

THE USE OF FLUOROSCOPY EQUIPMENT IN
CALIFORNIA HOSPITALS

Prepared By:

Department of Health Services
Radiological Health Branch
Certification

This study was undertaken at the request of the Radiologic Technology
Certification Committee.

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NOTE: This report does not include use of fluoroscopy simulators in radiation therapy.

Abstract

The survey reveals that in California hospitals fluoroscopy equipment, particularly mobile image intensified C-arm units, are: (1) located and used wherever health care is delivered, (2) used by a broad range of physician-specialists, and (3) extensively operated by certified radiologic technologists (CRTs).

Further, the study shows that in most instances radiologists cannot exercise the direct control needed for optimum protection of patient and operator because radiologists cannot always be present whenever or wherever a physician-specialist uses fluoroscopy equipment. Thus, in most instances it is the physician-specialist who has direct control over patient radiation exposure.

Finally, the study finds that technologists who operate or use fluoroscopy equipment during patient exposure do so with expertise obtained primarily on the job.

Objectives

The objectives of the study were: (1) to collect data on the use of fluoroscopy equipment (both stationary and mobile image intensified C-arm units) in California hospitals by radiologists, nonradiologist physicians, CRTs, and (2) make inferences on the use of fluoroscopy equipment which would enable the Department's advisory group, the Radiologic Technology Certification Committee, to assist in developing specific policies and/or regulations pertaining to the use of fluoroscopy equipment.

Procedure

A questionnaire (Attachment 1) was distributed to the 560 acute health care hospitals in California. Nearly 80 percent of the hospitals responded (Attachment 2). The data were tabulated according to geographical (postal ZIP code) areas (Attachment 3) and by hospital size in order to determine whether regional or hospital size differences exist. Ten hospitals, either highly specialized or located in rural areas, responded that they had no fluoroscopy equipment and were not included in the list of responses. Excluded also were five hospitals who were found not to be operational at the time of survey.

Accuracy of Data

The collected data are considered to be representative of the use of fluoroscopy equipment in California hospitals because hospitals of all sizes responded in reasonably proportionate numbers (Attachment 2).

Summary of Questionnaire Findings

I. Location and Use of Fluoroscopy Equipment

Table 1 shows the location and use of stationary fluoroscopy equipment. As expected, 90 percent of the 1,213 stationary fluoroscopy units are located in radiology departments. However, a considerable number (90) are reported to be located in cardiac catheterization laboratories where they are used primarily by cardiologists.

About 28 percent of all physicians who use fluoroscopy equipment in radiology departments are nonradiologist physicians.

Mobile image intensified C-arm units comprise approximately 20 percent of the fluoroscopy equipment reported in the survey. Table 2 shows their location and use. It is of interest to note that many radiologists (about 17 percent) use mobile fluoroscopy equipment. As expected, orthopedic surgeons and cardiologists are the major users of C-arm units. However, in addition to these specialists, a variety of other specialists use this equipment throughout the hospital.

Table 3 shows the distribution of video disc and video tape equipment by hospital size. The total number of video recording accessories is estimated (by extrapolation) to be about 485. It is not known with what type of equipment these accessories are associated. Most likely all cardiac catheterization units have video recording capabilities, as do units used in the intensive care unit (ICU) or cardiac care unit (CCU).

The reported number of video recording units in California appears to be correct, if we can believe information given to us by a video recording manufacturing and sales company, which states that there are about 5,000 such units nationwide (California accounting for approximately 10 percent of national sales).

Table 4 shows the distribution of stationary fluoroscopy equipment by size of hospital and geographic region, while Table 5 shows similar distribution of mobile image intensified (C-arm units) fluoroscopy equipment.

II. Use, Training and Supervision of Certified Radiologic Technologists Who Operate Fluoroscopy Equipment

Table 6 shows the number and distribution of CRTs who assist an X-ray supervisor and operator in operating fluoroscopy equipment under the direct supervision of the supervisor, that is, the supervisor is physically present in the same room as the person being supervised.

