Challenges in Radiology CDS: Evolving Strategies to for Implementation

Kevin W. McEnery, MD

Director Innovation Imaging Informatics

Professor of Radiology

kmcenery@mdanderson.org

THE UNIVERSITY OF TEXAS

MD Anderson

Cancer Center

Making Cancer History®

Disclosures

- Philips Healthcare
  - Trusted Advisor
- Epic
  - Epic Radiant Clinical Council
  - Epic Radiant Steering Board
- CODAMETRIX
  - Founding Scientific Advisor
- MDACC (Provider-led entity)
  - Chair, Appropriate-use Committee

Protecting Access to Medicare Act (PAMA) Imaging Decision Support

- In 2014, Medicare SGR patch ("Doc Fix") prevented a scheduled 24 percent reduction in Medicare physician reimbursement rates.

- Implementation by ~~1/1/2017~~ ~~1/1/2018~~ 1/1/2021
  - 1/1/2020 – "Educational and Testing Year"

- Physicians ordering advanced diagnostic imaging exams
  - CT, MRI, Nuclear Medicine and PET

- "Must consult government- approved, evidence-based appropriate-use criteria, namely through a CDS system".

- Scope: Out-patients and Emergency Center
  - Short-term admission units – out-patient status
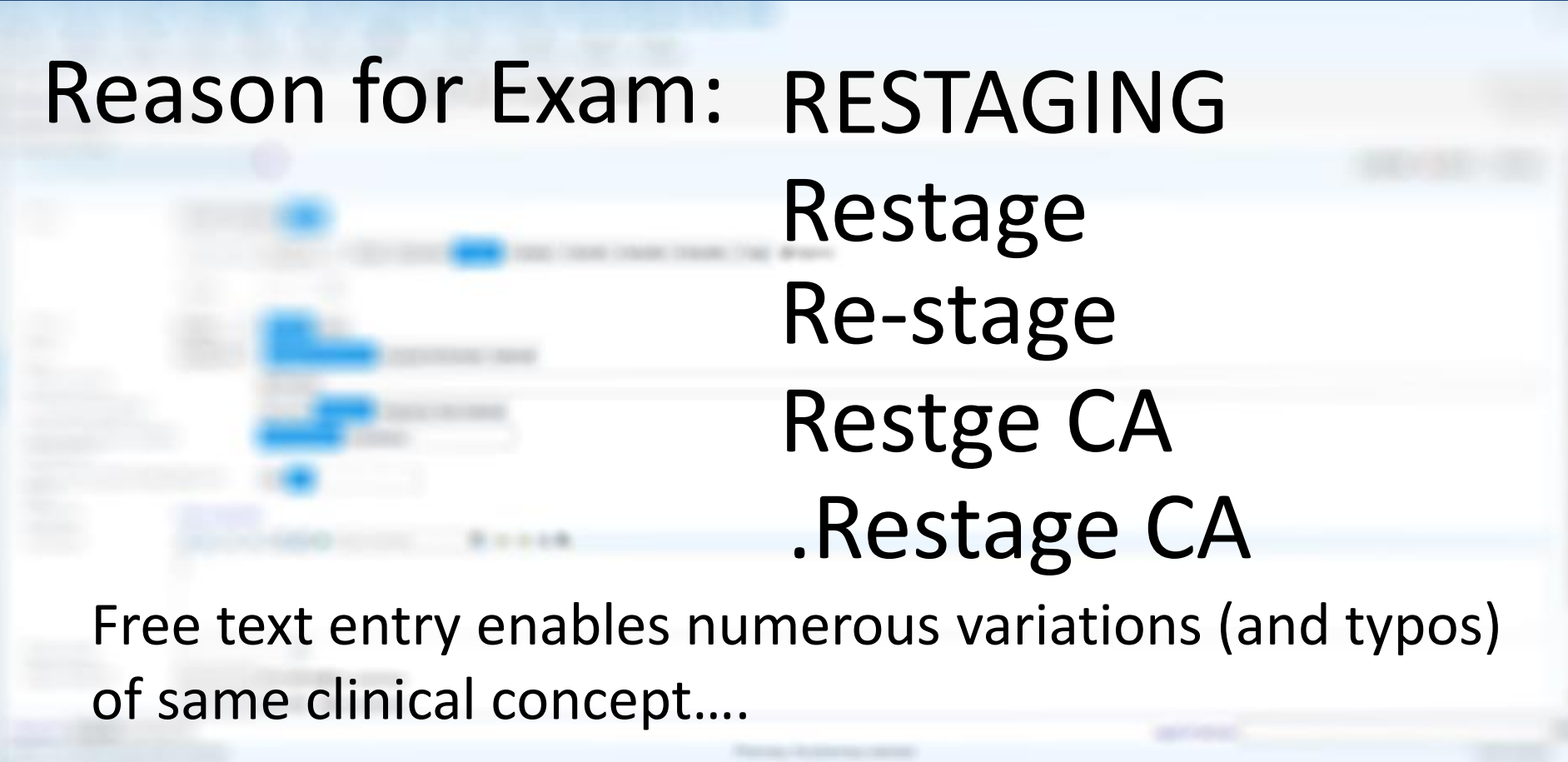
Imaging CDS: Potential Adverse Impacts

