Studies can be conducted on comatose, uncooperative, or mechanically vented patients.

- Distribution of radioactive gas is mainly to the lungs.
- Elaborate delivery system is not required.
- The only radioisotope that can be administered ON and OFF as needed.
- Easy to license when compared to Xenon Xe 133 gas.
The Pulmonary Profile

THE CONCEPT
The pulmonary profile is a series of matched perfusion and ventilation studies done consecutively on a patient using the MPI Krypton Kr 81m Gas Generator and Technetium Tc 99m Albumin Aggregated. Following administration of the two products you are able to switch the energy window on the gamma camera and scan the patient in the same position for each of the isotopes before you move the patient to the next view. Thus, a complete series of matching views may be accumulated for any number of patient positions.

THE PURPOSE
To increase the diagnostic sensitivity and specificity of lung imaging procedures by providing an easy means of obtaining matched perfusion-ventilation images in one patient visit.

THE RESULT
A new patient study which combines ventilation and perfusion imaging procedures into one study called the Pulmonary Profile Study.

For information regarding the MPI Krypton Kr 81m Gas Generator Krypton Kr 81m please call Medi-Physics at (415) 658-2184, Outside California (800) 227-0492 or Inside California at (800) 772-2477.

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DESCRIPTION: The Krypton Kr 81m Gas Generator consists of Rubidium Rb 81 fixed to a solid support from which the Krypton Kr 81m is eluted by passage of humidified oxygen or air through the generator. Other rubidium radio-isotopes which do not decay to radioactive Krypton Kr 81m in their decay are present in the generator (Rubidium Rb 82m, for example, is present at a concentration of 30-40%).

INDICATIONS AND USAGE: The Krypton Kr 81m Gas Generator is indicated for use in the study of pulmonary ventilation.

CONTRAINDICATIONS: None known.

WARNINGS: None known.

PRECAUTIONS:
General
The Krypton Kr 81m Gas Generator as well as other radioactive drugs, must be handled with care to minimize radiation exposure to clinical personnel. Also care should be taken to minimize radiation exposure to the patient consistent with proper patient management.

Carcinogenesis, Mutagenesis, Impairment of Fertility
No long-term animal studies have been performed to evaluate carcinogenic potential, mutagenicity potential, or whether Krypton Kr 81m gas affects fertility in males or females.

Pregnancy-Category C
Animal reproduction studies have not been conducted with Krypton Kr 81m gas. It is also not known whether Krypton Kr 81m gas can cause fetal harm when administered to a pregnant woman, or can affect reproduction capacity. Krypton Kr 81m gas should be given to a pregnant woman only if clearly needed.

Nursing Mothers
It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Krypton Kr 81m gas is administered to a nursing woman.

Pediatric Use
Safety and effectiveness in children have not been established.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

ADVERSE REACTIONS: None known.

DOSAGE AND ADMINISTRATION: The recommended dose range for Krypton Kr 81m is 1-10 millicuries and should be administered by continuous inhalation for a sufficient time to provide desired diagnostic information. The multiplication product of the radioactivity and the time of continuous inhalation of Krypton Kr 81m generally should not exceed 100 millicuries-minutes.

HOW SUPPLIED: The Krypton 81m Gas Generator is supplied in the form of Rubidium Rb 81, bound to a solid support, with an activity of 2-10 millicuries at calibration time. The generator is enclosed in a lead shielded filter assembly surrounded by a capped plastic canister to which a handle is affixed. The generator should be stored at room temperature. The generator expires 12 hours after date and time of calibration.

Generators and radiopharmaceuticals that arrive on time, week after week.

Mallinckrodt's generator delivery system is ranked number one* in the industry. Here's why:

Our mid-continental location means we can make most deliveries by truck. So for 90% of our customers in 45 states, the number one delivery problem—airline delays—is no problem at all. If there is a hitch, one quick call to our toll-free service number will straighten it out.

Mallinckrodt weekend generators are delivered no later than 8 AM every Monday. If you need midweek delivery, your generator will arrive by 8 AM Wednesday.

For dependable, on-time generator delivery, week after week, call your Mallinckrodt representative or this toll-free number:

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For technical assistance it's 800-325-8181
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THE MALLINCKRODT COMMITMENT to Nuclear Medicine

*In a recent independent survey of 400 nuclear medicine departments. Data on file at Mallinckrodt.
Whole New Planes of Vision.
Tomovision is a New Dimension in Nuclear Imaging.

Tomovision. As dramatic an advance over current nuclear tomography as tomography was over planar imaging. Large organ and area studies are now possible. And Tomovision gives you clearer images with more detail, fewer artifacts, and better contrast. How does it work? The real secret is in our collimators and programming.

To complement the 7 pinhole collimator, we designed a revolutionary Rotating Slant Hole Collimator. It works on Technicare's small field and large field gamma cameras. And gives you a field of view equal to the diameter of the collimator, beginning at the face of the camera.

So you can see more than ever before. And more clearly than ever before. So the role of nuclear medicine in research and diagnosis has suddenly expanded. Because tomography is ready to augment the classic diagnostic procedures. Ready to become a routine diagnostic tool.

All Tomovision equipment is manufactured by the Technicare Corporation. So we take care of it all. And we're building our one source reputation with a commitment to excellence. Excellence in training of our field service engineers. Excellence in providing prompt, local service throughout the nation. Tomovision is your assurance that nuclear tomography will deliver consistent, reliable performance for improved clinical confidence.