Table 7 shows the number and distribution of CRTs who operate fluoroscopy equipment under the immediate and personal supervision

of a supervisor, that is, the supervisor is on the premises and is readily available for direct and immediate consultation.

Table 8 shows type of training CRTs have received in the operation of fluoroscopy equipment. It is of interest to note that if we tabulate the actual number of technologists who have received adequate training in the operation of fluoroscopy equipment (Table 7, columns 15 and 16 and Table 8, column 5), we arrived at about 230 technologists, or 35 percent of all who operate the fluoroscopy equipment who are qualified by some measure of competency to do so. Table 9 indicates degree of supervision received by CRTs who operate fluoroscopy equipment. Tables 6 and 9 show the number of technologists who are adequately supervised (but may not be properly trained) to be 375.

Discussion

I. Licentiates

In 73 percent of hospitals (primarily over 100 beds), fluoroscopy equipment is widely used throughout the facility by a variety of physician-specialists. Approximately 4,000 specialists are reported to use both stationary and mobile intensified C-arm fluoroscopy equipment. In 27 percent of hospitals (primarily under 100 beds), all fluoroscopic work is done in the radiology department; however, not all fluoroscopic procedures are performed by radiologists. Approximately 300 (17 percent) of all the radiologists practicing in hospitals perform fluoroscopic procedures outside the department of radiology and most of these radiologists use mobile C-arm equipment.

Routinely, all fluoroscopy equipment in hospitals is under the general supervision of a radiologist certified by the American Board of Radiology. The survey reveals only two hospitals where fluoroscopy equipment in the cardiac catheterization laboratories is under the general supervision of a cardiologist rather than a radiologist.

Information available from certification files reveal that approximately 8,100 nonradiologist physicians in California hold X-ray supervisor and operator certificates. The following table compares the estimated number of specialists in each speciality category with numbers reported in this survey.

E s t i m a t e d

<u>Speciality</u>	<u>Percentage of Total</u>	<u>Number of Total</u>	<u>Reported in Survey</u>
Orthopedic surgeons	18.6	1,506	1,511
Cardiologists	16.4	1,328	1,043
General surgeons	10.0	810	451
Gastroenterologists	4.8	388	244
Neurological surgeons	2.8	226	188
Vascular surgeons	4.0	324	99
Emergency room specialists	1.7	137	98
Urologists	2.7	218	90
Thoracic surgeons	4.0	324	86
Neurologists	1.7	137	60
Internists	6.2	502	23
General or Family Practitioners	9.4	761	--
Others (or some professions underestimated)	<u>17.7</u>	<u>1,439</u>	<u>15</u>
Total	100.0	8,100	3,908

II. Technologists

As of March 1981, there were 14,500 active CRTs in California. A survey done by the Radiological Health Branch in 1975 revealed that approximately 80 percent were employed and approximately 65 percent of those employed worked in hospitals. Therefore, we can assume that approximately 8,000 CRTs currently work in hospitals. This survey shows that of these 8,000, approximately 2,600 assist certified licentiates by operating fluoroscopy equipment under their direct supervision, and approximately 1,200 CRTs operate or use fluoroscopy equipment semi-independently. Such semi-independent use involves spotting a gallbladder, ileo-cecal valve, or perform similar tasks delegated to them by a qualified licentiate.

The survey indicates that only a comparatively small group of CRTs have received additional (post-CRT) education and training in the operation and use of fluoroscopy equipment. The survey also shows that in 19 percent of hospitals that allow technologists to operate or use fluoroscopy equipment, the supervision of these technologists is less than optimum.

Finally, the survey discloses that 23 remote control fluoroscopy units are also operated for routine positioning prior to taking a radiograph. Of these 23 units, 16 (70 percent) are located in Southern California and 7 units (30 percent) are located in Northern California.

III. Equipment

Wide use of video disc or video tape equipment is evident. However, it is also clear that most of the fluoroscopy equipment is used in "motion picture" mode rather than in "slide projection" mode, as is possible with video disc use or electronic radiography mode. In addition, effective use of closed circuit television in one hospital permits a radiologist to provide immediate consultation (and supervision) during the fluoroscopy procedure.