- Financial penalties
  - PAMA: Failure to implement CDS system risks 100% of Medicare payments
- Provider workflow…Burn-out
  - Extra clicks
  - Alert fatigue
- Radiologist clinical productivity and accuracy
  - Inadequate clinical history and indications

CDS Only Focus

Order

CDS
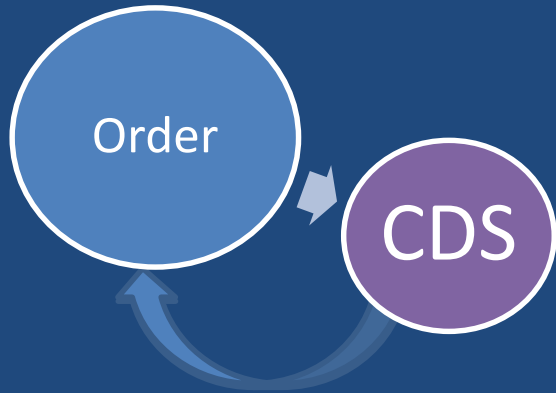
- Meet PAMA requirements
  - Avoid adverse penalties

Current State: Order Entry at many institutions Generic Order Screens & Free Text Indication Entry

Reason for Exam: RESTAGING

Restage

Re-stage

Restge CA

.Restage CA

Free text entry enables numerous variations (and typos) of same clinical concept….

Free-text order entry = manual typing … MDACC CT CAP - > 2 million characters (CT Chest, Abdomen & Pelvis - 3/2016 – 3/2019)

# Current State: The many variations of "Restaging*"

restage; enlarging adenopathy-1	restaging - eval for response to current chemo-1	restaging FL-1
restage; enlarging adenopathy in neck-1	restaging - eval response to current chemo-1	restaging follicular lymphoma-3
restage; enlarging cervical adenopathy-1	Restaging - evaluate enlarging messenteric adenop	Restaging Follicular Lymphoma-1
restage; enlarging inguinal adenopathy-1	restaging - evaluate for disease progression.-1	re-staging Follicular lymphoma-1
restage; marginal zone lymphoma-1	restaging - midcycle treatment evaluation-1	Restaging for clinical trial-24
restage; new neck pain and swelling-1	restaging - new adenopathy-1	Restaging for clinical trial / LYMPHOMA-
restage; progressive adenopathy; pain-1	restaging - new adenopathy in neck, assess for furt	restaging for CLL on treatment-1
restaggin-1	restaging - new enlarging LAD-1	restaging for CLL/SLL and CNS lymphoma
restagiangh-1	restaging - new palpable LAD-1	restaging for disease progression-2
restagign-7	restaging - new palpable LAD - eval for disease pro	Restaging for disease progression-1
restagigng-1	restaging - new palpable lymphadenopathy-1	Restaging for disease progression or com
restagiing-2	restaging - NO CONTRAST-1	restaging for disease progression prior to
Restagiing-1	restaging - pt with disease progression per outside	Restaging for dissease progression-1
restagimg-1	restaging - worsening back pain, concern for disea	Restaging for DLBLC-1
restagin-4	restaging lymphoma-1	restaging for follicular lymphoma-1
Restagin-4	Restaging Lymphoma-1	Restaging for follicular lymphoma-1
Restagin g-1	Restaging & patient has B symptoms - eval for dise	Restaging for Follicular Lymphoma-1
restagin scans-1	Restaging (having new symptoms of abdominal blo	restaging for Follicular lymphoma, grade
restaging-2010	restaging (persistent mesenteric nodes)-1	restaging for history of FL and rectal cand
Restaging-785	Restaging 12 months post radiotherapy-1	restaging for history of follicular lymphon
RESTAGING-27	restaging 2015-0567-1	restaging for lymphoma-12
rESTAGING-1	restaging after 2 cycles of chemotherapy-1	Restaging for lymphoma-2
re-staging-3	restaging after 2 cycles of protocol treatment-1	Restaging for lymphoma, evaluate for lyn
restaging - assess for disease-1	restaging after 3 cycles of chemotherapy-3	restaging for mantle cell lymphoma-1
restaging - assess for disease progression-2	restaging after 6 cycles of chemotherapy-2	Re-staging for MCL on Protocol 2013-009
Restaging - assess for disease progression-1	re-staging after succesful treatment for Diffuse lar	Restaging for mycoses fungoides-1
restaging - assess for disease progression while or	restaging and need for biopsy-1	restaging for nodular lymphocyte predom

