



Medicine Clerkship: Cancer

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Case #1: Mr. C

- 49 year old man with a chief complaint of fever, cough, and SOB x 2 weeks
 - Cough, sometimes productive
 - Shortness of breath, dyspnea on exertion
 - Fevers to 100.8
 - Sweats intermittently
- PMH and PSH: Hypertension. No surgeries.
- Social history: Works as a mechanic full time. Former smoker. No alcohol or drugs.

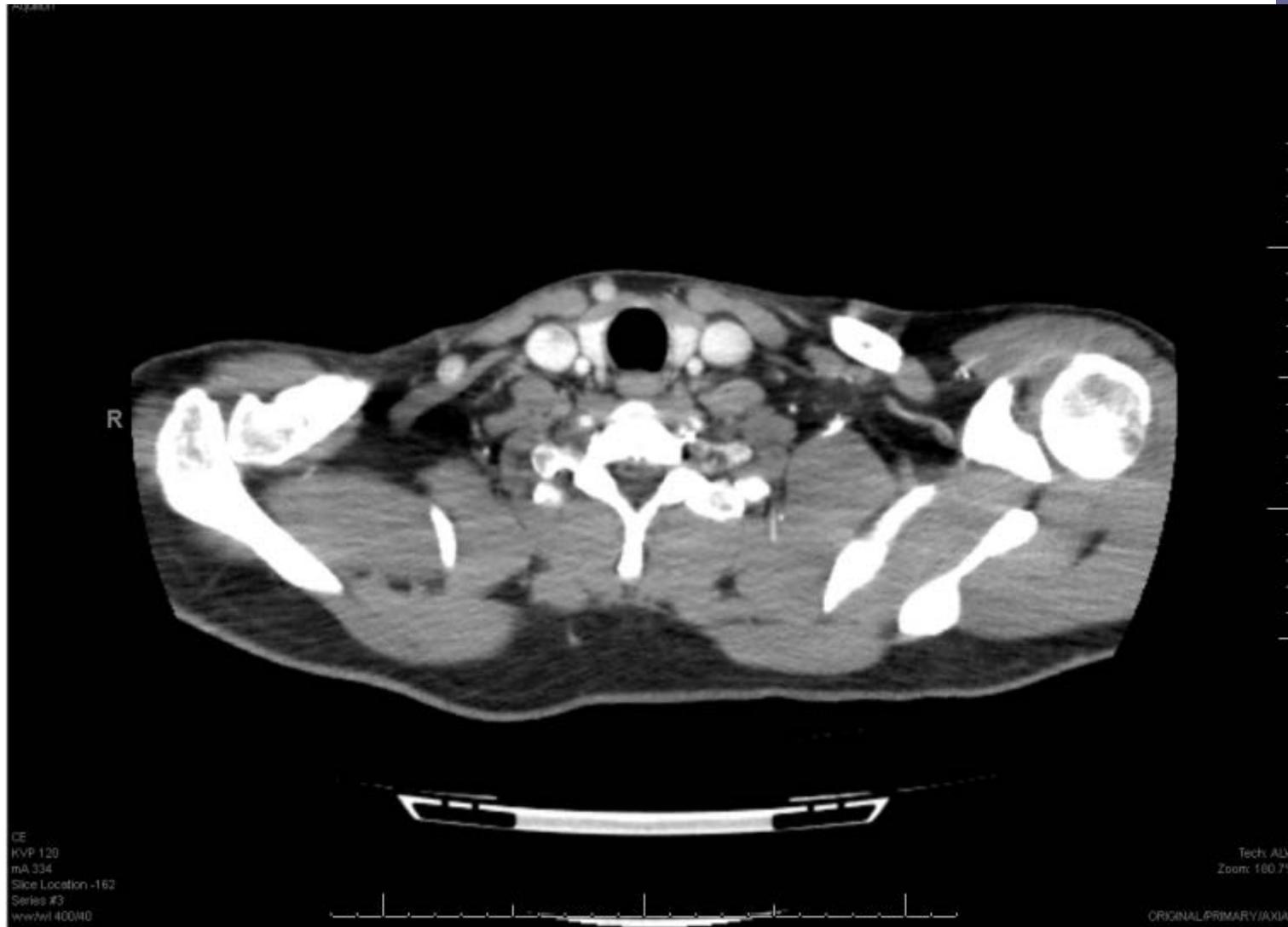


Mr. C...continued

- Exam in ER – tachycardia (HR in 110s), O₂ saturation 88%, crackles at right lung base, palpable left supraclavicular node
- CXR suspicious for lung mass and pneumonia
- CBC:
 - WBC 13.2 (89% neutrophils)
 - Hgb 11, hematocrit 34%
 - Platelets normal
- CT scan ordered

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Mr. C's CT chest



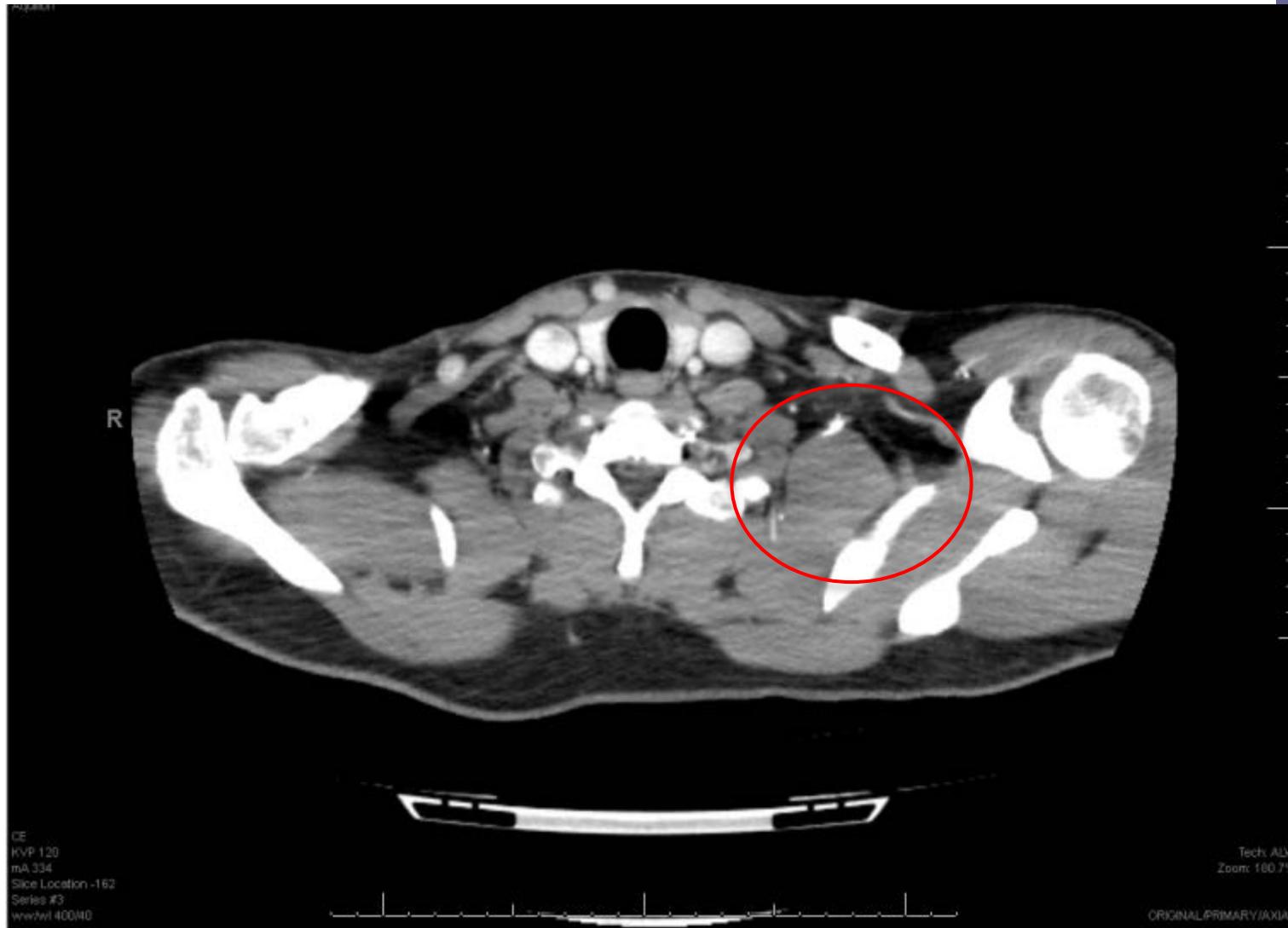
CE
KVP:120
mA:334
Slice Location -162
Series #3
Window/Width 400/40