Conclusions

I. Licentiates

The study shows that a broad range of physician-specialists are using fluoroscopy equipment throughout hospitals. In most instances, these specialists have (1) direct control over the patient's radiation exposure, and (2) directly supervise radiologic technologists who assist them. Therefore, these physicians should be qualified through education, training, and show their proficiency in the use of fluoroscope by passing a radiation protection and safety examination. Also, for optimum radiation health care delivery they should be under the general guidance of a radiologist.

II. Technologists

The survey shows that a large number of radiologic technologists operate or use all types of fluoroscopy equipment both under the direct supervision of an X-ray supervisor and operator and semi-independently. In most instances, these technologists have never received formal training to perform the tasks associated with semi-independent operation or use of fluoroscopy equipment. Use of untrained or poorly trained technologists to perform fluoroscopy services constitutes a health hazard both to the patient and operator.

TABLE 1
LOCATION AND USE OF STATIONARY FLUOROSCOPIC EQUIPMENT

USERS	LOCATION													
	RADIOLOGY		CARDIAC CATH. LAB & DEPT.		SPECIAL PROCEDURES ROOM		SURGERY		EMERGENCY ROOM		GASTRO-ENTEROLOGY		UROLOGY	
	NO. OF STATIONARY FLUORO UNITS													
	1,099		90		9		8		3		2		2	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Radiologists	431	1,994	-	-	3	c	-	-	-	-	-	-	-	-
Cardiologists	79	261	90	577	6	37	c	c	-	-	-	-	-	-
Gastroenterologists	63	118	-	-	-	-	-	-	-	-	c	c	-	-
Orthopedic Surgeons	22	117	-	-	-	-	c	c	c	c	-	-	-	-
Neurological Surgeons	47	96	-	-	-	-	-	-	-	-	-	-	-	-
General Surgeons	37	72	-	-	-	-	c	c	-	-	-	-	-	-
Neurologists	17	32	-	-	-	-	-	-	-	-	-	-	-	-
Emergency Room Specialist	8	19	-	-	-	-	-	-	c	c	-	-	-	-
Thoracic Surgeons	7	17	-	-	-	-	-	-	-	-	-	-	-	-
Vascular Surgeons	7	15	-	-	-	-	c	c	-	-	-	-	-	-
Urologists	7	14	-	-	-	-	-	-	-	-	-	-	c	c
Other (Oncologists, Pediatricians, etc.)	3	6	-	-	-	-	-	-	-	-	-	-	-	-
Podiatrists	3	6	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	431	2,767 ^d	90	577	9	37 ^e	9	37	9	37	9	37	9	37

a Number of hospitals that responded.
 b Number of each specialty using fluoroscope.
 c Insufficient data to make reliable estimate.
 d 773 are nonradiologist specialists.
 e Total users may be as high as 100 percent more.

TABLE 2
LOCATION AND USE OF MOBILE FLUOROSCOPIC UNITS (C-ARMS)