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Bone Imaging in Oncology
A Clinical Casebook: Bone Imaging in Orthopedic Medicine
Diagnosing Pulmonary Embolism
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New England Nuclear
Technetium Tc 99m Generators

INCORPORATE THE FOLLOWING ADVANTAGES:

ONLY UNION CARBIDE CINTICHEM® Technetium 99m Generators are produced in total at one domestic production site which:

- Possesses a ten million dollar* commitment to Nuclear Medicine through its own Nuclear Reactor for the production of high specific activity Fission Product Mo 99,
- manufactures and purifies by a patented process high specific activity Fission Product Mo 99,
- loads Fission Product Mo 99 onto columns,
- assembles the Generators,
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- ships Generators directly to the user

This provides you with a reliable product supply and a uniformly high quality product.

Elution Transfer Point Shielded Hood
Maximizes Radiation Protection During the Elution Process Itself

*Estimated 1980 construction value.

From Atom to Image

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FOR PRODUCT INFORMATION CALL TOLL FREE (800) 431-1146. IN N.Y.S. CALL (800) 942-1988
DYNA MO—ALL AROUND PERFORMANCE.
Today, DynaMo is succeeding because of its performance in any situation. DynaMo delivers incomparable resolution in the nuclear medicine department or out of it. Our integral Micro Z™ Processor gives it automatic image correction and up to 15% improvement in resolution. With its own lightweight collimators and its unique five-motion detector, it's easy to operate, even in crowded situations. And DynaMo interfaces with any nuclear medicine computer.

Whether you choose it as a prime unit, an all-around second camera, or as a complete department unto itself, you'll find DynaMo stands alone.

For more information, call your Picker representative or write Picker Corporation, 12 Clintonville Road, Northford, CT 06472, or Picker International, 595 Miner Road, Highland Hts., OH 44143.
Any of these four ADAC nuclear medicine systems will deliver useful clinical information faster and more accurately than ever before possible.

And one has exactly the capacity your clinic or hospital needs today.

That's the one to buy.

Later, as you expand, your ADAC expands with you.

ADAC System I

It processes and acquires.
It has a Diagnostic Acquisition/Processing Console, a Computer Section, and a Winchester disc drive.
It can easily be expanded to a System II.

ADAC System II

It processes one study while acquiring or processing another.
It's a System I — plus a Remote Acquisition/Processing Terminal, a second Computer Section, and a second Winchester. It can easily be expanded to a System III.
ADAC System III

It processes and acquires in two places at once.
It looks just like a System II.
But there's more capability inside the Computer Section.
It can easily be expanded to a System IV.

ADAC System IV

It has a three-location option.
With two Consoles and an expanded Computer Section, you can process and acquire in two places at once.
Add an optional Remote Terminal and you can process and acquire studies at three locations.

For more information on ADAC Systems I, II, III, & IV, write or call collect. ADAC Laboratories, 255 San Geronimo Way, Sunnyvale, California 94086. (408) 736-1101.
Minitec® (Technetium Tc 99m) Generator
Cold where it counts

Easy to operate
— After a few simple preparations, Minitec elutes automatically and quickly. Subsequent elutions are even simpler.
— Small-volume, high-concentration eluates give maximum flexibility for varying applications.

On-time delivery
— Express ground transportation and special air system assure on-time deliveries.

Dependable service
— Specially trained Technical Associates and Squibb Technical Customer Service provide prompt personal attention when needed.

See next page for brief summary.

Minitec®
(Technetium Tc 99m)
Generator

Designed for minimum exposure
— Unique construction (no exposed tubing) and thick shielding (19/16” lead) provide high shielding-to-activity ratio.
— Another 1 ½” of lead shielding provided by Maxi-Shield™.
— Built-in handle reduces hand exposure during carrying.
— A comparison study of radiation exposure from the three leading generator systems is available from your Squibb Representative.

Convenient
— Available in potencies of 220, 440, 880, 1330, 1770 and 2220 mCi.
— Tuesday-calibrated generators delivered Wednesday a.m.
— Saturday-calibrated generators delivered Monday a.m.
Minitec® Technetium Tc 99m Generator

Hot where it matters
Cold where it counts

MINITEC®
Technetium Tc 99m GENERATOR

DESCRIPTION: Minitec (Technetium Tc 99m) Generator consists of a specially designed lead-shielded alumina column containing adsorbed fission-produced Mo 99. Tc 99m, the short-lived daughter of Mo 99, is obtained as sterile sodium pertechnetate Tc 99m by periodic elutions of the generator with an isotonic saline solution.

INDICATIONS AND USAGE: Sodium pertechnetate Tc 99m is indicated in ADULTS as an agent for brain imaging including cerebral radionuclide angiography, thyroid imaging, salivary gland imaging, placenta localization, and blood pool imaging including radionuclide angiography. (Use of sodium pertechnetate Tc 99m as a diagnostic radiopharmaceutical in CHILDREN, consult package insert.)

CONTRAINDICATIONS: None known.

WARNINGS: Radiopharmaceuticals should not be administered to patients who are pregnant or to nursing mothers unless the expected benefit to be gained outweighs the potential hazards.

Since sodium pertechnetate Tc 99m is excreted in human milk during lactation, formula-feeding should be substituted for breast-feeding.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

Radiation risks associated with the use of sodium pertechnetate Tc 99m are greater in children than in adults and, in general, the younger the child the greater the risk owing to greater absorbed radiation doses and longer life expectancy. These greater risks should be taken firmly into account in all benefit-risk assessments involving children.

IMPORTANT: Since material obtained from the generator may be intended for intravenous administration, aseptic technique must be strictly observed in all handling. Only the eluent provided should be used to elute the generator. Do not administer material eluted from the generator if there is any evidence of foreign matter.

PRECAUTIONS: In the use of any radioactive material, care should be taken to insure minimum radiation exposure to the patient and occupational workers consistent with proper patient management. At the time of administration the solution should be crystal clear.

ADVERSE REACTIONS: No adverse reactions specifically attributable to the use of sodium pertechnetate Tc 99m have been reported.

For full prescribing information, consult package insert.