* Partial subset of free text entries

Strategy: Structured Indications

- Provide means to decreased clinical documentation variability
  - Constrained clinical concept vocabulary aligned to requirements of the AUC rule-set
- Improves functionality of CDS systems
  - Accurate provision of clinical data
- Clinicians can provide additional text based information as order "comments"
- Anticipate organizations will customize order entry screens to align to local patient population

Effective CDS Implementation: Imaging Value Chain Improvement
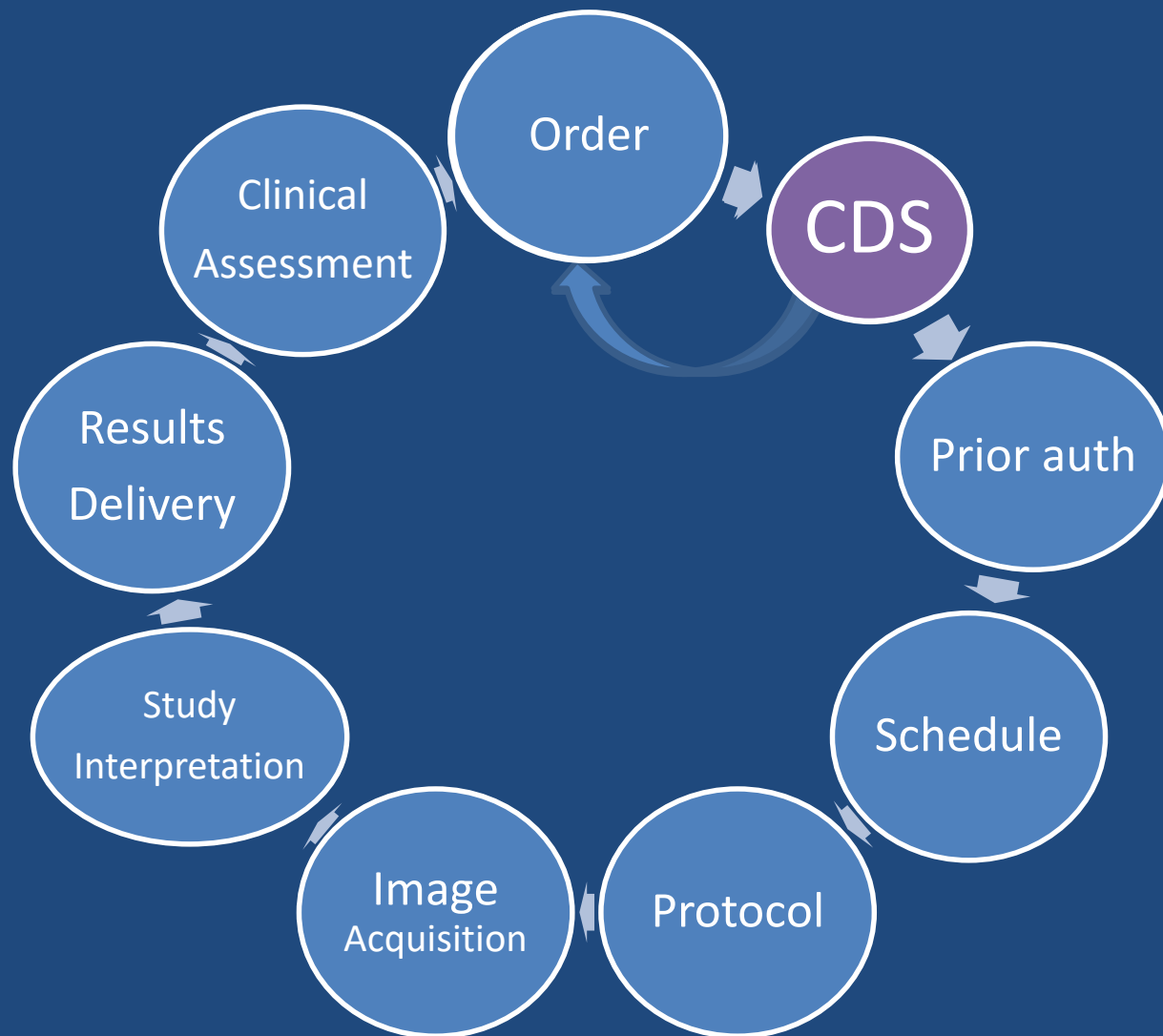
- Meet PAMA requirements
  - Avoid adverse penalties
- Appropriate clinical context available throughout the imaging value chain
- Process improvements
  - Increased value of reporting
  - Prior authorization optimization
  - Improve patient experience