USERS	LOCATION																		TOTAL USERS		
	CARDIAC CATH. LAB & CARD. DEPT.		SPECIAL PROCEDURES ROOM		SURGERY		EMERGENCY ROOM		GASTRO- ENTEROLOGY		UROLOGY		ICU		CCU		OUT- PATIENT SURGERY				
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b			
NUMBER OF MOBILE UNITS USED IN ALL LOCATIONS: 292																					
Radiologists	14	108	4	30	15	80	2	8	-	-	-	-	10	58	8	58	-	-	-	-	342
Cardiologists	-	-	6	37	69	251	2	13	-	-	-	-	39	124	46	262	-	-	-	-	687
Gastroenterologists	-	-	3	11	27	64	3	7	19	50	-	-	-	-	3	11	3	11	-	-	154
Orthopedic Surgeons	1	2	-	-	228	1,359	7	35	-	-	-	-	-	-	1	3	-	-	-	-	1,399
Neurological Surgeons	3	7	4	13	38	84	-	-	-	-	-	-	-	-	-	-	-	-	1	4	108
General Surgeons	2	4	1	2	80	320	5	28	1	9	-	-	-	-	7	24	-	-	-	-	387
Neurologists	4	4	-	-	7	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28
Emergency Room Specialists	-	-	-	-	3	9	19	70	-	-	-	-	1	2	1	2	-	-	-	-	83
Thoracic Surgeons	3	14	1	1	16	54	-	-	-	-	-	-	2	9	1	7	-	-	-	-	85
Vascular Surgeons	4	6	2	13	10	55	-	-	-	-	-	-	-	-	1	7	-	-	-	-	74
Urologists	4	6	2	13	12	37	-	-	-	-	14	43	-	-	-	-	-	-	-	-	80
Internists	1	1	-	-	5	13	-	-	-	-	-	-	1	4	1	5	-	-	-	-	23
Other (Pulmonary, Oncologists, Pediatricians)	-	-	-	-	4	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Podiatrists	-	-	-	-	5	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
TOTAL	c	146	21	107	228+	2,373	38	161	20	59	14	43	53	197	68	372	4	15	4	15	3,473

a Hospitals.
b Nonradiologist specialists.
c Insufficient data to make reliable estimate.

TABLE 3
VIDEO-DISC OR VIDEO-TAPE EQUIPMENT ON FLUOROSCOPIC MACHINES

SIZE OF HOSPITAL (BEDS)	STATEWIDE DATA							EXTRAPOLATION Number of Video-Disc or Video-Tape Equip- ment in 560 Hospitals
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	Number of Hospitals Responding	Number of Stationary Fluoroscopy Machines	Number of Mobile Fluoroscopy Machines (C-Arm)	Total Number of Fluoroscopy Machines	Number That Have Video-Disc or Video-Tape Equipment	Percent That Have Such Equipment		(8)
— 50	91	117	14	131	19	14.5		26
51— 99	120	233	52	285	51	17.8		65
100—199	119	351	100	451	95	21.0		115
200—299	52	218	56	274	87	31.7		110
300—399	25	130	33	163	42	25.6		53
400—499	11	57	10	67	27	40.3		44
Over 500	13	107	27	134	52	38.8		72
TOTAL	431	1,213	292	1,505	373	24.7		485

TABLE 4

STATIONARY FLUOROSCOPY MACHINES

SIZE OF HOSPITAL (BEDS)	SOUTHERN CALIFORNIA				NORTHERN CALIFORNIA				STATEWIDE DATA					EXTRAPOLATION Fluoroscopy Machines in 560 Hospitals
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
- 50	41	22	26	1.18	85	69	91	1.31	126	91	72.2	117	1.28	162
51- 99	84	61	117	1.96	71	59	116	1.96	155	120	77.4	233	1.94	301
100-199	88	71	227	3.20	57	48	124	2.58	145	119	82.0	351	2.94	428
200-299	35	29	128	4.41	31	23	90	3.91	66	52	78.7	218	4.19	277
300-399	18	15	79	5.27	14	10	51	5.10	32	25	78.1	130	5.20	166
400-499	10	4	17	4.25	8	7	40	5.71	18	11	61.1	57	5.18	93
Over 500	11	7	72	10.28	7	6	35	5.83	18	13	72.2	107	8.23	148
TOTAL	287	209	666	3.19	273	222	547	2.46	560	431	76.9	1,213	2.81	1,575

TABLE 5
MOBILE IMAGE INTENSIFIED FLUOROSCOPY EQUIPMENT (C-ARM)