Tech: ALY
Zoom: 100.7%

ORIGINAL/PRIMARY/AXIAL

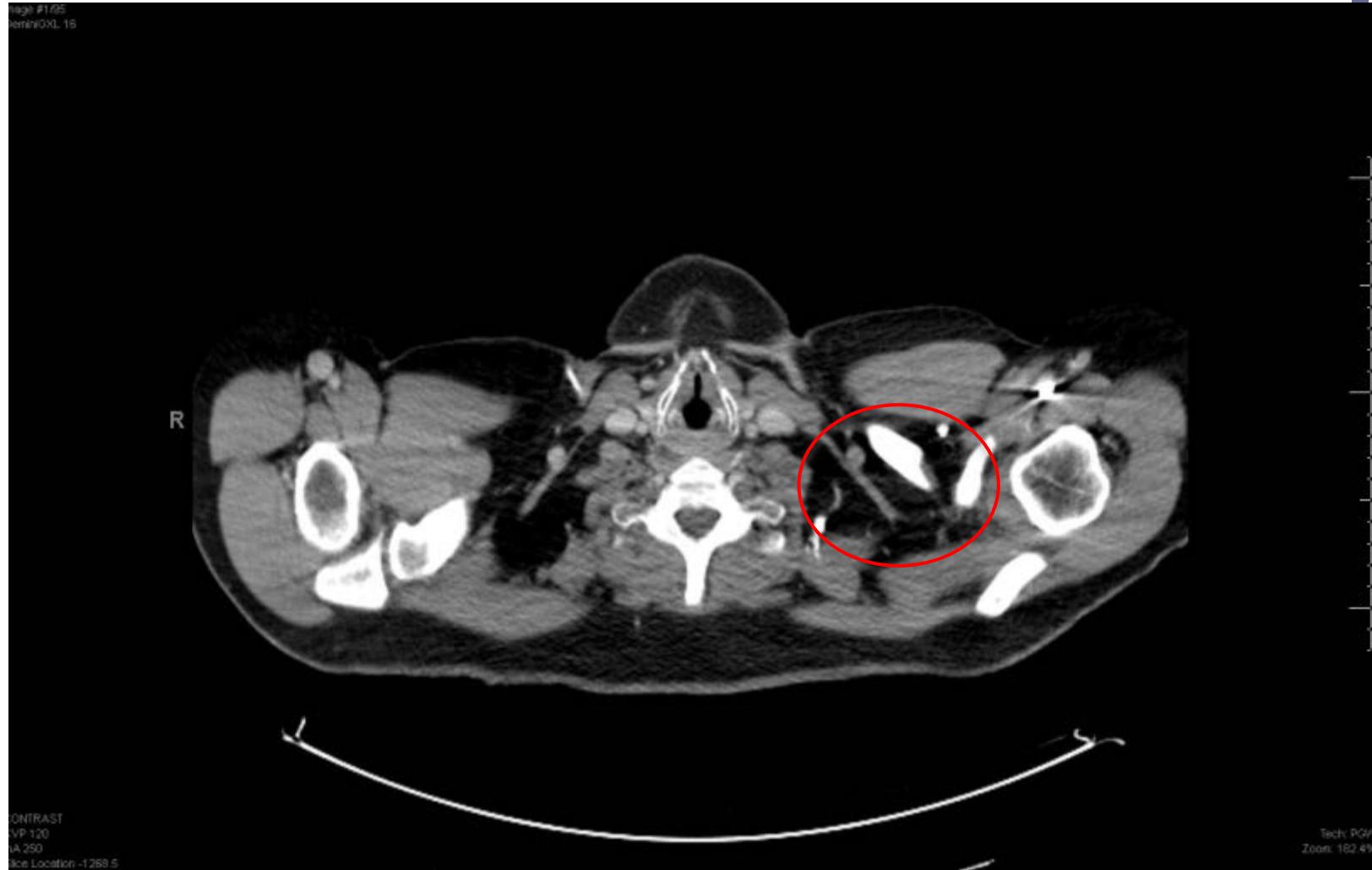
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Mr. C's CT chest



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And a normal CT for comparison





Mr. C

- Intern in the ER: “You have lung cancer and it doesn’t look curable”
- Admitted to Internal Medicine for work up.

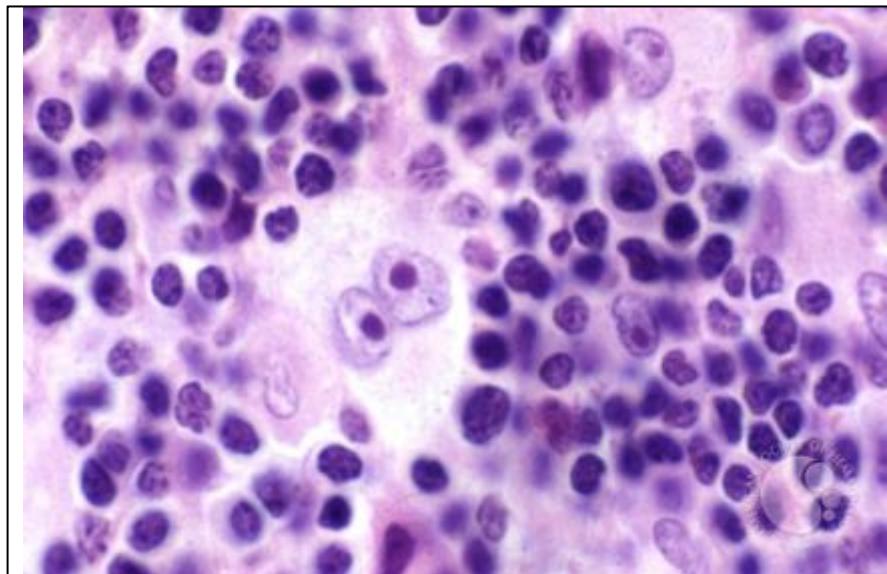
If you were the intern, would you have handled this differently?

What is the RIGHT way to make a cancer diagnosis?



Step 1: Diagnostic Workup

- What type of biopsy would you recommend for this patient?
- Biopsy confirms:
 - CD 15+, CD, 30+, CD 45+
- Macroscopy appears like:



What is the Diagnosis

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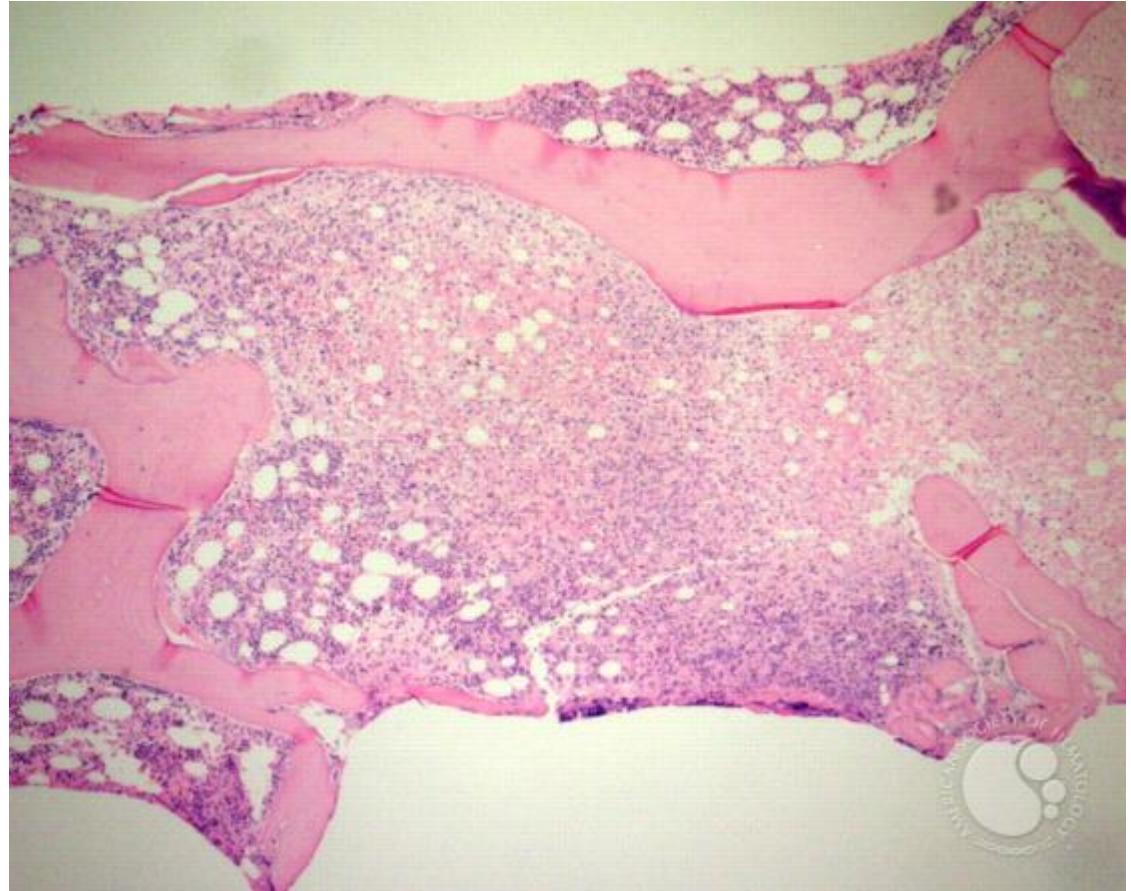
Step 2: Staging