HOW SUPPLIED: Minitec (Technetium Tc 99m) Generator is available in potencies of 220, 440, 880, 1330, 1770, or 2220 millicuries Mo 99 at calibration time. The generator is supplied with vials of sterile, nonpyrogenic eluant; a sterile needle adapter assembly and evacuated sterile collecting vials. Other accessories including lead shields, reference standard solutions, and a whole vial assay kit are available on request for use with the Minitec (Technetium Tc 99m) Generator.
On call 24 hours a day to take your order.

You can place an order with Mallinckrodt any time of the day or night, 7 days a week. Our order department is open a full ten hours every business day. But you can call even after hours or on weekends and your order will be recorded. Since our people are scheduled to come in early, order processing starts before normal business hours.

Ours is a time-proven system which processes and ships literally hundreds of orders a day. And isn’t it nice to know you can always get through to Mallinckrodt should you need to order a technetium Tc99m generator, or radiopharmaceuticals?

For more information, call your Mallinckrodt representative or this toll-free number:

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THE MALLINCKRODT COMMITMENT to Nuclear Medicine
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Why more small hospitals buy the imaging system owned by more large hospitals.
Digital's Gamma-11.

Digital's Gamma-11 is found in more large teaching hospitals and research centers worldwide than any other nuclear medicine imaging system. And the reasons these hospitals prefer the Gamma-11 are no different from the reasons you should choose it.

Your first reason for choosing the Gamma-11 is beautifully simple. The Gamma-11 is designed for ease of use. The computer prompts you in English. So it's simple to learn, even if you don't know anything about computers. Nothing is mysterious, but you'll find the results remarkable.

To help you with your job it does two jobs at once. On the screen you'll see dynamic or static images of single or multiple studies in color, monochrome or black and white. Or you can focus your attention on two different studies side by side for comparison. For instance, an image acquired at rest and stress, or pre- and post-operative. On every frame, positive patient identification automatically appears. But best of all, the Gamma-11 can both acquire and analyze data simultaneously, even in gated cardiac mode. Something no other imaging system can do without expensive additions.

Digital's Gamma-11 will acquire, process, store, and display information so expertly and thoroughly that you can diagnose your patient's problem faster. With a greater degree of accuracy.

The information acquired from the Gamma-11 is gathered on a disk pack which has a much greater capacity for permanent information storage than, for example, the smaller alternative floppy disk. Also the disk, unlike the floppy, allows you to acquire data in both matrix and list mode.
As your department grows, so grows the Gamma-11.
What's more, the Gamma-11 is expandable. In fact our imaging system can accommodate up to three additional gamma cameras without requiring expensive interfaces. Since it's the finest on the market, you can easily and economically adapt the Gamma-11 to meet your growing needs. You don't have to worry about obsolescence either, as the first Gamma-11 installed 9 years ago is still up and running.

We'll support you with the IMAGE, so you'll see new developments.
All Gamma-11 owners receive the IMAGE, a newsletter for Gamma users from the Medical Systems Group at Digital. It's a forum for communicating with your peers and with the Medical Systems Group about significant developments involving Gamma-11 systems.
You'll read articles by users and be informed of upcoming symposia, shows, and meetings of relevance to Gamma-11 owners. So that at all times you'll be aware of new techniques and innovations in nuclear medicine as they relate to computer-operated imaging systems.

available from medical software firms, you can also get application packages from Digital and other Gamma-11 users. Such as the large teaching hospitals. So in effect, you'll be benefiting from their experience.
And many teaching hospitals have been using Gamma-11 systems since 1971. Which means that, in demanding circumstances, and over a lengthy period of time, Digital's system has proven itself in both reliability and performance.
The Gamma-11 comes with the acquisition software you'll need. Digital will provide on-site training plus information concerning university-based clinical training courses on the Gamma-11.
Find out more. Fill out and mail this coupon today. You'll soon see that with the flexibility and reliability of the Gamma-11, the nuclear medicine imaging system found in more of our large hospitals is more than ideal for your hospital.

The imaging system for my hospital must be both flexible and easy to use. Send more information on the Gamma-11 immediately!

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The Leader

Raytheon takes pride in performance, in productivity — but above all, we take pride in technical innovation ahead of the crowd.

Raytheon Nuclear Diagnostics is the leader with its multi-tube camera. Where the rest are still playing catch-up with 61-tube cameras, RND's 91-tube large field-of-view camera has an enviable four-year record with greater than 740,000 hours of clinical service. From the beginning we recognized the value of high resolution in a large-field camera — and with the massive resources of the Raytheon group we made it happen.

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SIEMENS
Multi-gated blood pool studies can be acquired in either single or sequential modes with the ejection fraction data displayed for one study or up to eight stress or intervention studies at once.

Regional wall motion changes within the heart can be displayed through "stroke volume" and "ejection fraction" images. Additionally, paradox images enhance the diagnosis of dyskinetic myocardial segments for complete cardiac analysis.

A gated 128 by 128 mode reduces motion blur in myocardial images without significantly prolonging study time.

The ACAP Program provides an automated wall detection method for outlining left ventricular borders and provides accurate, reproducible left ventricular ejection fractions.
**Acquisition and Processing Features**

Operator selection of study termination parameters (memory full, time). For intervention studies, up to eight sequential multi-gated blood pool studies may be acquired. Rapid analysis of ventricular parameters can be obtained conveniently by use of lite pen or automatically via an advanced edge detection algorithm requiring little or no operator intervention. Storage of R-R time intervals, ejection fraction data, volume curve and regions of interest is permitted.

**Myocardial Gated Imagery**

Stop action viewing of technetium pyrophosphate infarct images or Thallium-201 perfusion images is provided in a 128 x 128 matrix. 100 millisecond time intervals provide motion deblurring without excessively prolonged study time. Thallium-201 four frame 128 x 128 gated images may be displayed in cine mode for visualization of myocardial thickening.