SIZE OF HOSPITAL (BEDS)	SOUTHERN CALIFORNIA				NORTHERN CALIFORNIA				STATEWIDE DATA				EXTRAPOLATION Mobile Fluoroscopic Equipment in 560 Hospitals (14)
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
(1)	Number of Hospitals That Have Mobile Fluoroscopic Equipment	Percent of Hospitals With Mobile Fluoroscopic Equipment	Number of Mobile Fluoroscopic Equipment	Average per Hospital	Number of Hospitals That Have Mobile Fluoroscopic Equipment	Percent of Hospitals With Mobile Fluoroscopic Equipment	Number of Mobile Fluoroscopic Equipment	Average per Hospital	Number of Hospitals That Have Mobile Fluoroscopic Equipment	Percent of Hospitals With Mobile Fluoroscopic Equipment	Number of Mobile Fluoroscopic Equipment	Average per Hospital	
- 50	3	15	3	0.14	11	16	11	0.15	14	16	14	0.15	19
51- 99	24	40	24	0.39	28	48	28	0.47	52	44	52	0.43	66
100-199	53	75	59	0.83	37	78	41	0.85	90	76	100	0.84	122
200-299	27	93	32	1.10	22	96	24	1.04	49	95	56	1.07	71
300-399	14	94	21	1.40	9	90	13	1.30	23	92	33	1.32	42
400-499	3	73	3	0.75	5	76	7	1.00	8	73	10	0.90	16
Over 500	7	100	16	2.28	5	94	11	1.83	12	93	27	2.07	37
TOTAL	131	63	158	0.75	117	53	135	0.60	248	58	292	0.67	373

TABLE 6
 CERTIFIED RADIOLOGIC TECHNOLOGISTS WHO OPERATE FLUOROSCOPES UNDER DIRECT SUPERVISION

Size of Hospital (Beds)	SOUTHERN CALIFORNIA						NORTHERN CALIFORNIA						STATEWIDE DATA					
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)		
	Hospitals Responded	Number of Hospitals Allowing Techs to Fluoro	Percent of Hospitals Allowing Techs to Fluoro	Total Number of Techs Operating Fluoro	Average Number of Techs per Hospital Permitted to Fluoro	Hospitals Responded	Number of Hospitals Allowing Techs to Fluoro	Percent of Hospitals Allowing Techs to Fluoro	Total Number of Techs Operating Fluoro	Average Number of Techs per Hospital Permitted to Fluoro	Hospitals Responded	Number of Hospitals Allowing Techs to Fluoro	Percent of Hospitals Allowing Techs to Fluoro	Total Number of Techs Operating Fluoro	Average Number of Techs per Hospital Permitted to Fluoro	Statewide EXTRAPOLATED Numbers		
(1)																		
- 50	22	11	50	21	0.95	69	18	26	46	0.66	91	29	32	67	0.73	92		
51-99	61	32	52	144	2.36	59	27	45	154	2.61	120	59	49	298	2.48	384		
100-199	71	41	58	394	5.55	48	23	48	217	4.52	119	64	54	611	5.13	744		
200-299	29	22	76	329	11.34	23	14	61	197	8.56	52	36	69	526	10.11	667		
300-399	15	12	80	195	13.00	10	5	50	93	9.30	25	17	68	288	11.52	386		
400-499	4	4	100	62	15.50	7	3	43	42	6.00	11	7	64	104	9.45	170		
Over 500	7	3	43	70	10.00	6	3	50	74	12.33	13	6	46	144	11.07	199		
TOTAL	209	125	60	1,215	5.81	222	93	42	823	3.70	431	218	51	2,038	4.72	2,624		