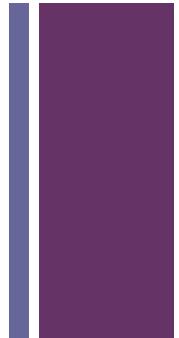
■ How would you stage his cancer?



How Would you Stage Mr. C?

- Bone marrow biopsy:
- Diffuse involvement with Hodgkins Lymphoma
- **What stage is his disease?**





■ What treatment would you offer to Mr. C?

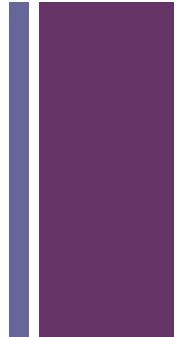


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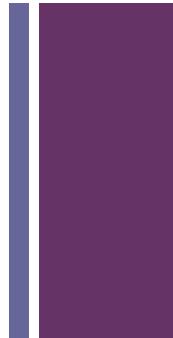
Now Sit Back and Let's Learn!



Cancer Cases & Deaths, 2013



- What is the most common cancer in both men and women?
- **Skin Cancer**
- What is the most common cancer in males? How about females?
- **Prostate and Breast**
- What cancer leads to the most deaths in **both** men and women?
- **Lung Cancer**
- What cancer is the **2nd** most common cause of death in **both** men and women?
- **Colorectal Cancer**

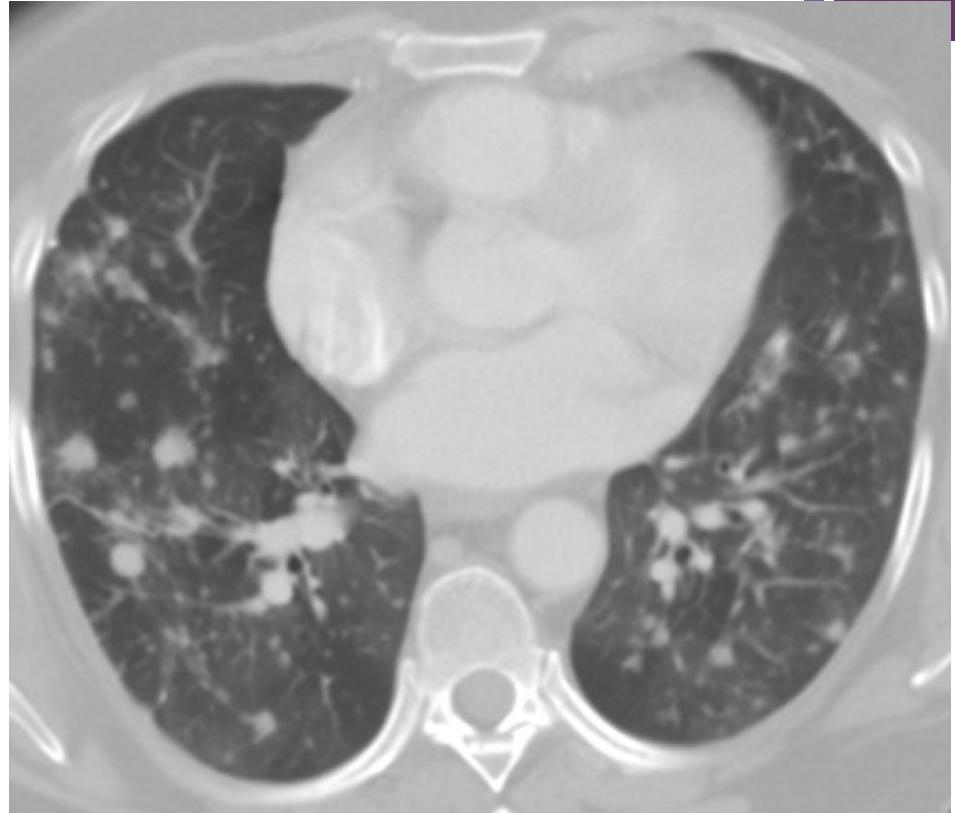


Can we make a diagnosis of a
solid tumor based on imaging
alone?



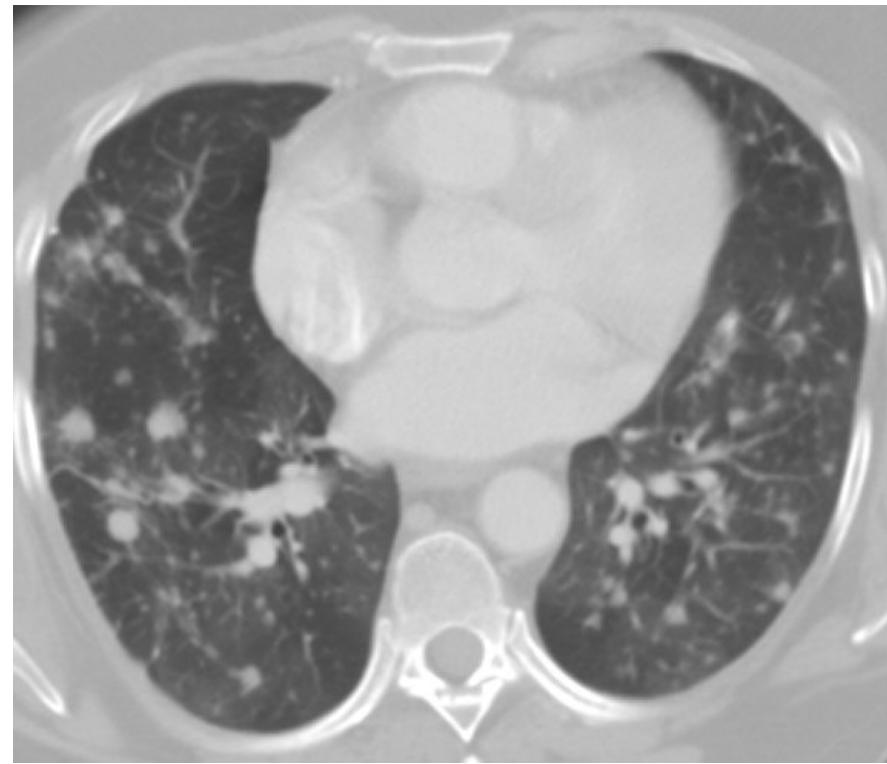
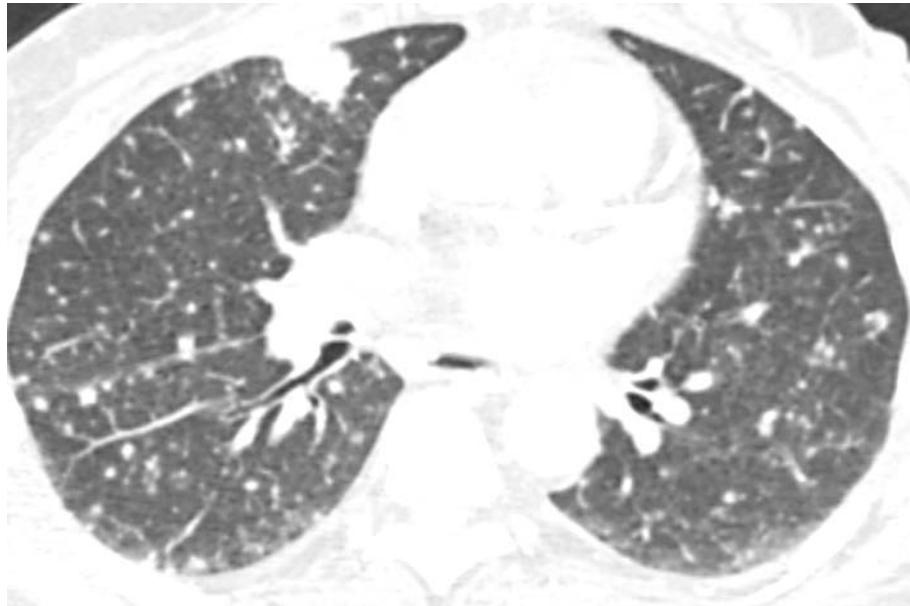
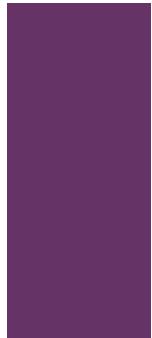
Step 1: Making a Cancer Diagnosis

