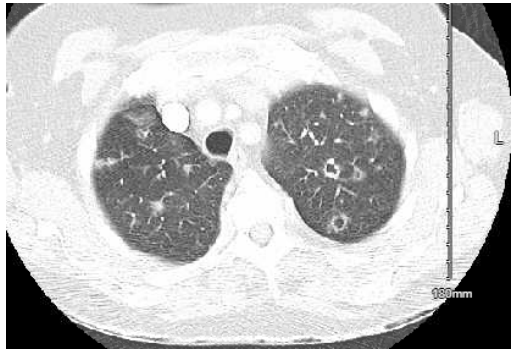
79y/o female with hx squamous cell carcinoma of the vulva s/p hemivulvectomy and radiation 1 year prior who presented to a CAH ER with left chest pain that woke her from sleep

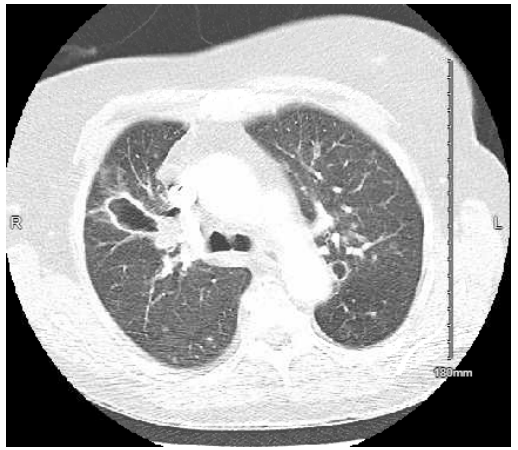
- Cough for a few weeks which made the chest pain worse.
  - Hx MRSA abscesses s/p multiple I&D
- Vitals T 99.1, P 57, R 18, BP 136/52
- Labs: WBC 9.82, Hb 11, Plt 266, procal <0.05. Ddimer 4464
- Influenza/RSV/COVID neg

79y/o female with hx squamous cell carcinoma of the vulva s/p hemivulvectomy and radiation 1 year prior who presented to a CAH ER with left chest pain that woke her from sleep



- CT chest: Numerous bilateral cavitary lung lesions.
- Differential includes septic pulmonary emboli, primary pulmonary atypical infection as well as metastatic pulmonary lesions.





79y/o female with hx squamous cell carcinoma of the vulva s/p hemivulvectomy and radiation 1 year prior who presented to a CAH ER with left chest pain that woke her from sleep

- Work up obtained, pt felt better so dc home the next day.
- Placed on doxy + augmentin
- Outpatient IR biopsy scheduled 4 days after dc.

LUNG, RIGHT UPPER LOBE, CT-GUIDED BIOPSY:
1. **INVASIVE SQUAMOUS CELL CARCINOMA, FAVOR METASTASIS**

Infectious Disease Case Six

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81 y/o female with HTN, Afib, recurrent UTI, history of Cdiff x 6 times and s/p fecal transplant in 2020 presented to CAH ER with sepsis / AMS / diarrhea.

- Was recently treated for URI with azithromycin and was placed on PO Vanc for 5 days after completion.
  - Completed PO Vanc 5 days before.
- Presented to ER 4 days earlier with diarrhea and had negative Cdiff testing.
- In ER, UA with 10-14 WBC. Cdiff testing +toxin/antigen/PCR

81 y/o female with HTN, Afib, history of Cdiff x 6 times and s/p fecal transplant in 2020 admitted with sepsis / AMS / diarrhea.

- Family at bedside very nervous with her having Cdiff and needing transferred for ID consults and fecal transplant.
- Was on ceftriaxone for possible UTI – family worried about her sepsis being caused from UTI.

Hospital course

- Stopped ceftriaxone, reassured family
- Continued on oral vancomycin (did not pursue fidaxo due to cost)
- CT showed pancolitis
- Discharged hospital day 4 after marked improvement in stools
- Arranged for bezlotoxumab to be given in 1 week
- Arranged for fecal transplant at the CAH 24 hours after the last dose of Vancomycin.
- Family extremely grateful that no transfer was needed!

Summary

- Patients can be kept locally for ID expertise with tele-ID
- Enhances patient's perception of local hospital
- Consulting at a CAH can help expedite a work-up, streamline transfers to higher level of care and streamline discharge planning process
- Keep patient's follow-up testing like CT scans, MRIs, infusions, fecal transplants local
- Tele-ID can be beneficial also at tertiary / regional referral centers to cover full time staff and in complicated cases that hospitalists or surgeons may not feel comfortable managing.

Questions?

- Thank You!

- Allison Nazinitsky MD
- drnaz@idss.health