TABLE 7
 CERTIFIED RADIOLOGIC TECHNOLOGISTS WHO OPERATE FLUOROSCOPES UNDER IMMEDIATE AND PERSONAL SUPERVISION

Size of Hospital (Beds)	SOUTHERN CALIFORNIA						NORTHERN CALIFORNIA						STATEWIDE DATA				
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	
	Hospitals Responding	Number of Hospitals Allowing Techs to Fluoro Semi-independently	Percent of Hospitals Allowing Techs to Fluoro	Total Number of Techs Using Fluoro	Average Number of Techs per Hospital Who Fluoro	Hospitals Responding	Number of Hospitals Allowing Techs to Fluoro Semi-independently	Percent of Hospitals Allowing Techs to Fluoro	Total Number of Techs Using Fluoro	Average Number of Techs per Hospital Who Fluoro	Hospitals Responding	Number of Hospitals Allowing Techs to Fluoro Semi-independently	Percent of Hospitals Allowing Techs to Fluoro	Total Number of Techs Using Fluoro	Average Number of Techs per Hospital Who Fluoro	Statewide EXTRAPOLATED Data	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	
— 50	22	4	18	7	0.32	69	8	12	18	0.26	91	12	13	25	0.27	34	
51— 99	61	14	23	68	1.11	59	15	25	66	1.11	120	29	24	134	1.11	172	
100—199	71	28	39	237	3.33	48	11	23	68	1.41	119	39	33	305	2.56	371	
200—299	29	14	48	198	6.83	23	7	30	79	3.43	52	21	40	277	5.37	351	
300—399	15	9	60	117	7.80	10	0	0	0	—	25	9	36	117	4.68	149	
400—499	4	2	50	23	5.75	7	2	28	13	1.85	11	4	36	36	3.27	59	
Over 500	7	1	14	2	0.28	6	2	33	18	3.00	13	3	23	20	1.53	27	
TOTAL	209	72	34	652	3.12	222	45	20	262	1.18	431	117	27	914	2.12	1,187	

TABLE 8
SPECIAL TRAINING FOR CRTs IN THE USE/OPERATION OF FLUOROSCOPIC EQUIPMENT

TYPE OF TRAINING	SOUTHERN CALIFORNIA		NORTHERN CALIFORNIA		STATEWIDE DATA	
	Number of Hospitals Responded	Percent	Number of Hospitals Responded	Percent	Number of Hospitals Responded	Percent
	(1)	(2)	(3)	(4)	(5)	(6)
Under the direct supervision of a radiologist	43	34	28	30	71	31
Extensive in-service training	27	22	18	20	45	21
Training given but not specified	23	18	12	13	35	17
Trained by a sales representative	3	2	0	0	3	1.5
Trained by an RSO (physicist)	0	0	1	1	1	0.5
No training offered	2	2	4	4	6	3
Unknown	27	22	30	32	57	26
Number of hospitals	125	100	93	100	218	100

TABLE 9
SUPERVISION OF CERTIFIED TECHNOLOGISTS WHO USE FLUOROSCOPIC EQUIPMENT

	SOUTHERN CALIFORNIA				NORTHERN CALIFORNIA				STATEWIDE DATA				Statewide EXTRAPO- LATED Data Number of Hospitals Where Techs Are Under Proper Supervision
	(1) Hospitals Responding	(2) Number of Hospitals in Which Techs Use Fluoro	(3) Operate Fluoro Only When Radiologist is on the Premises	(4) Percent of Hospitals That Permit Techs to Use Fluoro Under Proper Supervision	(5) Hospitals Responding	(6) Number of Hospitals in Which Techs Use Fluoro	(7) Operate Fluoro Only When Radiologist is on the Premises	(8) Percent of Hospitals That Permit Techs to Use Fluoro Under Proper Supervision	(9) Hospitals Responding	(10) Number of Hospitals in Which Techs Use Fluoro	(11) Operate Fluoro Only When Radiologist is on the Premises	(12) Percent of Hospitals That Permit Techs to Use Fluoro Under Proper Supervision	
209	125	96	77	222	93	81	87	431	218	177	81	229	
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	

ATTACHMENT NO. 2
RESPONSE TO QUESTIONNAIRE

SIZE OF HOSPITAL (BEDS)	SOUTHERN CALIFORNIA			NORTHERN CALIFORNIA			STATEWIDE			Number of Hospitals in the United States
	(2) Number of Hospitals	(3) Number That Responded	(4) Percent Response	(5) Number of Hospitals	(6) Number That Responded	(7) Percent Response	(8) Number of Hospitals	(9) Number That Responded	(10) Percent Response	
(1)										(11)
- 50	41	22	53.6	85	69	81.1	126	91	72.2	2,833
51- 99	84	61	72.6	71	59	83.0	155	120	77.4	
100-199	88	71	80.6	57	48	84.2	145	119	82.0	1,401
200-299	35	29	82.8	31	23	74.1	66	52	78.7	713
300-399	18	15	83.3	14	10	71.4	32	25	78.1	380
400-499	10	4	40.0	8	7	87.5	18	11	61.1	243
Over 500	11	7	63.6	7	6	85.7	18	13	72.2	311
TOTAL	287	209	72.8	273	222	81.3	560	431	76.9	5,881