- Need tissue
- “tissue is the issue”
- Fine needle aspirate
- Core needle biopsy
- Excisional Biopsy
- Best for lymphoma dx



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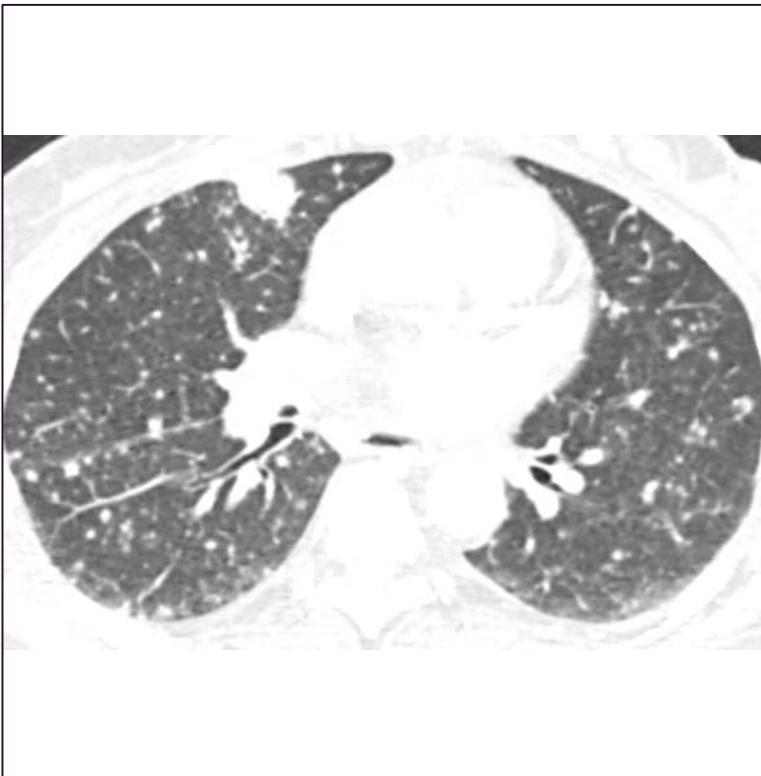
What's the Diagnosis?



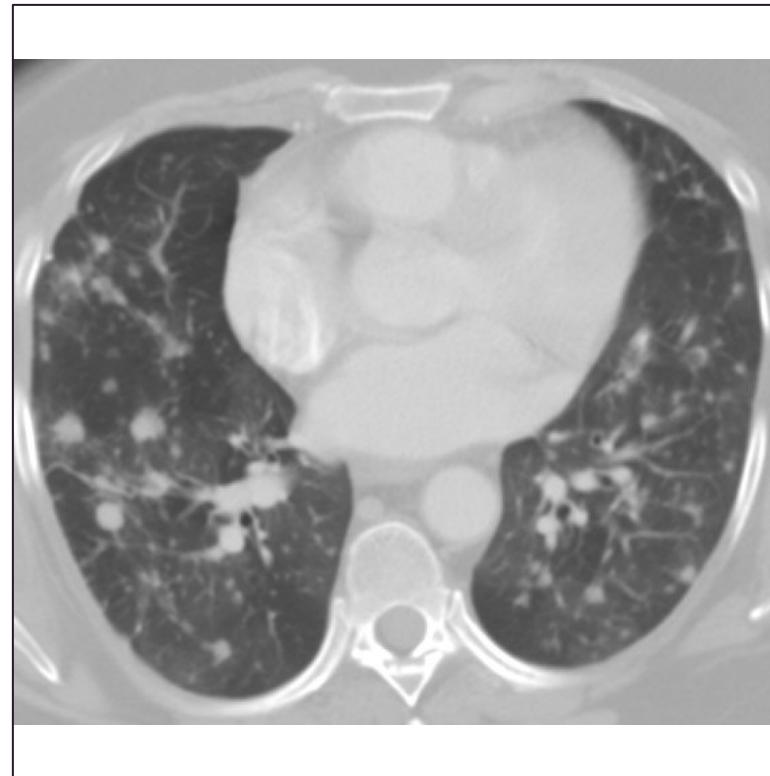
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What's the Diagnosis?