**Extended Wall Motion Analysis**

Display of regional volume changes on a pixel by pixel basis is provided in a static gray scale format via “functional” images. Analysis of dyskinetic wall motion is obtained by use of the “paradox” image. Overlap of the diastolic and systolic borders over the “stroke volume” image are possible to aid in ROI assignment over the left ventricle.

ECAP and ACAP are part of our commitment to nuclear cardiology. For complete information on ECAP, ACAP, and/or our line of nuclear cardiology products, Pho/Gamma® LEM®, Pho/Gamma SFOV and LFOV®, Pho/Con®, Gamma/Cor®, Slant Hole Collimator, or Image Magnifier-Rotator, call or write today.

**SIEMENS GAMMASONICS, INC.**

Nuclear Medical Division
2000 Nuclear Drive
Des Plaines, IL 60018
Telephone 312/635-3100
The Pho/Gamma* LEM Scintillation Camera provides high resolution, high count rate nuclear medicine imaging capability at the patient's bedside. The LEM is available with power assist or optional power drive and is suitable for mobile applications or use in stationary settings such as in stress testing laboratories.

The Image Magnifier/Rotator allows magnification (up to 2.75 times normal size) of camera data prior to digitizing and display. Magnification aids in visualizing small organs imaged with a large field of view camera. The Image Rotator provides 360° rotation of camera data to allow operator chosen orientation of clinical studies.

The Pho/Gamma* LFOV™ Scintillation Camera is a high performance LFOV Detector, integrated with a microprocessor-based Standard Console (Scintiview™ with Micro Dot Imager™) that provides cardiac analysis and processing with optional ECAP and ACAP programs.

ZLC provides uniformity and linearity correction in a manner which will not distort quantitative camera data. The demanding camera requirements necessary to perform quantitative nuclear cardiology are met with ZLC.

The Gamma/Cor* RCG is a lightweight, highly mobile cardiac system which offers a unique direct method for rapid, repeatable assessment of left ventricular ejection fraction in a minimally invasive, safe manner right at the patient's bedside. The Gamma/Cor also provides assessment of other cardiac parameters such as cardiac output.

A HISTORY OF PERFORMANCE... A COMMITMENT TO THE FUTURE.
Kits and generators shipped together to save shipping cost and paper work.

One order assures dependable delivery of your nuclear imaging needs... shipped together for freight savings. You also get the convenience of one-source responsibility for shipping, billing and follow-through support from the most responsive service organization in the business.

Mallinckrodt offers a full range of generator sizes and the organ-imaging kits you use most often. Find out how Mallinckrodt's efficient shipping can save time and money in your department. Call your Mallinckrodt representative or this toll-free number:

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For technical assistance it's 800-325-8181
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MALLINCKRODT COMMITMENT to Nuclear Medicine

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SCOPIX® CR3
Universal CRT
Imaging Film
Up to now, if you wanted good CRT image recording from computed tomography, ultrasound and nuclear medicine equipment, you may have used several different “special purpose” imaging films.

We started with a conviction that a more convenient universal emulsion film was desirable and possible. The result is Agfa-Gevaert’s new SCOPIX CR3 Universal CRT Imaging Film . . . the one film that does it all!

It is a film matched to the spectral emission of white, blue and green phosphors used for CRT displays and video monitors.

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The broad spectral sensitivity of SCOPIX CR3 Film ensures accurate and detailed recording from greyscale CRT and video monitors which use white, blue or green phosphors in their display tubes. It is the “blindness” to green phosphors which causes other films to exhibit higher grain and less definition.

SCOPIX CR3 Film is a single-coated, orthochromatic, medium speed film of relatively high contrast, which gives outstanding recording of CT scan, ultrasound and nuclear video images.

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Its higher speed allows CRT monitor intensity to be decreased, thus reducing the “halo” effect on the video screen and improving image definition.

SCOPIX CR3 Film is single-coated on GEVA 5 polyester base, with anti-halation layer. This combination enhances image detail and definition by preventing image parallax. It is suitable for all RP and manual film processing.

With SCOPIX CR3 film . . . you purchase fewer film types and simplify film inventory; get improved and consistent quality and economy because one film does it all!

For additional information, contact your nearest Agfa-Gevaert Rex Representative or call 914-682-5650.

Image Quality and Support Second to None.

Agfa-Gevaert Rex offers a complete line of superior, sensitometrically dependable X-ray films. All have the finest definition and image quality to help make precise diagnoses. And all offer appropriate speed for the desired technique. Whether it’s general purpose radiology, or special procedures such as cinefluorography, angiography or mammography, Agfa-Gevaert has the film to meet your diagnostic needs.

SCOPIX CR3 Film

The one film that does it all!

Photos courtesy Mt. Sinai Hospital, N.Y.
This small desk top microprocessor computer provides complete inventory control and NRC record keeping functions for the nuclear medicine department.

It is user programmable — you program it to fit your requirements even down to the half-life of the radionuclide so the Isotron never becomes obsolete in the rapidly changing field of nuclear medicine.

The Isotron can keep track of up to 20 different radiopharmaceuticals simultaneously by both radionuclide and chemical form! Updates the quantity of radioactivity every minute to reflect radioactivity decay.

The Isotron performs patient dose/volume calculations.

The Isotron subtracts the administered dose from the decayed activity and provides a running total of remaining activity.

The Isotron performs future time calculations. If it is 8:00 A.M. and you want to draw up a dose for 1:00 P.M. the calculation is simply and rapidly performed.

An optional hard copy data printer is available with the Isotron, known as the Isocord, which provides three copies of all pertinent data for your record keeping.

The Isotron may be used with any manufacturers dose calibrator.

The Cost? Very reasonable. When combined with the Isocord and our Assayer 1 Dose calibrator the total price is less than competitive systems with 50% of the capabilities.