DEPARTMENT OF HEALTH SERVICES

714/744 P STREET

ACRAMENTO, CA 95814

Radiologic Health Section
Certification

November 17, 1980

FLUOROSCOPY UTILIZATION QUESTIONNAIRE

Dear Administrator:

The Radiologic Technology Certification Committee has asked us to look into the utilization of fluoroscopic equipment by licensed physicians, and in certain instances, by qualified certified radiologic technologists. Please request your Radiology Department to complete and return this form to the above address by December 1, 1980.

We greatly appreciate your cooperation.

Sincerely,

Irving Goldberg
Irving Goldberg
Senior Health Physicist
Radiologic Health Section
Certification

1. Name and title of person completing the questionnaire _____.
2. Qualification of physician in charge of providing radiological services:
ABR certified? yes; no.
3. FOR FLUOROSCOPY EQUIPMENT ONLY:
- a. Total number of stationary units _____, mobile C-arm units _____.
- b. Number in (indicate full-time location with "F" and part-time location with "P"):
Radiology Department _____; Surgery _____; Emergency _____;
Cardiac Catheterization Lab _____; Cardiology Department _____;
Urology Department _____; Neurology Department _____;
Gastroenterology Department _____; other locations (please specify) _____
-
4. How many units have electronic radiography mode? _____; how many units have video disc or video tape capabilities? _____.

OVER

5. PHYSICIANS AND SURGEONS USING FLUOROSCOPIC EQUIPMENT:

Please indicate total number of physicians (approximate if necessary) who use fluoroscopic equipment, and where the equipment is being used (see item 3.b.):

Number	Specialty	Where used
	Cardiologists	
	Orthopedic surgeons	
	Emergency room specialists	
	Urologists	
	Gastroenterologists	
	Neurologists	
	Neurological surgeons	
	General surgeons	
	Radiologists	
	Others (please specify)	

6. CERTIFIED RADIOLOGIC TECHNOLOGISTS:

- a. Number of certified radiologic technologists who are permitted to assist a physician by energizing (stepping on a foot-switch) fluoroscopic equipment _____; N/A.
- b. Number of technologists who are permitted to fluoroscope a gallbladder, ileocecal valve, and similar procedures, take appropriate spot-films, under immediate and personal supervision of a radiologist (present on the premises and available for immediate consultation) _____; N/A.
- c. Are certified radiologic technologists permitted to energize a fluoroscope without an X-ray supervisor and operator being present? yes; no; a radiologist not being on the premises? yes; no. If either answer is "yes", please explain _____
- d. Do technologists use remote-control fluoroscopic assistance for routine radiographic positioning? yes; no; N/A. If the answer is "yes", please explain _____