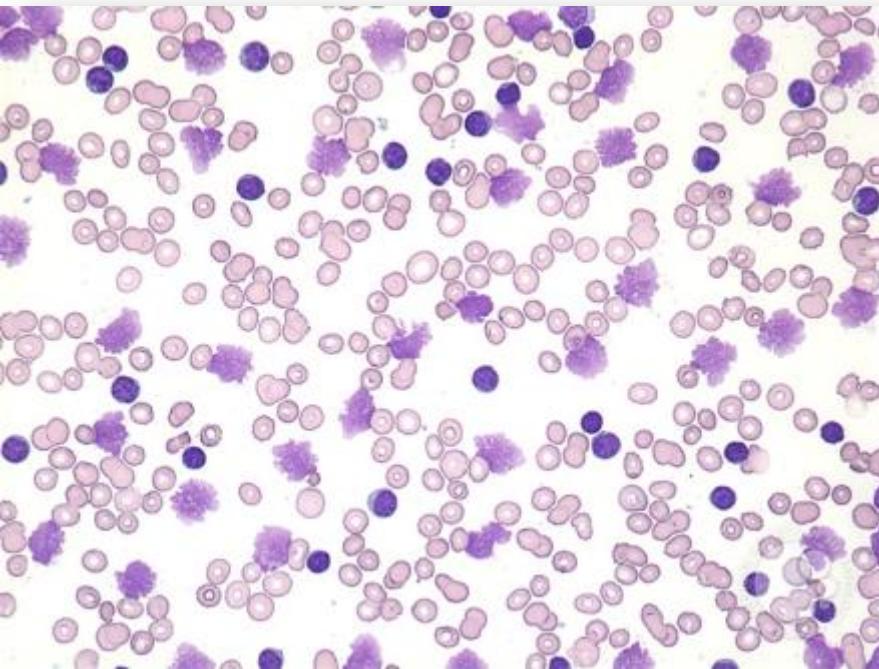
Pulmonary nocardia



Metastatic lung cancer

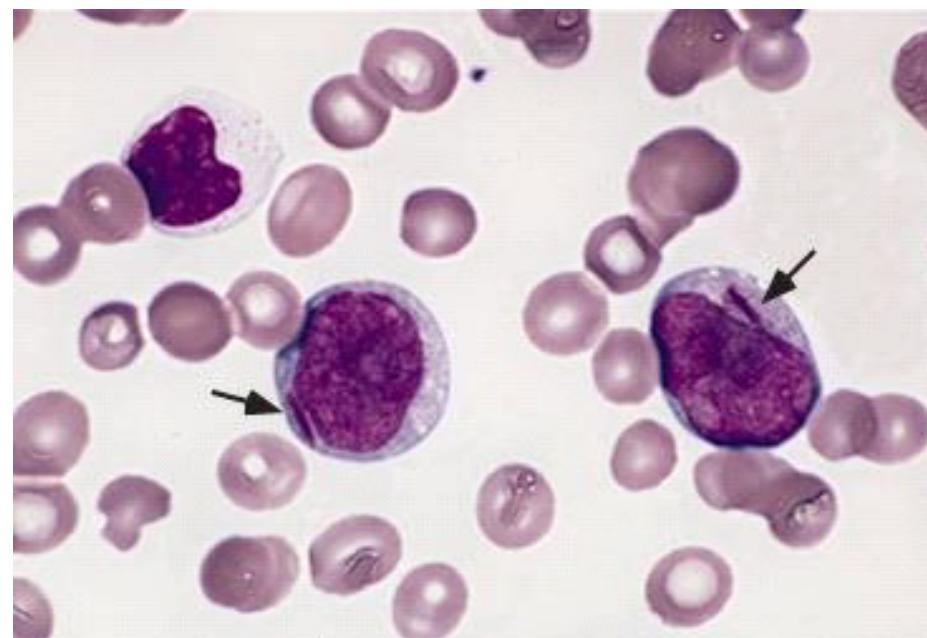


Sometimes the microscope can make a diagnosis! Blood disorders



CLL

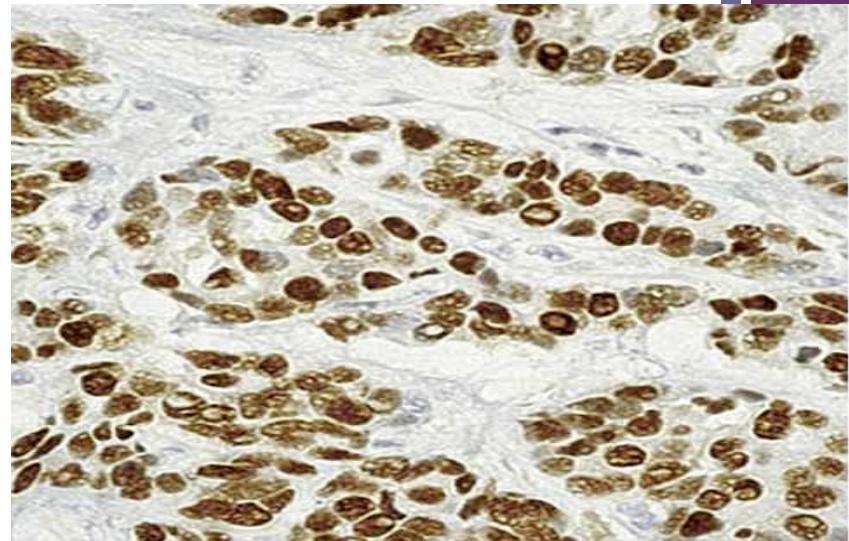
AML: M3 APL



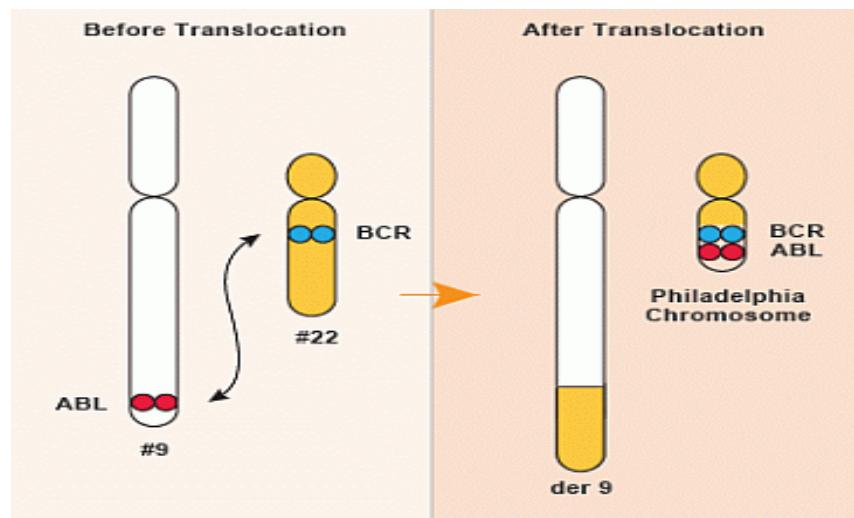
+ Beyond the Microscope:



- Immunohistochemistry
 - ER/PR receptors in breast cancer



- Molecular markers
 - BCR-ABL
 - Translocation between chromosomes 9 & 22
 - Philadelphia Chromosome





Step 2: Staging



Importance of Staging?

- Understanding the extent to which the cancer is involved
- Helps to accurately predict a patients prognosis
- Dictates how patients are treated
- Gives a common language



Two Methods of Staging

Clinical Staging

- Physical exam
- Imaging
 - CT and Pet scan
 - MRI

Pathologic Staging

- Information obtained during a surgical procedure
 - Endoscopic exams in GI cancers: EUS
 - Pathologic specimen – fluid or tissue

TNM staging system for lung cancer (seventh edition)



Staging System: AJCC (“TNM”) for solid tumors

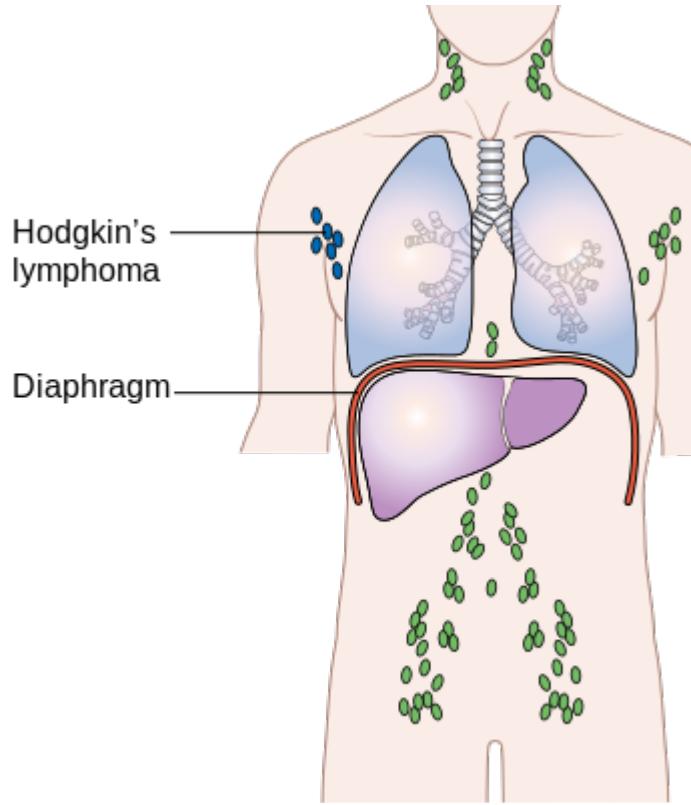
- Tumor
- Node
- Metastases

Primary tumor (T)			
T1	Tumor ≤3 cm diameter, surrounded by lung or visceral pleura, without invasion more proximal than lobar bronchus*		
T1a	Tumor ≤2 cm in diameter		
T1b	Tumor >2 cm but ≤3 cm in diameter		
T2	Tumor >3 cm but ≤7 cm, or tumor with any of the following features: Involves main bronchus, ≥2 cm distal to carina Invades visceral pleura Associated with atelectasis or obstructive pneumonitis that extends to the hilar region but does not involve the entire lung		
T2a	Tumor >3 cm but ≤5 cm		
T2b	Tumor >5 cm but ≤7 cm		
T3	Tumor >7 cm or any of the following: Directly invades any of the following: chest wall, diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium, main bronchus <2 cm from carina (without involvement of carina) Atelectasis or obstructive pneumonitis of the entire lung Separate tumor nodules in the same lobe		
T4	Tumor of any size that invades the mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, carina, or with separate tumor nodules in a different ipsilateral lobe		
Regional lymph nodes (N)			
N0	No regional lymph node metastases		
N1	Metastasis in ipsilateral peribronchial and/or ipsilateral hilar lymph nodes and intrapulmonary nodes, including involvement by direct extension		
N2	Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s)		
N3	Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraventricular lymph node(s)		
Distant metastasis (M)			
M0	No distant metastasis		
M1	Distant metastasis		
M1a	Separate tumor nodule(s) in a contralateral lobe; tumor with pleural nodules or malignant pleural or pericardial effusion		
M1b	Distant metastasis (in extrathoracic organs)		
Stage groupings			
Stage IA	T1a-T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T1a,T1b,T2a	N1	M0
	T2b	N0	M0
Stage IIB	T2b	N1	M0
	T3	N0	M0
Stage IIIA	T1a,T1b,T2a,T2b	N2	M0
	T3	N1,N2	M0
	T4	N0,N1	M0
Stage IIIB	T4	N2	M0
	Any T	N3	M0
Stage IV	Any T	Any N	M1a or M1b