RADX gave you the first calculating dose calibrator, the first printing dose calibrator, and now the first desk top inventory control computer, the ISOTRON.

For more information or to arrange a demonstration call our toll free number 800-231-1747 (Texas customers call 713-468-9628.)

RADX
P. O. Box 19164 Houston, TX 77024
Stands Alone.
SPECIFICATIONS:

Performance Characteristics
Intrinsic Spatial Resolution (FWHM): based on Slot Widths of 1mm:
- Gallium 300 KeV, 5.6mm
- Technetium 140 KeV, 5.8mm
Bar Phantom:
- Technetium 140 KeV, 3mm

Uniformity (20% Window):
Measured by sampling all pixels in a 128 x 128 matrix using a sampling area of approx. 2.5cm² and comparing against a flat field reference. Uncorrected, ±10% measured over 40cm F.O.V., corrected, ±4% measured over 38cm F.O.V. Uniformity correction circuit can be turned on and off by the operator.

Uniformity Gradient:
Uncorrected, 4% RMS over 40cm F.O.V. Corrected, 2% RMS over 40cm F.O.V.

Count Rate: (Counts per second)
Using 67 Ga with 3 PHA @ 50%:
- >200,000 (67 Ga) 50% Window,
- >150,000 (76Ga) 50% Window,
- >125,000 (76Ga) 20% Window.

Energy Resolution:
Technetium 140 KeV, 12.5%
Energy Range: 50-560 KeV

Detection System
Field of View (F.O.V.):
- Maximum, 41cm
Crystal Size: 51cm Diameter by 1.27cm thick NaI (TI)
PMT’s: 61 2.5" (6.35cm) Diameter Bialkali photomultiplier tubes
Bowl Dimensions: 28½" (71.8cm) Diameter, 16" (41cm) High
Shielding: ¾" (1.9cm) Lead

Mechanical Positioning
Vertical: Upper Limit 152cm
Lower Limit (at face) 46cm,
Speeds — 15 ipm and 30 ipm

Bowl Rotation: 90° Clockwise, 105° Counterclockwise, Speeds — ½ rpm and 1 rpm

Yoke Rotation: ±90° from Horizontal, Speeds — ½ rpm and 1 rpm

Hand Control
Connection to Camera: 15' (4.6m) Flexible Cable
Numeric Display: 6-Digit LED
Control Functions: Positioning Controls — Vertical Drive — Bowl Rotation — Yoke Rotation
Register Set: Count — Time — Count/Time
Display Controls: Allows selection of preset conditions or display of live status of count rate, total count or elapsed time
Operating Controls: Image Recording — START — STOP — RESET — ERASE P-SCOPE

Physical Characteristics (Camera Only)
Height: 85" (216cm)
Width: 40" (102cm) at base
Depth: 42" (107cm) base, 47" (119cm) bowl extension from wall
Weight: 2500 pounds (1136 kilograms)

Environmental
Normal Operating Temperature:
50°F to 80°F (10°C to 26°C)

Electrical Requirements
115V ±10%, 60Hz
220V ±10%, 50Hz
240V ±10%, 50Hz

SERVICE:
Unless otherwise stated, MEDX LF sixty one systems delivered in the Continental United States include, without additional charge, a full one-year service contract. The service contract commences with installation of the system — not with shipment, as most other warranties. In addition to covering parts, labor and travel, the contract includes semi-annual maintenance checks. Service is provided by highly trained direct service personnel and by independent service agents located throughout the United States. Service for overseas accounts is by special arrangement.

AT MEDX,
SERVICE IS OUR #1 PRIORITY.

Specifications are subject to change without notice.

Printed in U.S.A.
MEDA Stands Alone.
Large Field Gamma Camera . . .
Stands Alone.

- The only true stand-alone gamma camera available anywhere; all essential controls are built in.
- Unique hand control replaces conventional operator console.
- 61 PM tube array provides 41 cm field of view without edge packing.
- Built-in microprocessor-based uniformity correction provides flat-field uniformity to within ±4%.
- Fast counting system: 125,000 CPS with 20% window (Tc$^{99m}$) with no loss of resolution.
- Triple pulse height analyzer improves photon collection efficiency for multi-peak isotopes.
- Interfaces directly to commercially available computer systems.
- Base specially designed to accommodate wheelchairs, hospital beds and stretchers.

Ask MEDX for the facts.
The MEDX LF sixty one is designed to enhance diagnosis and research, produce a return on investment, and create better health care at lower patient costs. Send today for descriptive literature. Or call for fast action.

Service is our #1 Priority . . .

MEET US AT BOOTH 2658 AT RSNA.
**SPECIFICATIONS:**

**Performance Characteristics**

Intrinsic Spatial Resolution (FWHM): based on Slot Widths of 1mm:
- Gallium 300 KeV, 5.6mm
- Technetium 140 KeV, 5.8mm

**Bar Phantom:**
- Technetium 140 KeV, 3mm

**Uniformity (20% Window):**
- Measured by sampling all pixels in a 128 x 128 matrix using a sampling area of approx. 2.5 cm² and comparing against a flat field reference. Uncorrected, ±10% measured over 40 cm F.O.V., corrected, ±4% measured over 36 cm F.O.V. Uniformity correction circuit can be turned on and off by the operator.

**Uniformity Gradient:**
- Uncorrected, 4% RMS over 40 cm F.O.V. Corrected, 2% RMS over 40 cm F.O.V.

**Count Rate:** (Counts per second)
- Using 67 Ga with 3 PHA @ 50%:
  - ≥200,000 (67 Ga) 50% Window,
  - ≥160,000 (Te99m) 50% Window,
  - ≥125,000 (Te99m) 20% Window.