Priority Clinical Areas: 1.1.2019

- CMS finalized an initial list of priority clinical areas in the CY 2017 Physician Fee Schedule Final Rule.
  - Cancer of the lung (primary or metastatic, suspected or diagnosed)
  - Suspected pulmonary embolism
  - Hip pain
  - Low back pain
  - Shoulder pain (to include suspected rotator cuff injury)
  - Cervical or neck pain
  - Headache (traumatic and non-traumatic)
  - Coronary artery disease (suspected or diagnosed)

Cancer of Lung Imaging

Procedure	#	Procedure	#	Procedure	#
PET CT	10915	NM LUNG QUANT PERFUSION	139	CT ABDOMEN W CONTRAST	62
CT CHEST W CONTRAST	10785	CTA ABDOMEN PELVIS W WO CONTRAST	121	MRI LUMBAR SPINE W WO CONTRAST	56
MRI BRAIN W WO CONTRAST	4184	CT CHEST ABDOMEN PELVIS WO CONTRAST	121	MRI PELVIS W WO CONTRAST	55
CT CHEST ABDOMEN PELVIS W CONTRAST	3528	CT ABDOMEN PELVIS W CONTRAST	113	MRI LUMBAR SPINE W CONTRAST	54
CT CHEST WO CONTRAST	2440	MRI THORACIC LUMBAR SPINE W WO CONTRAST	110	CT CHEST ABDOMEN WO CONTRAST	53
CT CHEST ABDOMEN W CONTRAST	1428	NM TUMOR LOCALIZATION MULTIPLE	100	MRI CERVICAL SPINE W WO CONTRAST	52
CT CHEST W WO CONTRAST	929	CT BODY W WO CONTRAST	93	CTA CHEST W WO CONTRAST	51
MRI BRAIN W CONTRAST	912	MRI CERVICAL THORACIC LUMBAR SPINE W WO CONTRAST	92	MRI PELVIS W CONTRAST	50
NM INJECTION AREAS	573	CT SPINE AND/OR NECK W CONTRAST	90	MRI CERVICAL SPINE W CONTRAST	46
NM BONE SCAN WHOLE BODY	503	CT CHEST ABDOMEN W WO CONTRAST	88	CT ABD W CONTRAST	40
CT SOFT TISSUE NECK W CONTRAST	466	CT ANGIO W WO CONTRAST	80	CTA HEAD W WO CONTRAST	35
CT CHEST ABDOMEN PELVIS W WO CONTRAST	453	CT CHEST PULMONARY EMBOLISM W CONTRAST	77	CTA HEAD NECK W WO CONTRAST	35
CT BODY W CONTRAST	425	MRI THORACIC SPINE W CONTRAST	77	MRI CHEST W WO CONTRAST	32
MRI HEAD W WO CONTRAST	407	MRI CHEST W CONTRAST	72	MRI FACE ONLY W WO CONTRAST	30
CT HEAD W WO CONTRAST	150	MRI THORACIC SPINE W WO CONTRAST	71	MRI BRAIN WO CONTRAST	30
CT HEAD W CONTRAST	145	MRI ABDOMEN W WO CONTRAST	65	Other Procedures - 230	1,260