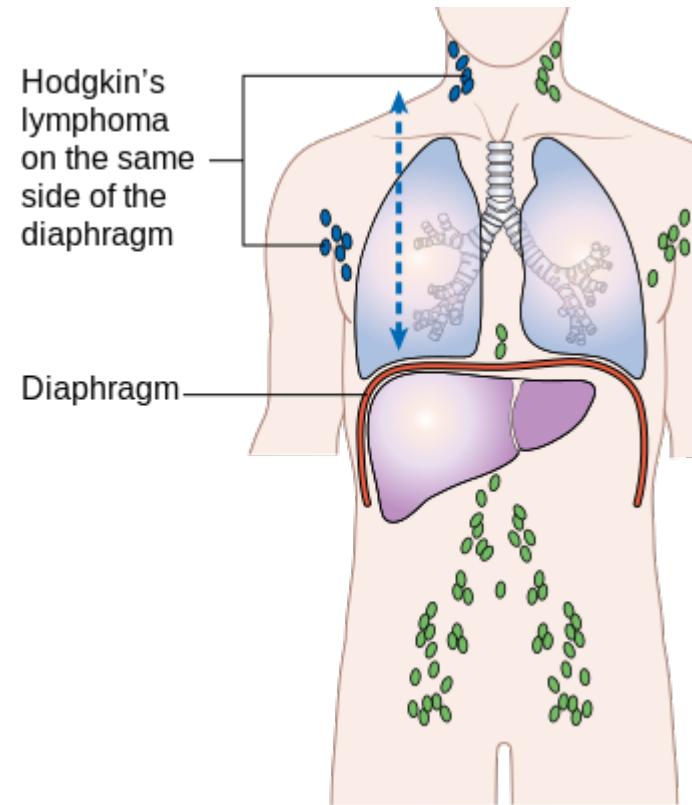
* The uncommon superficial spreading tumor of any size with its invasive component limited to the bronchial wall, which may extend proximal to the main bronchus, is also classified as T1a.



Ann Arbor Staging for Lymphomas



Stage I

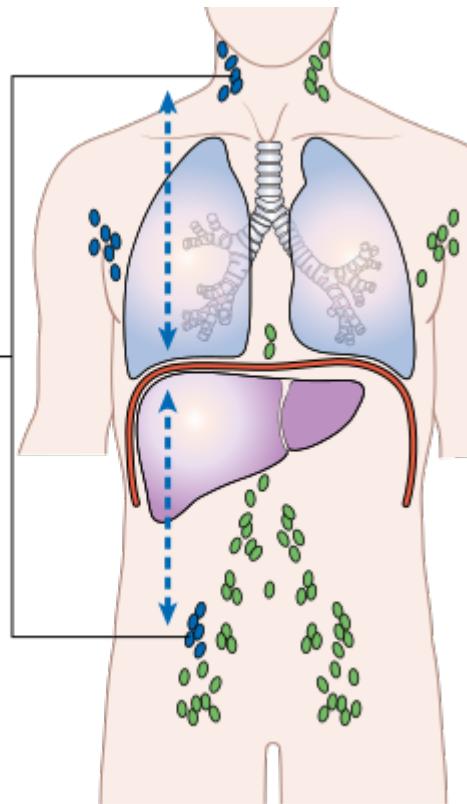


Stage II

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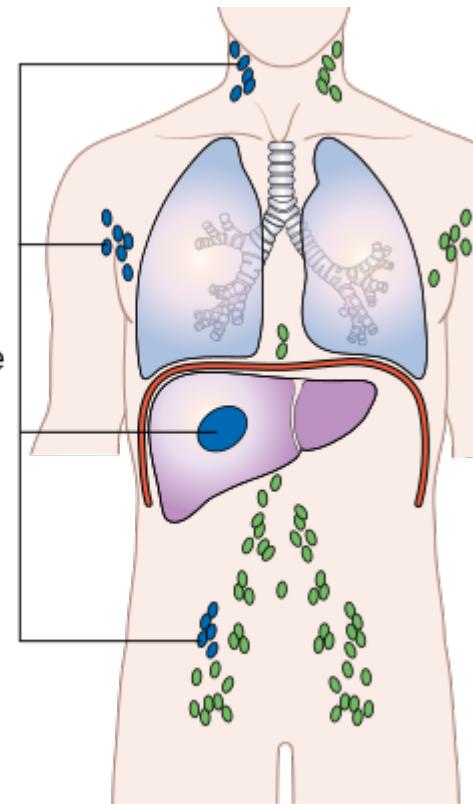
Ann Arbor Staging for Lymphomas

Hodgkin's lymphoma
on both
sides of the
diaphragm



Stage III

Hodgkin's lymphoma
in the lymph nodes above
and below the
diaphragm
and has
spread to
the liver



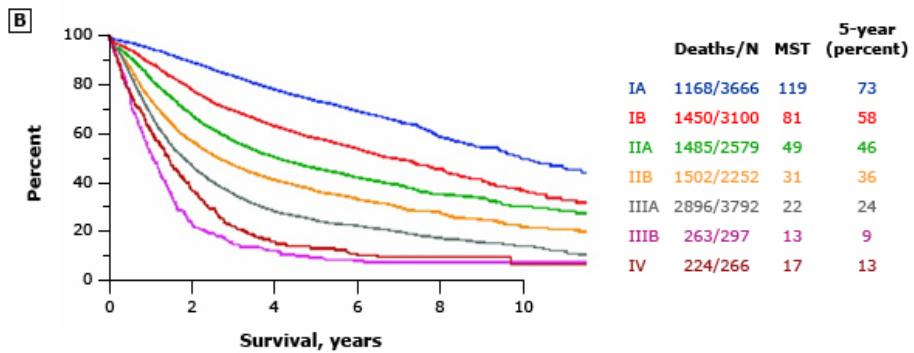
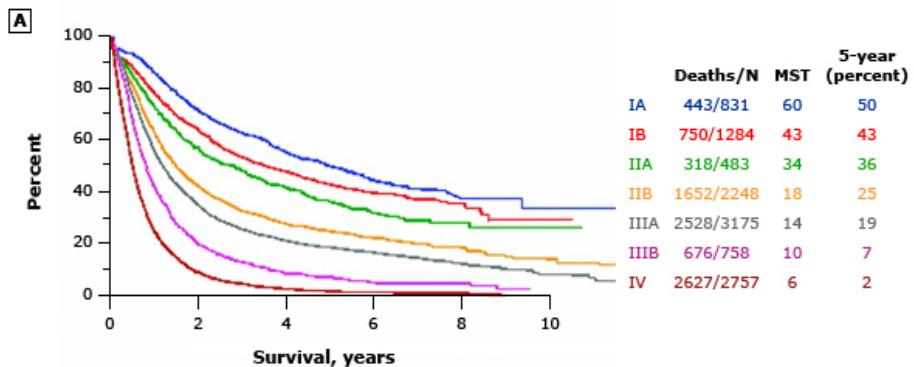
Stage IV



Prognosis Varies by Stage

Overall survival for non-small cell lung cancer, by stage (TNM)

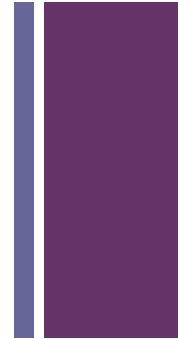
Overall survival by TNM grouping, NSCLC



Overall survival, expressed as median survival time (MST) and five-year survival, using the sixth edition of TNM staging system by (A) clinical stage and (B) pathologic stage. Reproduced with permission from: Goldstraw, P, Crowley, J, Chansky, K, et al. The IASLC Lung Cancer Staging Project: proposals for the revision of the TNM stage groupings in the forthcoming (seventh) edition of the TNM Classification of malignant tumours. *J Thorac Oncol* 2007; 2:706. Copyright © 2007 Lippincott Williams & Wilkins.