**Energy Resolution:**
- Technetium 140 KeV, 12.5%
- Energy Range: 50-560 KeV

**Detection System**

**Field of View (F.O.V.):**
- Maximum, 41 cm

**Crystal Size:** 51 cm Diameter by 1.27 cm thick NaI (TI)

**PMT's:** 61.25 cm (6.35 cm) Diameter Bialkali photomultiplier tubes

**Bowl Dimensions:** 28 1/2" (71.8 cm) Diameter, 16" (41 cm) High

**Shielding:** 3/4" (1.9 cm) Lead

**Mechanical Positioning**

**Vertical:** Upper Limit 152 cm
- Lower Limit (at face) 46 cm
- Speeds — 15 rpm and 30 rpm

**Bowl Rotation:** 90° Clockwise, 105° Counterclockwise; Speeds — ½ rpm and 1 rpm

**Yoke Rotation:** ±90° from Horizontal, Speeds — ½ rpm and 1 rpm

**Hand Control**

**Connection to Camera:** 15' (4.6 m) Flexible Cable

**Numeric Display:** 6-Digit LED

**Control Functions:** Positioning Controls — Vertical Drive — Bowl Rotation — Yoke Rotation

**Register Set:** Count — Time — Count/Time

**Display Controls:** Allows selection of preset conditions or display of live status of count rate, total count or elapsed time

**Operating Controls:** Image Recording — START — STOP — RESET — ERASE P-SCOPE

**Physical Characteristics (Camera Only)**

- **Height:** 85" (216 cm)
- **Width:** 40" (102 cm) at base
- **Depth:** 42" (107 cm) base, 47" (119 cm) bowl extension from wall
- **Weight:** 2500 pounds (1136 kilograms)

**Environmental**

- **Normal Operating Temperature:** 50°F to 80°F (10°C to 26°C)

**Electrical Requirements**

- **115V ± 10%, 60 Hz**
- **220V ± 10%, 50 Hz**
- **240V ± 10%, 50 Hz**

**SERVICE:**

Unless otherwise stated, MEDX LF sixty one systems delivered in the Continental United States include, without additional charge, a full one-year service contract. The service contract commences with installation of the system — not with shipment, as most other warranties. In addition to covering parts, labor and travel, the contract includes semi-annual maintenance checks. Service is provided by highly trained direct service personnel and by independent service agents located throughout the United States. Service for overseas accounts is by special arrangement.

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Telephone: USA 312-564-4644, UK 031-225-3097

THE JOURNAL OF NUCLEAR MEDICINE
Oral Cyanocobalamin Co 58, Oral Cyanocobalamin Co 57 Bound to Human Gastric Juice, Cyanocobalamin I.M. Injection

INDICATIONS
Dicopac Kit consisting of cyanocobalamin Co 58 and cyanocobalamin Co 57 combined with human intrinsic factor is used to assess vitamin B₁₂ absorption in the diagnosis of malabsorption due to the lack of intrinsic factor, e.g. Addisonian (pernicious) anemia, and as a diagnostic adjunct in other defects of intestinal absorption.

CONTRAINDICATIONS - None.

WARNINGS
This radiopharmaceutical should not be administered to patients who are pregnant or during lactation unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, on a woman of childbearing capability should be performed during the first few (approximately 10) days following onset of menses.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

PRECAUTIONS
As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers.

The test should not be started within 24 hours of a therapeutic dose (1000 µg) of vitamin B₁₂ or within 24 hours of a loading dose of vitamin B₁₂ given for the Schilling test. If bone marrow examinations are to be done, they should precede the administration of this test, as the flushing parenteral dose of vitamin B₁₂ may alter the bone marrow picture.

ADVERSE REACTIONS - None.

One day test for Vitamin B₁₂ malabsorption

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Co 58 Standard Solution.
0.016 µCi/ml on 28 April

Canadian Lic. No. 128 Lot No.

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- Four digit LED Display
- Trigger Pulse LED
- Unlimited Heart Rate Capability
- **ONE YEAR WARRANTY**

**BENEFITS**

- Computer is gated only on the R-wave. High amplitude T-waves are ignored.
- Provides permanent record of patient ECG. Insures proper lead placement.
- Indicates R-R Interval or Heart Rate during stress studies.
- Monitors presence of output signals to the computer.
- Both Heart Rate display and R-trigger pulses have unlimited tracking capability during stress studies.
- **ONE YEAR WARRANTY**

**MODEL**

**FEATURES**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FEATURES</th>
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</thead>
<tbody>
<tr>
<td>AccuSync-I</td>
<td>R-Trigger pulse output, ECG output, Heart Rate/R-R int. display, Strip Chart Recorder and Isolation Amplifier for patient safety.</td>
</tr>
<tr>
<td>AccuSync-II</td>
<td>All above features incorporated into a Module designed to fit into certain Mobile cameras.</td>
</tr>
<tr>
<td>AccuSync-III</td>
<td>All AccuSync-I features with the exception of the Strip Chart Recorder.</td>
</tr>
<tr>
<td>AccuSync-IV</td>
<td>All AccuSync-III features with the exception of the Heart Rate R-R int. display.</td>
</tr>
</tbody>
</table>

Advanced Medical Research Corp./P.O. Box 3094 PPS/301 Brewster Road
Milford, CT 06460/Telephone : (203) 877-1610
Technetium Tc 99m Pyrophosphate Kit...the only pyrophosphate kit indicated for gated cardiac blood pool imaging.

Mallinckrodt's TechnoScan® PYP® is the only pyrophosphate kit available that gives you the additional diagnostic capability of an advanced method for the dynamic assessment of cardiac function. Other indications in nuclear cardiology include use as an adjunct in the diagnosis of acute myocardial infarction.