MDACC Thoracic Oncology Center – March 2016 – March 2019

Strategy: Limit Decision Support to Priority Areas

- Reality:
  - Priority areas cover a large proportion of out-patient imaging procedures
  - Primary Lung Cancer is a small proportion of oncologic imaging.
  - Scope of "Lung Cancer" imaging extends beyond thorax
- Updated Strategy: Align order entry for CDS for all CT, MR, PET and NM procedures
  - Limit active AUC determination to priority areas

Strategy: Limit CDS to Medicare Patients

- Legislative requirement for CDS only for Medicare patients
  - Some organizations coordinating with local insurance carriers for pre-authorization or non-CMS patients
- Potential for inconsistent ordering experience
- Reality: benefits of consistent ordering experience likely outweigh limiting scope to only Medicare patients

Strategy: "Silent Mode is Golden"

- Enables prediction of AUC rules impact prior to interruptions for recommending alternative appropriate imaging
  - Clinician education as to AUC logic
- Discovery and mitigation of performance issues prior to provider impact
  - Example: Lab value retrieval in the CCD document
  - Example: Validation of correct mapping of pre-population

Proposed Rule CY2020 – late June

- CDS Rule Update Speculation
  - Priority Clinical Areas Remain Same
  - Further guidance regarding specification for claims submission
    - Necessarily will lead to version update for claims submission software
      - EMR or other third party vendor
  - Further guidance regarding implementation use cases
    - Example CY2019 – CDS by providers NOT office personnel
- Annual Update Announcement
  - Provider-led entities (PLE)
  - Certified Clinical Decision Support Mechanisms (CDSM)

PAMA and The University of CA Health Systems

Jeff Wajda DO, MS, FACEP

Chief Medical Information Officer, UCDH

Disclosure Slide

I serve as an advisor for BeHeartFit

UC DAVIS HEALTH

AGENDA

1. Collaboration Between the UC Health Campuses

2. Who leads our build and how it's done

3. Successes and Challenges

How we do this

➢ UC Health is one of roughly 15 QPLE's

➢ Project Management – Scott Foster (UCDH)

➢ AUC Coordinator, Radiologist and Researcher – John Mongan, UCSF

➢ Physician Content Advisors at UCD – Eric Gross, Scott MacDonald and Aman Parikh

➢ Executive Sponsors and Obstruction Removers – Many individuals including UC Health CMIO's listed alphabetically. Brian Clay (UCSD), Eric Cheng (UCSF), Russ Cucina (UCSF), John Luo (UCR), Scott Rudkin (UCI) and Jeff Wajda (UCD)

… and 76 Physicians!

➢ Physician Engagement is Key

76 Physicians from the <u>Five UC Medical Campuses</u> (UCR has a Medical School but not a Hospital)

	Assigned	Unassigned	Total Roster
UCD	12	1	13
UCI	4	2	6
UCLA	16	4	20
UCSD	7	9	16
UCSF	12	9	21
Total	51	25	76

AUC Team Roster Example

Headache:

Julie Bykowski, MD, Leader	**Associate Professor, Radiology (Neuroradiology)**	**UCSD**
Alexander A. Khalessi, MD, MS	Associate Professor of Neurology and Neurosciences	UCSD
Daniel Nishijima, MD	Associate Research Director Director, Emergency Medicine Research Associate Program (EMRAP)	UCD
Hossein Ansari, MD.	Assistant Professor, Neuroscience (Headache specialist), Director of Headache Clinic	UCSD
Karl Meisel MD, MA	Assistant Professor Neurology , Director of Outpatient Stroke Clinic	UCSF
Marin McDonald, MD	Professor, Neuroradiology	UCSD
John Mongan, MD, PhD	Assistant Professor, Radiology	UCSF

Frequency: ONCE 🔍 | ONCE

Starting: 11/8/2018 📅 | Today | Tomorrow   At: 1000 🕐

First Occurrence: **Today 1000**

Scheduled Times ⌃

11/08/18   1000

Pulm Embolism

❗Reason for Exam: [❗   🔍]