The Big Picture



Stage I early

Stage II and III advanced

Stage IV metastatic or very advanced



Prognosis worsens

Important to know that **NOT ALL** stage IV cancers are incurable

- Lymphoma
- Colon cancer
- Breast Cancer
- Head and Neck Cancers

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Prognostic Scores for Lymphomas

- Lymphomas have their own prognostic scoring systems
 - further help characterize how patients will do
 - APLES

- A: age >60
- P: performance status
- L: LDH elevated
- E: extranodal sites
- S: stage III or IV

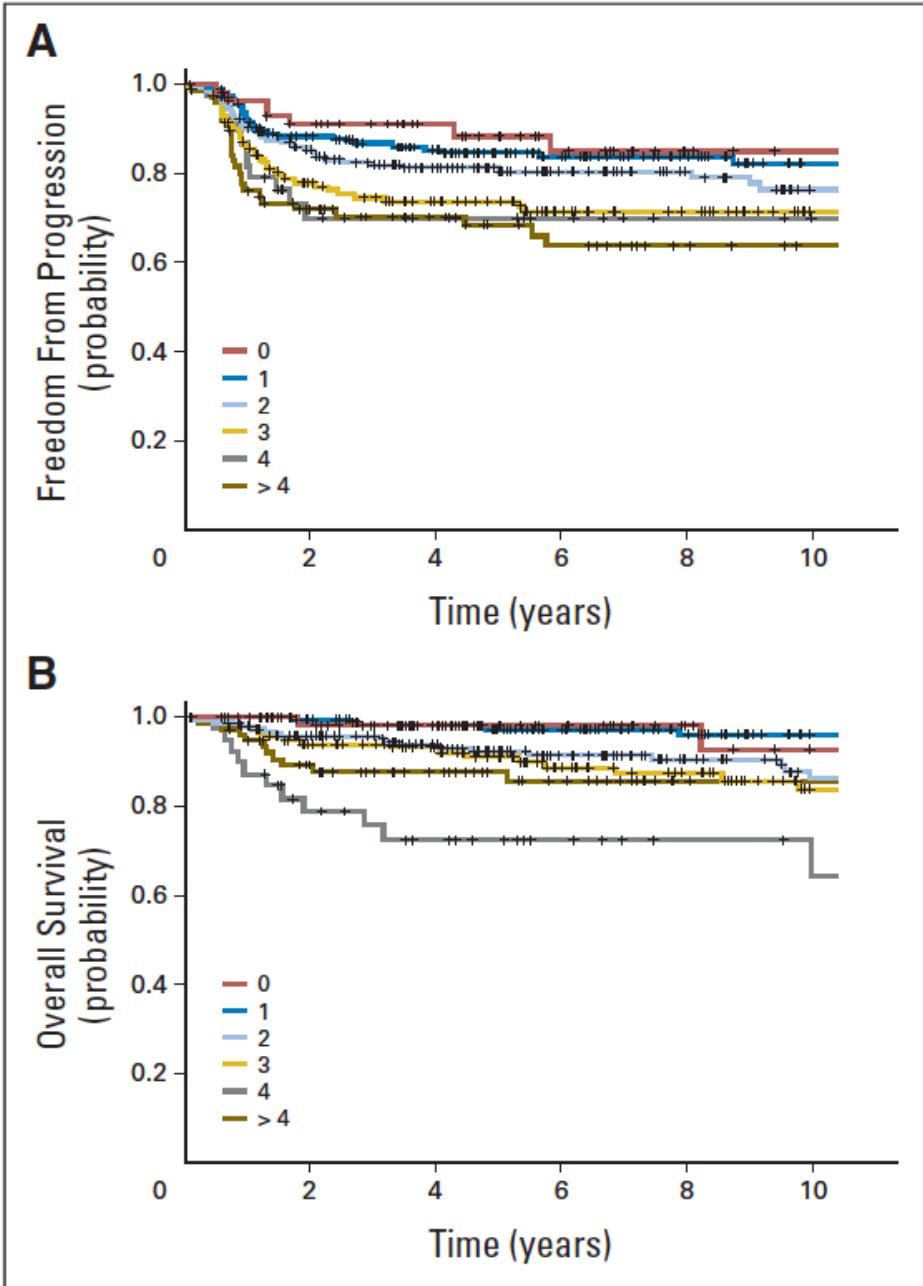


Higher scores = Worse prognosis

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And Mr. C's prognosis?

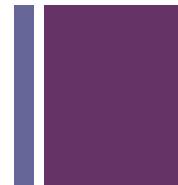
- Stage IV by bone marrow involvement
- IPS= 2





+ Cancer Treatment Goals of Therapy Response to Treatment

Goals of Therapy



- Curable vs Not Curable
 - Localized disease or Metastatic
 - Performance status
 - Wishes
- Improve survival and extend life
- Palliate symptoms in the non-curable s
 - quality versus quantity
 - Treatment can be TOXIC





Treatment Modalities

Local Therapies

- Surgery
 - To cut is to cure
 - Its best in a bucket
- Radiation

Systemic Therapies

- Chemotherapy
- Hormonal therapy
- Targeted agents against specific receptors or pathways
- Immunotherapy

All of these can be used in the curative or palliative setting

Surgery

Most solid tumor cancers
cannot be cured unless they
are cut out

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Some cancers are curable
without surgery:

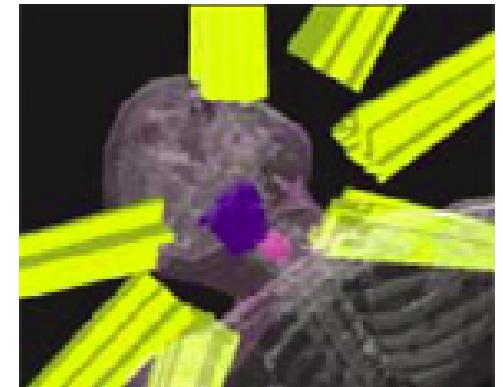
- Lymphoma and blood cancers
- Small cell lung cancer



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Radiation Therapy

- For localized disease of an organ in a fixed location
- Reduces the risk of the cancer coming back locally
- Shrink a cancer so it can be cut out successfully
- Can offer better cosmesis and eliminate the need for more extensive surgery
 - Breast cancer
 - mastectomy vs lumpectomy



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Systemic Therapy:

- Chemotherapy, Hormonal therapy, Biologic Agents, Immunotherapy
- Adjuvant: to kill micrometastatic disease after cancer resection
- Neoadjuvant: to result in better surgical outcomes and downsize tumor





How was Mr. C treated?

- 6 months of chemotherapy with ABVD and cured
- He developed cough and DOE 2 months after stopping chemo:

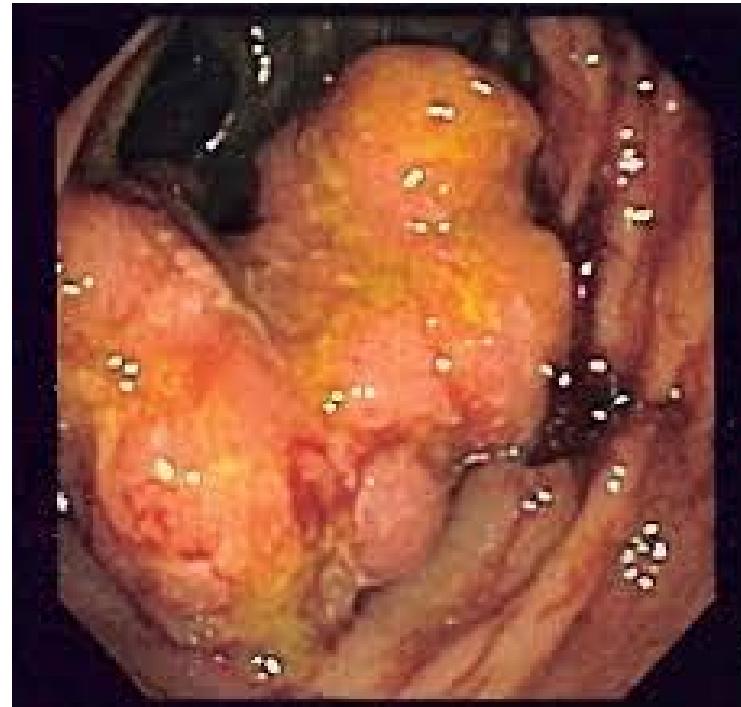


Bleomycin Toxicity: Treat with Steroids



Case #2: Solid Tumor = Ms. J

- 48 yo AAF with rectal bleeding for 2 months with bowel movements. Complains of difficulty defecating.
- Colonoscopy shows a friable, partially obstructinga biopsy is taken:



