of an electromechanical reduction between the scanner probe and the photo display. In those procedures where lesion detection is the primary goal (e.g., bone scans), the concept of a low information density (ID), rapid survey scan would seem suitable. Interpretation of the low ID scan is difficult because of the statistical fluctuation, but by minifying the images and increasing the apparent data per unit area viewed, interpretation is greatly improved. Using the commercially available scanner with minification, Mishkin, et al (*3*) performed scans using high scan speeds and low information density. Because of minification, they were able to obtain interpretable images. Unfortunately, there are many instruments which do not permit scan minification due to a direct one-for-one correspondence between the scanner head and the photo display. We have used the method of secondary scan minification on one-for-one scans (optical-10 diopter lens, or photo-optical Polaroid pictures), and compared low-ID "minified" scans with images obtained at a "high ID" in 23 patients undergoing bone scan. There were no lesions present on the high-ID scan that were not similarly detectable on the low-ID scan. In all of the low-ID scans, the scanner was run at a 500-cm scan speed. Thus, a total-body bone survey could be obtained within 1½ hr in the posterior view with a single anterior pelvic view. Additional views were obtained as indicated clinically.

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ADVERSE REACTIONS TO RADIOPHARMACEUTICALS

We believe the Survey of Adverse Reactions to Radiopharmaceuticals sponsored by the Society of Nuclear Medicine has produced useful information which had not been previously available. Several limitations are apparent however:

1. A number of major institutions did not reply to the survey. Others put down round figures for total examinations thus diminishing the accuracy.
2. Many respondents have not kept records of reactions and were relying on memory.
3. Minor reactions probably are often not reported.
4. Some of the reactions reported are questionably related to the administered radiopharmaceutical.
5. We do not know the actual incidence of reactions for each of the radiopharmaceuticals because we do not know the total number of examinations performed with each pharmaceutical. The last Public Health Service survey for radiopharmaceutical utilization was in 1966. The utilization of radiopharmaceuticals has changed markedly since then.

A review of the results of the survey is of interest (Tables 1, 2). Most numerous are the reactions to technetium and indium colloids. These reactions are most likely secondary to the stabilizers used.

Intrathecal ^{131}I-IHSA is next in line in order of frequency. However, considering the probable frequency of the performance of cisternography, this most likely represents a very high incidence, possibly the highest of all radiopharmaceuticals. These reactions were aseptic meningitis except for one case which resulted in death 2 weeks later attributed to the performance of a lumbar puncture.

Two reactions to ^{32}P as chromic phosphate were severe, one due to suppression of marrow activity and the other to rapid reaccumulation of pleural fluid. One fatal reaction to ^{131}I-macroaggregates of human serum albumin was encountered immediately

TABLE 1. SURVEY OF ADVERSE REACTIONS

Survey forms mailed			4,505	
Number with M.D. degree			2,502	
Institutions or offices replying			327	
	1967	1968	1969	1970
Total number of examinations	295,972	361,685	449,964	
Number of reactions*	24	55	32	26
Incidence	1/12,332	1/6,576	1/14,061	
Total examinations 1967–69			1,107,621	
Total reactions			111	
Incidence			1/9,979	

* Six reactions were not specified as to year of occurrence.

TABLE 2. TYPE OF REACTION

Radiopharmaceutical	Pyrogens or nonsterility	Toxic or pharmacologic effect	Radiation effect	Allergic or idiosyncratic	Other	Total
^{99m}Tc-sulfur colloid	12	4		11	2	29
^{113m}In-colloid	1	3		18		22
^{131}I-IHSA (intrathecal)	4	1		3	11	19
^{131}I-iodohippurate		1		9	4	14
^{131}I-NaI (therapeutic)			2	3	7	12
^{113m}In-aggregates		3		9		12
^{99m}Tc-MAA				7		7
^{99m}Tc-pertechnetate				4		4
^{131}I-MAA				2	2	4
^{99m}Tc-iron hydroxide		1			3	4
^{85}Sr-nitrate	3					3
^{32}P-chromic phosphate		1	1	1		3
^{203}Hg-chlormerodrin				3		3
^{198}Au-colloid				2		2
^{131}I-NaI (diagnostic)				2		2
^{99m}Tc-DTPA					1	1
^{113m}In-DTPA				1		1
Totals	20	14	3	75	30	142

after injection. This is the only definite radiopharmaceutical related fatality noted. Three deaths following radioiodine therapy with ^{131}I are questionably associated with the radiopharmaceutical.

Of interest is a relatively large number of reactions to ^{131}I-o-iodohippurate. These consisted of a feeling of weakness or dizziness at about the conclusion of the study. Most of the reactions were attributed to the emotional state of the patient but a pharmacologic effect of the drug cannot be excluded.

The incidence of reactions is very low, particularly in comparison with reactions to radiographic contrast media. For instance, the incidence of reactions to intravenous urography was 4.6–8.53%, to intravenous cholangiography from 7.5–15.3%, and for various types of angiography 0.4–1.7% (Shehadi WH: *Amer J Roentgen* 97: 762, 1966). These are equivalent to one reaction for every 6.5–250 examinations.

We would like to urge all users of radiopharmaceuticals to maintain adequate records of utilization and of adverse reactions. These should be sent into the Society of Nuclear Medicine, 211 East 43rd Street, New York, New York 10017 on the appropriate forms which can be obtained from the Society office.

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ERRATUM

In the article entitled "Lower normal values for ^{131}I thyroid uptake not related to the ingestion of white bread," *J Nucl Med* 12: 743, 1971, the units of measurement for iodine values should read "μg" (microgram) instead of "mg" (milligram) throughout.