▽ **A: Clinical Indications**

☐ Chest pain pleuritic   ☐ Dyspnea on exertion   ☐ Pulmonary complications, postoperative

☐ Cough   ☐ Hypoxia   ☐ Tachypnea

▽ **B: Clinical Gestalt**

☐ High probability of PE (clinical gestalt > 40   ☐ Intermediate probability of PE (clinical gestalt 15-40%)   ☐ Low probability of PE (clinical gestalt < 15%)

▽ **C: Wells Criteria**

☐ Active cancer treatment or palliation   ☐ DVT signs or symptoms present   ☐ Tachycardia - Heart Rate 100 or more

☐ Bedridden at least 3 days or major surgery within 4 weeks   ☐ Hemoptysis

☐ Deep vein thrombosis or pulmonary embolism resolved in past   ☐ Pulmonary embolism is leading diagnosis

▽ **D: Laboratory Results**

☐ D-dimer elevated   ☐ D-dimer normal   ☐ D-dimer not done

Reason for Exam (Free Text): [❗   ]

❗Pager #: [   ] [   ]

❗"I authorize the Radiologist to modify the parameters of this test as medically necessary based on the clinical indications for the study. This includes administration of IV or PO contrast."

[Yes] [No] [   ]

❗What is the pre-test probability (pre D-dimer) of pulmonary embolism? (CT scan not recommended for low risk unless there is a positive D-Dimer)

[Low] [Medium] [High] [   ]

Comments: 🔍 ᵃᵇᶜ ↶ ↷ ? ? ✚ [Insert SmartText] ▣ ⇦ ⇨ ✔ ⧎

❗Next Required | Link Order   ✓ Accept   ✗ Cancel

What our Ordering Providers see

- Our Clinical Decision Support is Pragmatic – e.g. the w/f for PE engages a physician with both Wells Criteria and Gestalt.

- If they ignore this slide, a PERC Calculator appears on a subsequent slide.

UC DAVIS
HEALTH

- Three AUC sets completed, one in draft, three underway. Four teams: headache, spine (cervical & lumbar pain), joint (shoulder & hip), and chest (pulmonary embolism & lung cancer).

- Head (Headache), Neck (Cervical Spine) and PE in production

Appropriate Use Criteria	Team Leaders	Status
Headache	Julie Bykowski, MD UCSD	Completed
Cervical Pain	Eric Klienberg, MD UCD	Completed
Lumbar Pain	Kenrik Duru, MD UCLA	In Progress
Pulmonary Embolism	Jon Goldin, MD Ashley Prosper, MD UCLA	Completed
Shoulder Pain	Kambiz Motamedi, MD UCLA	In Progress
Hip Pain	Benjamin Levine, MD Benjamin Plotkin, MD UCLA	In Progress
Lung cancer	Lisa Brown, MD UCD	In Progress
Cardiac Pain		Evaluating AUC from American College of Cardiology

UC**DAVIS**
HEALTH

Lessons

- AUC Work takes longer than you think it should
- Empower your engaged physicians to make decisions quickly
- Don't render CDS on the screen if not necessary
- Don't make it a Radiology problem to solve, Instead, have Radiology domain experts collaborate with the Physicians serving on AUC groups.

Questions

- Thank you, Jeff Wajda – jwajda@ucdavis.edu

UC DAVIS HEALTH

Implementation Scenarios

- Closed staff model
  - Consistent EMR and CDS rules
- Open staff model
  - Potential for multiple CDS vendors and rules sets
- Non-affiliated physician practices and free-standing imaging centers
  - Could lack direct access to CDSM
  - Free-CDSM available – likely paper-based processes
  - Potential for manual errors in CDS code transfer

Anticipate Future CDS Audits by CMS

- Review alignment of indications on patient's problem list with those provided in order entry
  - Example: Low back pain
    - Pain persisting > 6 months (order indication)
    - Pain documented in EMR (absent)
  - Example: CT Pulmonary Embolism
    - D-Dimer positive (order indication)
      - D-Dimer billing or result (none)
    - Tachycardia, SOB (order indication)
      - No documentation of noted symptoms in EMR
- Outcome: Potential for claims of Medicare fraud