Well differentiated adenocarcinoma of the rectum

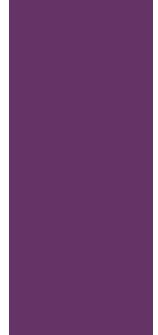


Step 2: Staging

- CT Chest, ABD, and PEL shows **no** evidence of distant metastatic disease, particularly a clear liver and normal lung fields
 - An endoscopic US (EUS) is performed for additional staging
 - Stage II T3N0M0
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- **How would you treat:**
 - Chemoradiation → downstage and prevent local recurrence
 - Surgery → cure
 - Adjuvant chemotherapy → prevent distant recurrence

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Monitoring Response to Therapy



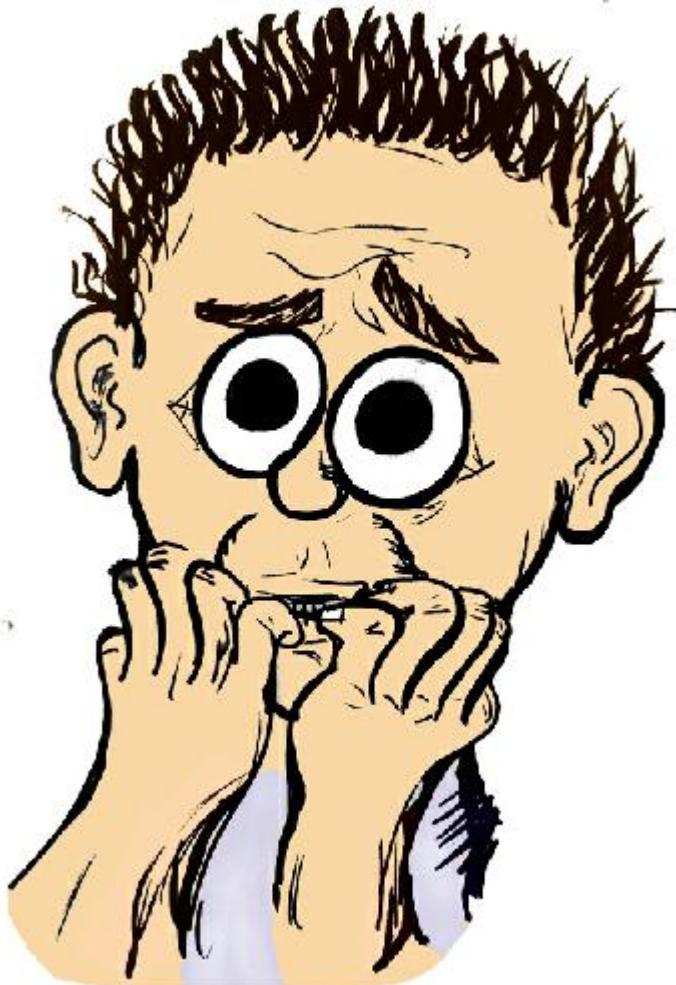
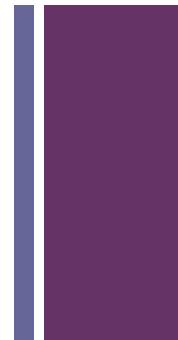
- Tumor markers

- CEA
- β -HCG
- CA 19-9
- CA 125

- Imaging:

- CT scans
- MRI
- PET scans
- Bone marrow biopsy

+ Defining Response to Therapy



Complete Response

- Tumor/disease is no longer detectable
- Does not necessarily mean “cured”

Partial Response or Stable disease

Progressive Disease

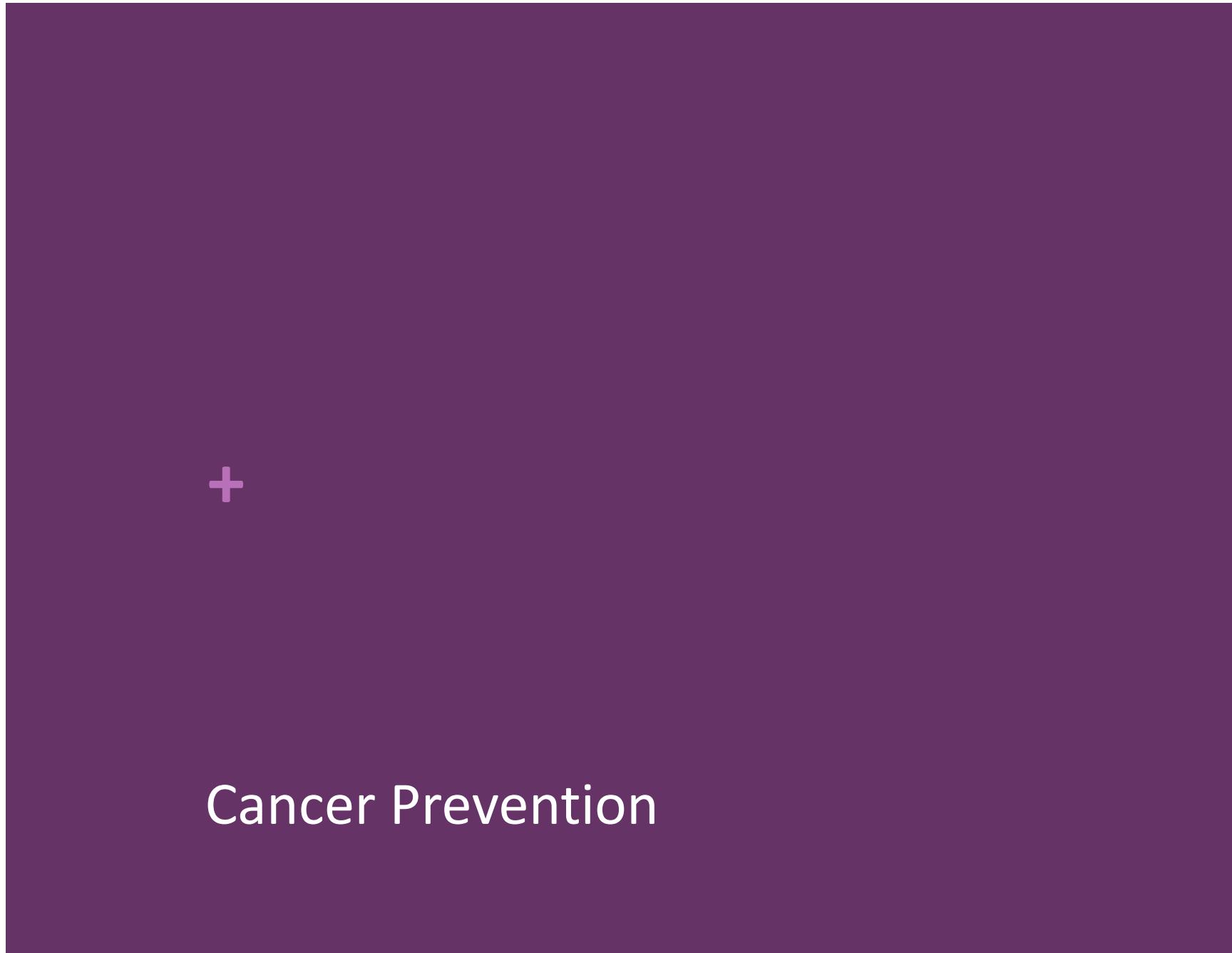
- Growth of cancer or new lesions that develop



Common Side Effects of Chemotherapy and/or Radiation

- Nausea and vomiting
- Hair loss
- Myelosuppression
 - Neutropenic fever
- Mucositis
- Diarrhea
- Burns (radiation)
- Neuropathy





Cancer Prevention

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save the ta~~x~~tas



Seven Steps to Prevent Cancer

- 1 Don't use tobacco.
- 2 Protect your skin from the sun.
- 3 Eat a healthy diet.
- 4 Maintain a healthy weight and be physically active.
- 5 Practice safer sex and avoid risky behaviors.
- 6 Get immunized (HPV & hepatitis vaccines).
- 7 Know your family medical history and get regular cancer screenings.

To learn more, please visit www.preventcancer.org



THE CANCER PREVENTION DIET

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KUSHI**
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Revised and Updated
with the Latest Research,
New Recipes, and Practical
Suggestions for Relieving
25 Types of Cancer

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+ Prevention



- Lifestyle changes to prevent cancer

- The 3 BIG ones

- Smoking cessation

- Reduction in alcohol use

- Exercise





+ Prevention

- Screening programs
 - Colonoscopy for colorectal cancer
 - PAP smears for cervical cancer
 - Mammograms for breast cancer
 - PSA measurement for prostate cancer
 - CT scans for lung cancer in smokers

