Supplement 2: Benefit indicators identified in the literature

Study	Category	Indicator
Patel, S. (2014). Value management program: Performance, quantification, and presentation of imaging value-added actions. Journal of the American College of Radiology, 12(3), 239–248.	Quality	List ACR accreditations
		List CMS PQRS initiatives
		Protocols developed/revised
		List individual patient safety metrics (e.g., procedure complications)
		Conference hours
		Examinations with documented technologist feedback
		Radiology-pathology correlations
		Peer-reviewed studies
		Peer-reviewed study agreement (e.g., ACR RADPEER score 1/total no. of scores)
		CMS EHR Incentive Programs (meaningful use stage 1) patient interactions
		List national designations (e.g., Image Wisely, Choosing Wisely)
		Radiology department policies/procedures updated
		Structured reporting templates developed/revised
		List radiation dose reduction initiatives
	Service	List report turnaround time metrics
		Patient satisfaction survey results
		Hours of patient procedural supervision (e.g., MRI conscious sedation)
		Hours of community support
		Referring provider communications
		Critical test results delivered
		Hours of recruiting
		Committee hours
		Selected examinations interpreted by subspecialty radiologist(s)
		Referring physician satisfaction survey results
		Clinician and patient interactions
		Timeliness of care metrics (e.g., time between screening and diagnostic mammography)
		Examinations provided through financial assistance programs
		Examination results given directly to patients
		Hours of marketing
	Utilization management	List CMS Hospital Outpatient Quality Reporting Program imaging measure data (www.medicare.gov/hospitalcompare/search.html)
		Reports self-edited by radiologists
		List activities related to cost management and money saved and/or revenue enhancement
		List utilization reviews with results
		List examination outcomes review with results
		List short-term follow-up examination data (e.g., percentage BI-RADS category 3 mammographic assessments)
		List mammographic outcomes data
		List population health outcomes data (e.g., lung screening program)
	Professional development	List leadership positions within hospital
		List national/regional positions (e.g., ACR practice guidelines/standards and Appropriateness Criteria Joint Committee)
		List national sponsored practice improvement projects with results (e.g., ABR part IV MOC requirement)
		Hours of executive meetings
		Hours of leadership duties
		Hours of research
		Hours of teaching
		Leadership CME
		List published articles
		List lectures given
		List presentations given
		Hours of national/state radiology activities
Sarwar, A., et al. (2015). "Metrics for Radiologists in the Era of Value-based Health Care Delivery." Radiographics 35(3): 866-876.	Process	Turnaround time
		Communication rate
		Equipment idle time
		Percentage of unreported cases
	Performance	Peer review
		Miss rate
		Number of studies interpreted
	Survey	Patient satisfaction

Study	Category	Indicator
		Referrer satisfaction
	Access	Wait times
		Imaging unit availability
		Staff courtesy
		Scheduling process
	Appropriateness	Decision support software
1. Heller, R. E., 3rd, et al. (2017). "Quality measures and pediatric radiology: suggestions for the transition to value-based payment." Pediatr Radiol 47(7): 776-782.	Performance	Evaluation of the radiology report - Establish a departmental standard Percentage of reports using a standardized format (Process)
		Evaluation of the radiology report - Report Review Process to evaluate adequacy of the reports based on established guidelines (Structural)
		Fluoroscopy - Document fluoroscopy time on routine exams, such as upper GI (Process)
		Turnaround time Track times for emergency department interpretations (Process)
	Safety	MRI safety Incidence of adverse events or near-misses in MRI, such as ferrous objects in Zone 4 (Process)
		Contrast extravasation Incidence of contrast extravasation (Process)
		Critical results communication Incidence of documentation of appropriate communication of critical results (Process)
		Improper or unnecessary imaging Incidence of improper or unnecessary imaging (such as wrong patient, wrong exam, wrong site or poor technique) (Process)
		Radiation dose Use of a dose monitoring program (Structural)
		Treatment of contrast reactions Percentage of reactions treated according to protocol (Process)
	Service and Experience	Patient and family satisfaction Results of a satisfaction survey (Process or outcome)
		Clinician satisfaction Results of a satisfaction survey (Process or outcome)
		Radiologist satisfaction Results of a satisfaction survey (Process or outcome)
Boland, G. W., et al. (2017). "Report of the ACR's Economics Committee on Value-Based Payment Models." Journal of the American College of Radiology 14(1): 6-14.	Imaging appropriateness/stewardship	Compliance with ACR guidelines and Appropriateness Criteria by specialty and physician
		Adherence to clinical decision support tools
		Identification of duplicate examinations
		Time, frequency of referring physician consultation
		Ease of availability of radiologists for referrer consultation
		Cost savings to institution for avoiding unnecessary imaging
	Patient scheduling	Scheduler response time
		Scheduler customer service feedback (patient experience)
		Time from examination request to patient appointment
		Scheduled at convenient time and location to patient
		Time to schedule and perform same-day add-ons
		Impact of expedited examination on length of stay
	Patient preparation	Availability of procedure information to patients (patient survey)
		Number and efficacy of patient reminder calls
		Ease of access to scanning facility
		Time from arrival at suite to scanning
		Staff customer service feedback
		Appropriate safety checks performed before patient arrival (contraindications to examination)
	Protocol	Compliance with departmental (or national) standard protocol
		Radiation dose measurement and benchmarking
		Protocol length
		Cost savings (or earnings) to department for shorter protocols (examination slots available)
	Modality operations	On-time scanning
		Time performing scan (room time)
		Overall time from arrival to discharge
		Contrast reactions
		Number and frequency of radiologist-patient interactions/consultations
		Staff and overall customer feedback (patient experience)
		Number of examination slots available (including off hours and weekends)
	Reporting	Adequate history
		Access to relevant collateral data in the electronic medical record
		Adherence to ACR incidental finding criteria
		Frequency of recommendations per procedure
		Percentage of subspecialty reporting
		Structured reporting
		Standard lexicon and language

Study	Category	Indicator
		Report grammatical or voice recognition error
		Time from examination completion to finalized report
		Is the report actionable?
		Accuracy of report to final diagnosis, including false positives
		Local radiologist 24/7 coverage
	Report communication	Time for report availability to patient
		Time for closed loop critical results reporting by category
		Ease of report access by patient
		Report understood by patient
		Report consultation to patient
	Peer review	Percentage of reports evaluated
		Percentage of missed findings/category percentage false positives
		Is the report actionable
		Accuracy of report to final diagnosis
		Adherence to ACR incidental finding criteria
		Frequency of recommendations
		Structured reporting
		Standard lexicon and language
		Report grammatical or voice recognition error
		Recommendations in appropriate field (i.e., recommendation field at end of report)
		Time for closed loop critical results reporting by category
		Frequency of error feedback to technologists and/or radiologists
	Examination outcome	Did the referring physicians find the information useful?
		Did results of imaging change diagnosis or therapy?
		Did use of imaging eliminate need for more invasive/expensive procedures?
		Did use of imaging reduce length of stay?
		Complications
		Patient satisfaction
		Referring physician satisfaction
	Institutional citizenship	Type and frequency of administrative meetings
		Number of institutional leadership/committee positions
		Preparation time for hospital administrative expectations
		Health system marketing efforts
		Number of ACR accreditations
		Referring physician and leadership customer service evaluation