Cardiovascular Computed Tomography
Job/Task Analysis
Executive Summary – 2016/2017

Conducted on behalf of

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Programs

By

The Caviart Group, LLC

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Contents

THE JOB TASK ANALYSIS METHODOLOGY

A diverse panel of experienced cardiovascular computed tomography (CCT) imaging specialists was formed into a Job Task Analysis (JTA) Working Group. This group was charged with the primary responsibility of defining a draft list of the tasks performed by professionals in the field and the knowledge, skills and abilities believed to be important for competent performance of those tasks in order to survey practitioners in the field on the state of the practice of cardiovascular CT.

The JTA Working Group met face-to-face on December 2 and 3, 2016 in Rockville, MD. The meeting was facilitated by Clarence "Buck" Chaffee, President of The Caviart Group, with the assistance of Inteleos staff Dawn Edgerton and Helen Gootinag.

During this meeting, the group discussed and came to consensus on the characteristics of a newly certified cardiovascular computed tomography imaging specialist.

The description of the characteristics of such individuals created by the JTA Working Group is as follows:

Definition of a Certified Cardiovascular Computed Tomography Imaging Specialist

Certified cardiovascular computed tomography (CT) imaging specialists are physicians who are trained in Cardiovascular CT, have the ability to determine the appropriateness of a Cardiovascular CT study, properly select patients, and safely perform and accurately interpret Cardiovascular CT studies. They are able to understand the diagnostic and prognostic implications of the test results and effectively communicate the findings.

They understand the strengths and limitations of different acquisition protocols and their impact on the interpretation of Cardiovascular CT studies. They are able to effectively integrate the clinical and other pertinent data into a single comprehensive and clinically relevant report.

They supervise the activities of technologists/medical personnel according to institutional protocols.

They are able to understand the fundamental radiation safety concepts and implementation principles as they apply to cardiovascular CT.

SURVEY ADMINISTRATION

On September 15, 2017 the CBCCT JTA survey was launched. CBCCT used an internet survey software system to deliver the final survey. Any computer with a web browser and a web connection could be used to access the survey.

Individuals were recruited to respond through direct email invitations. A total of 3,668 emails were sent to CBCCT Diplomates and SCCT Physician members. 185 emails were returned as undeliverable. We are not able to determine the number of emails that were actually delivered and opened. Two follow-up emails were sent to everyone who had not started the survey as well as those who had started the survey but had not completed the survey. The survey was closed on October 8, 2017.

A total of 597 responses were received during the survey period. Of these responses, 430 were deemed to be sufficiently complete and from individuals whose demographic information represented them as qualified CCT professionals.

Since we are unable to determine how many surveys were actually delivered, we are unable to calculate a response rate for this study. The 430 usable survey responses however exceeds the minimum required for statistically reliable results for the study. In addition, the distribution of the demographic characteristics of the respondent population is believed to be representative of the breadth of the profession[1].

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[1] Per CBCCT JTA Working Group

CONVERTING RAW DATA TO CRITICALITY SCORE

Response Scales		Overall Criticality Score	Notes
Importance	**Frequency**		
Critically Important (5)	Frequently (5)	16	These tasks are either frequently performed, very important, or both. As a result, most of these tasks should be kept. A rationale is required for any of these tasks that are removed. **Items should be reviewed if "Importance" is below 3.**
	Often (4)	15	
	Occasionally (3)	14	
	Rarely (2)	13	
Very Important (4)	Frequently (5)	12	
	Often (4)	11	
	Occasionally (3)	10	
	Rarely (2)	9	
Important (3)	Frequently (5)	8	These tasks may be kept or removed. A rationale is required for any of these tasks that are removed.
	Often (4)	7	
	Occasionally (3)	6	
	Rarely (2)	5	
Somewhat Important (2)	Frequently (5)	4	These tasks are either infrequently/never performed, of little importance, or both. As a result, most of these tasks should be considered for removal. A rationale is required for any of these tasks that are kept.
	Often (4)	3	
	Occasionally (3)	2	
	Rarely (2)	1	
Not Important (1)	All options	0	
All options	Never (1)	0	

The following test specification was unanimously approved by the CBCCT Job Task Analysis by email vote concluded on December 8, 2017.

This report was approved by the APCA Council on March 2, 2018. This content outline will be applied to the 2019 administration of the CBCCT examination.

ID	Domain	Task	Weight	KSA's
I		**Perform Pre-Exam Tasks**	**14%**	
I	A	Review prior focused medical history and clinical information		Knowledge of test relative and absolute contraindications
I	B	Evaluate clinical indications considering appropriate use criteria		Knowledge of proper breath holding techniques
				Knowledge of medications used in cardiovascular CT (such as beta blockers, calcium blockers, nitrates and ivabradine)
I	C	Educate referring physician and other health care providers		Knowledge of informed consent
				Knowledge of diagnostic capabilities and limitations of the test
I	D	Perform or direct pre-test counseling for patient		
I	E	Screen for contraindications		Knowledge of cardiovascular tests and alternative options
I	F	Perform or direct pre-test patient preparation and test instructions		Knowledge of cardiovascular medicine as it pertains to cardiovascular CT, including calcium scoring
				Knowledge of appropriate use criteria and relevant guidelines
				Skill in communicating with patients, other physicians and other healthcare providers
				Ability to integrate information and modify the planned procedure as required
				Ability to identify critical information that might affect test indication, appropriateness, safety and performance