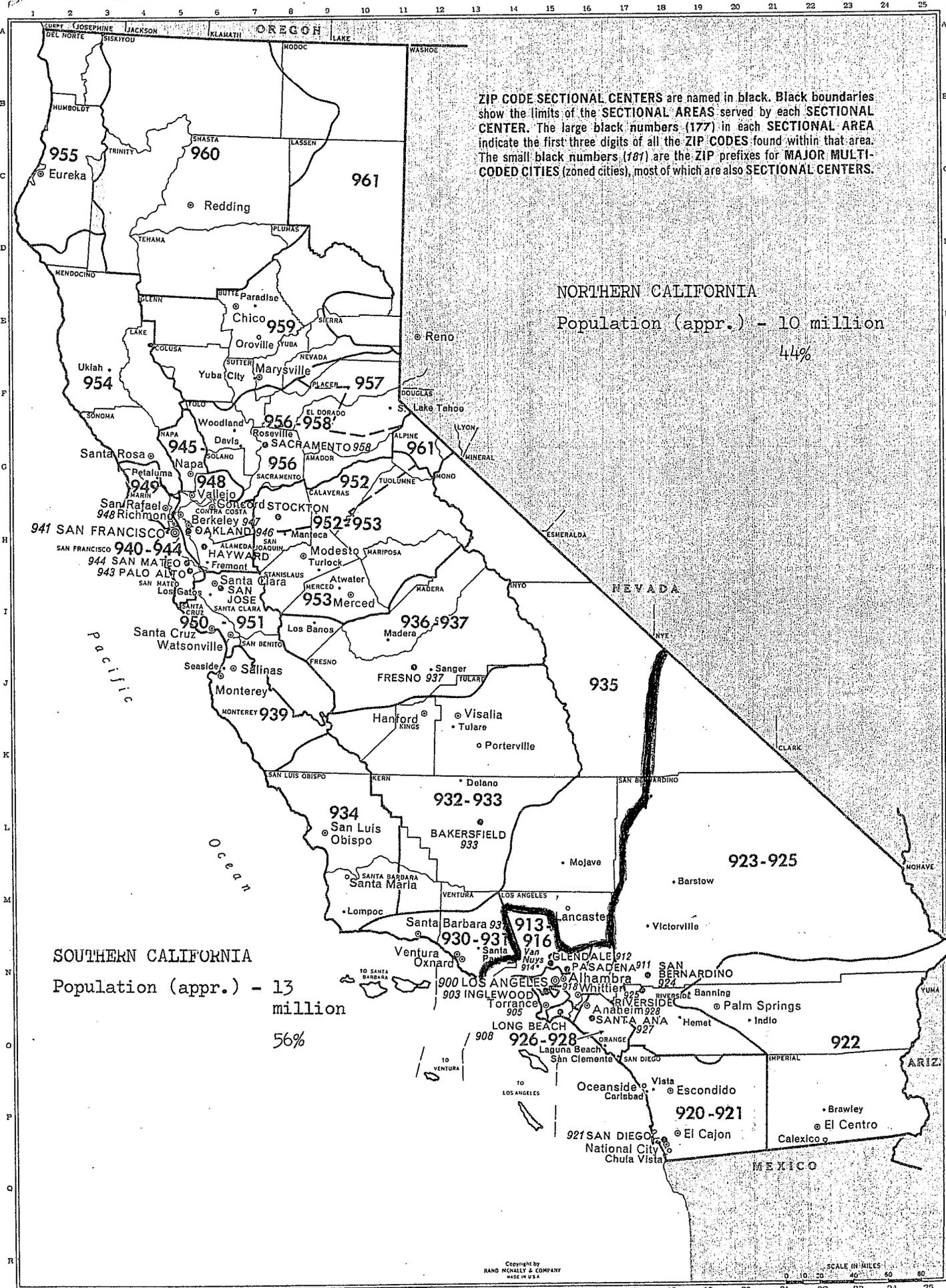
7. Please describe briefly special training in the use of fluoroscopic equipment given to certified radiologic technologists: N/A ; _____

8. Are all fluoroscopic units under the general supervision of the chief radiologist? yes; no. If the answer is "no", please explain _____

If there is insufficient space or if you would like to add any comments, please write on a separate sheet and enclose with the questionnaire.

* Having direct control over the patient's radiation exposure.

ZIP CODE MAP / 8



ZIP CODE SECTIONAL CENTERS are named in black. Black boundaries show the limits of the SECTIONAL AREAS served by each SECTIONAL CENTER. The large black numbers (177) in each SECTIONAL AREA indicate the first three digits of all the ZIP CODES found within that area. The small black numbers (101) are the ZIP prefixes for MAJOR MULTI-CODED CITIES (zoned cities), most of which are also SECTIONAL CENTERS.

NORTHERN CALIFORNIA

Population (appr.) - 10 million
44%

SOUTHERN CALIFORNIA

Population (appr.) - 13 million
56%