For more information about TechnoScan PYP® and all the other organ-imaging kits available from Mallinckrodt, just call your Mallinckrodt representative or this toll-free number: 800-325-3688 (In Missouri, 314-344-3880 collect)
For technical assistance it's 800-325-8181
(In Missouri, 314-395-2405 collect)
See brief summary on following page.
**TechneScan® PYP®**

**Technetium Tc-99m Pyrophosphate Kit**

**BRIEF SUMMARY**

**CLINICAL PHARMACOLOGY**

When injected intravenously, TechneScan PYP Tc-99m has a specific affinity for areas of altered osteogenesis. It is also concentrated in the injured myocardium, primarily in areas of irreversibly damaged myocardial cells.

One to two hours after intravenous injection of TechneScan PYP Tc-99m, an estimated 40 to 50 percent of the injected dose has been taken up by the skeleton and approximately 0.01 to 0.02 percent per gram of acutely infarcted myocardium. Within a period of one hour, 10 to 11 percent remains in the vascular system, declining to approximately 2 to 3 percent twenty-four hours post injection. The average urinary excretion was observed to be about 40 percent of the administered dose after 24 hours.

TechneScan PYP also has an affinity for red blood cells. When administered 30 minutes prior to the intravenous administration of sodium pertechnetate Tc-99m approximately 76 percent of the injected activity remains in the blood pool providing excellent images of the cardiac chambers.

**INDICATIONS AND USAGE**

TechneScan PYP Tc-99m is a skeletal imaging agent used to demonstrate areas of altered osteogenesis, and a cardiac imaging agent used as an adjunct in the diagnosis of acute myocardial infarction.

As an adjunct in the diagnosis of confirmed myocardial infarction (ECG and serum enzymes positive), the incidence of false negative images has been found to be 6 percent. False negative images can also occur if made too early in the evolutionry phase of the infarct or too late in the resolution phase. In a limited study involving 22 patients in whom the ECG was positive and serum enzymes questionable or negative, but in whom the final diagnosis of acute myocardial infarction was made, the incidence of false negative images was 23 percent. The incidence of false positive images has been found to be 7 to 3 percent. False positive images have also been reported following coronary bypass graft surgery, in unstable angina pectoris, old myocardial infarcts and in cardiac infarctions.

TechneScan PYP is a blood pool imaging agent which may be used for gated cardiac blood pool imaging. When administered intravenously 30 minutes prior to the intravenous administration of sodium pertechnetate Tc-99m approximately 76 percent of the injected activity remains in the blood pool.

**CONTRAINDICATIONS**

None.

**WARNINGS**

This radiopharmaceutical should not be administered to patients who are pregnant or lactating unless the information to be gained outweighs the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

Warning: Preliminary reports indicate impairment of brain scans using pertechnetate Tc-99m which have been preceded by bone scan. The impairment may result in false positives or false negatives. It is recommended, where feasible, that brain scans precede bone imaging procedures.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

The TechneScan PYP Kit must be maintained at refrigeratortemperature until use.

The contents of the TechneScan PYP reaction vial are intended for use in the preparation of Technetium Tc-99m Stannous Pyrophosphate. TechneScan PYP may also be reconstituted with sterile, pyrogen-free normal saline containing no preservatives and injected intravenously prior to the administration of sodium pertechnetate Tc-99m.

Sodium pertechnetate Tc-99m solutions containing an oxidizing agent are not suitable for use with the TechneScan PYP Kit.

The contents of the kit are not radioactive. However, after the sodium pertechnetate Tc-99m is added, adequate shielding of the final preparation must be maintained.

TechneScan PYP Tc-99m should not be used more than six hours after preparation.

**PRECAUTIONS**

As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers.

**Bone Imaging**

Both prior to and following TechneScan PYP Tc-99m administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the TechneScan PYP Tc-99m injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation.

**Cardiac Imaging**

Patient's cardiac condition should be stable before beginning the cardiac imaging procedure.

If not contraindicated by the cardiac status, patients should be encouraged to ingest fluids and to void frequently in order to reduce unnecessary radiation exposure.

Interference from chest wall lesions such as breast tumors and healing rib fractures can be minimized by employing the three recommended projections.

**Blood Pool Imaging**

TechneScan PYP should be injected by direct venipuncture. Heparinized catheter systems should be avoided.

**ADVERSE REACTIONS**

None.

**HOW SUPPLIED**

Catalog Number — 094 TechneScan PYP Technetium Tc-99m Pyrophosphate Kit.

Kit Contains:

5—Stannous Pyrophosphate Reaction Vials (lyophilized) for the preparation of Technetium Tc-99m Stannous Pyrophosphate.

Reaction Vial Contains:

- 12.0 mg sodium pyrophosphate and 3.4 mg stannous chloride (lyophilized).
- Hydrochloric acid is added for pH adjustment prior to lyophilization.

5—Radioassay Information String Tags.
Our $^{125}$I Methotrexate Radioimmunoassay Kit provides a rapid, simple method with an unequaled level of sensitivity and specificity. Here is a comparison chart that speaks for itself. Select the proven DBI $^{125}$I MTX-RIA kit to monitor the circulating methotrexate levels in serum, plasma, cerebral spinal fluid or urine.

<table>
<thead>
<tr>
<th></th>
<th>DBI RADIOIMMUNOASSAY</th>
<th>IMMUNOENZYME ASSAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT INCUBATION:</td>
<td>15 minutes at 37°C</td>
<td>1 minute</td>
</tr>
<tr>
<td>SENSITIVITY:</td>
<td>0.0004 µM (700 times more sensitive)</td>
<td>0.3 µM</td>
</tr>
<tr>
<td>EXOGENOUS INTERFERENCE:</td>
<td>None</td>
<td>Lypemic Icterus Hemolysis</td>
</tr>
<tr>
<td>STANDARDS SUPPLIED:</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>PRICE:</td>
<td>*57½ cents per tube</td>
<td>$1.86 per tube</td>
</tr>
</tbody>
</table>

*In units of 200

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Safety • Convenience • Versatility

Xenon Xe 133-V.S.S.
Xenon Xe 133
Ventilation Study System

Please see complete Package Insert before prescribing; a Brief Summary is included on the following page.
• Single dose system.
• Simplicity of system allows for ease of administration.
• No dilution or transfer of xenon gas required.
• No expensive delivery system required.