II		**Perform In-Suite Exam Functions**	**16%**

II	A	Supervise patient (pre-test, intra-scan, post-test) treatment optimization	Knowledge of cardiovascular CT physics
			Knowledge of contrast resolution and signal-to-noise ratios
II	B	Manage heart rate and recognize arrhythmias	Knowledge of contrast administration and contrast agents
II	C	Adjust pacemaker settings as applicable for optimal scanning	Knowledge of how pacemakers affect cardiac CT scanning
			Knowledge of pacemaker optimization options
II	D	Select scanning protocol and troubleshoot scanning acquisition problems	Knowledge of proper ECG gating techniques and trouble-shooting
II	E	Perform scan quality assessment	Knowledge of radiation dose reduction strategies
II	F	Practice radiation safety principles	Knowledge of scanner capabilities and limitations
			Knowledge of scanning protocol options
			Knowledge of signs, symptoms and management of adverse contrast reactions
			Knowledge of venous access and injection options, issues and complications
			Ability to articulate instructions to technologists
			Ability to assess scan artifacts and determine remedy
			Ability to identify poor quality scans and make adjustments in scanning reconstruction
			Ability to identify significance of and manage heart rate and arrhythmias
			Ability to recognize and manage cardiovascular or other clinical distress

		Interpret Studies	55%	
III	A	Check for scan artifacts		Knowledge of standard nomenclature for coronary segments and dominance
III	B	Assess coronary anatomy		Knowledge of various artifacts, their sources and their potential remedies (including artifacts related to bright structures, image processing artifacts and motion artifacts)
III	C	Quantify coronary artery stenosis		Ability to adjust scan parameters for cardiac vein scanning
III	D	Assess coronary stents		Ability to apply proper acquisition modes (including LVADs)
III	E	Assess coronary artery bypass grafts		Ability to apply protocols pertinent to cardiac chambers
III	F	Assess chronic total occlusions		Ability to apply protocols pertinent to cardiac function and assessment
III	G	Perform plaque characterizations (e.g., identify high risk plaque)		Ability to apply protocols pertinent to valvular evaluation
III	H	Assess coronary anomalies		Ability to assess pulmonary number, size, location and anomalies
III	I	Assess pulmonary veins		
III	J	Assess cardiac veins		Ability to correctly recognize and categorize coronary stenoses, location, severity, significance and risk
III	K	Assess cardiac chambers		Ability to differentiate high risk from low risk coronary anomalies
III	L	Assess cardiac function		
				Ability to identify non diagnostic scans or segments
III	M	Assess pericardium		Ability to interpret calcium score (including Agatston score, plaque volume, plaque mass, percentile)
III	N	Assess native/artificial valves		
III	O	Assess myocardium		Ability to measure size and categorize pericardial thickness
				Ability to measure size and function of cardiac chambers
III	P	Assess appendage		Ability to recognize and classify segmental and global cardiac function and pathology
III	Q	Assess septum (atrial/ventricular)		
III	R	Assess percutaneous valvuloplasty procedures (e.g., feasibility of, TAVR, etc.)		Ability to recognize aortic pathology
				Ability to recognize appendage pathology
III	S	Assess congenital heart disease		Ability to recognize cardiac chamber pathologies
III	T	Assess aorta		Ability to recognize cardiac devices (including variety and impact on interpretation)
III	U	Assess pulmonary artery		

III	V	Assess vascular anomalies	Ability to recognize cardiac vein pathology
III	W	Assess common lung disease, pulmonary nodules/tumors and pleural effusions	Ability to recognize congenital heart disease
			Ability to recognize coronary anomalies
			Ability to recognize high risk plaque features (such as high plaque volume, positive remodeling, spotty calcification, napkin ring sign, low attenuation plaque)
III	X	Assess mediastinal and hilar pathology	
III	Y	Assess other non-vascular structures (e.g., bones, soft tissue)	Ability to recognize indications for cardiac vein assessment
III	Z	Assess calcium scoring	Ability to recognize indications for pulmonary vein assessment
			Ability to recognize mediastinal and hilar pathology
			Ability to recognize myocardium pathology (e.g., infarction, perfusion, aneurysm, masses, viability)
			Ability to recognize non coronary calcium (such as MAC)
			Ability to recognize pathology related to device (e.g, pacer, ICD, hemodaynamic support, etc.)
			Ability to recognize pathology of other non-vascular structures (such as bones, other soft tissue, etc.)
			Ability to recognize pleural effusions
			Ability to recognize pulmonary nodules/tumors
			Ability to recognize pulmonary vein pathology
			Ability to recognize septum pathology
			Ability to recognize the differences in scanning and interpreting bypasses of different types and locations
			Ability to recognize the differences in scanning and interpreting stents of different sizes and types
			Ability to recognize the differences in scanning parameters for known chronic total occlusions
			Ability to recognize the limitations of distinguishing subtotal and total occlusions
			Ability to recognize the pertinent anatomic considerations when interpreting known chronic total occlusions

			Ability to recognize therapeutic and prognostic implications of coronary pathology
			Ability to recognize vascular pathology
IV	**Perform Post-Scan Tasks and Reporting Findings**	**15%**	
	A	Supervise reconstruction protocols	Knowledge of the storage parameters for raw and reconstructed data
	B	Actively perform post-processing (i.e., manipulation and reformatting at workstation)	Knowledge of reformatting types, including strengths and limitations
	C	Evaluate and treat adverse contrast reactions and extravasations	Knowledge of DICOM and PACS storage capabilities and limitations
	D	Evaluate and manage contrast-induced nephropathy	Knowledge of image quality resolutions (such as contrast, temporal, spatial and field-of-view)
			Ability to reconstruct raw data
			Ability to utilize full capacity of workstation tools
			Ability to reconstruction and post-processing options and indications for use
			Ability to actively reformat multi planar images to improve image quality and diagnostic accuracy
TOTAL		**100%**	