• Reduces radiation exposure to patient and technologist.
• Eliminates risk of cross infection as may occur when reusable apparatus is employed.
• Available for daily use in most cities.
• Auxiliary lead shield and xenon valve available as accessories.

DESCRIPTION: The Xenon Xe 133-V.S.S. (Xenon Xe 133) Ventilation Study System consists of a sealed frangible capsule containing 10 millicuries ±20% of Xenon Xe 133 gas at calibration time and date with less than 1% carrier xenon in air.

INDICATIONS AND USAGE: Study of pulmonary ventilation.

WARNINGS: Xenon Xe 133 should not be administered to children or to patients who are pregnant, or to nursing mothers unless the benefits to be gained outweigh the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of child-bearing capability should be performed during the first few (approximately 10) days following the onset of menses.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. There are no well-controlled studies in pregnant women which allow any conclusions as to the safety of Xenon Xe 133 for the fetus. Xenon Xe 133 should be used in pregnant women only when clearly needed.

PRECAUTIONS: Xenon Xe 133 gas, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel and to patients consistent with proper patient management.

Exhaled Xenon Xe 133 gas should be controlled in a manner that is in compliance with the appropriate regulations of the government agency authorized to license the use of radionuclides.

Xenon Xe 133 gas delivery systems, i.e., respirators or spirometers, and associated tubing assemblies must be leak-proof to avoid loss of radioactivity into the laboratory environs not specifically protected by exhaust systems. Xenon Xe 133 adheres to some plastics and rubber and should not be allowed to stand in tubing or respirator containers for such unrecognized loss of radioactivity from the dose for administration may render the study non-diagnostic.

ADVERSE REACTIONS: Adverse reactions specifically attributable to Xenon Xe 133 have not been reported.

DOSAGE AND ADMINISTRATION: The recommended activity range for pulmonary ventilation studies in the average patient (70 kg) is 2 to 20 millicuries (0.03 to 0.3 millicuries/kg).

HOW SUPPLIED: Each Ventilation Study System (V.S.S.) contains Xenon Xe 133 in a sealed frangible capsule containing 10 millicuries ±20% at calibration time and date stated on the label.

The sealed capsule is enclosed in a metal valve-shield which is sealed with a plastic shrink-band to prevent accidental loss of xenon during shipping. A Key is provided to remove the end plugs of the valve-shield and to turn the valve fitting which breaks the sealed capsule of Xenon Xe 133. The V.S.S. also includes a disposable filter/mouthpiece assembly and a breathing-collection bag with an attached CO2 absorber canister.
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I'm a custom-designed automated reader. You can count on me to give the fastest, most meticulous readings in the radiation dosimetry industry.

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Jeanine MacDonald
(22 years experience)
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(16 years of experience)
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Mary Hopkins
(Nurse)
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Yola Linde
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(1 year old)
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(17 years experience)
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Ruth High
(12 years experience)
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Diagnosis: normal ventilation, abnormal perfusion — pulmonary embolism

Imaging information: Instrument: Picker Model 4/15 Gamma Camera
Dose: 15 mCi Xenon 133; 3 mCi PULMOLITE
Information density: 1,000 counts/cm²; 2,000 counts/cm²

Xenon Xe 133 Gas (CALIDOSE™) Dispensing System
PULMOLITE™ Technetium Tc 99m Aggregated Albumin Kit

Please see following page for brief prescribing information.
**Xenon Xe 133 Gas**  
(CALIDOSE™) Dispensing System

**INDICATIONS:** Inhalation of xenon Xe 133 gas has proved valuable for the evaluation of pulmonary function and for imaging the lungs. It may also be applied to assessment of cerebral flow.

**CONTRAINDICATIONS:** To date, no known contraindications to the use of xenon Xe 133 gas have been reported.

**WARNINGS:** This radiopharmaceutical should not be administered to pregnant or lactating women unless the benefits to the patient are deemed to outweigh the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capacity should be performed during the first few (approximately 10) days following the onset of the menses.

Radiopharmaceuticals should be used only by physicians, who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator, and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides.

**PRECAUTIONS:** As in the use of any other radioactive material care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers. Expired xenon Xe 133 gas should be controlled in a manner that is in compliance with the appropriate governmental agency regulations.

Xenon Xe 133 adheres to some plastics and rubber and should not be allowed to stand in tubing or respirator containers. Such unrecognized loss of radioactivity from the dose for administration may render the study nondiagnostic. Xenon Xe 133 gas delivery systems, ie, respirators or spirometers, and associated tubing assemblies must be leakproof to avoid loss of radioactivity into the laboratory environment not specifically protected by exhaust systems.

**ADVERSE REACTIONS:** At date, no adverse reactions based on the use of xenon Xe 133 gas have been reported.

**DOSAGE AND ADMINISTRATION:** Xenon Xe 133 gas is administered by inhalation from closed respirator systems or spirometers.

The suggested activity range employed for inhalation by the average adult patient (70kg) is:

- Pulmonary function including imaging: 2-30 mCi in 3 liters of air.
- Cerebral blood flow: 10-30 mCi in 3 liters of air.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

**HOW SUPPLIED:** The xenon Xe 133 gas is supplied as part of the Calidoose™ system, consisting of 2 ml unit dose vials and the Calidoose dispenser™ for shielded dispensing.

Normally vials containing either 10 or 20 mCi/vial, packed up to 5 vials per shield tube, are supplied. Vial sets containing up to 100 mCi/vial are available.

Catalog Number NRP-127 *Patent Pending*  
+JO 127 July 1975, Rev 1

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**PULMOLITE™**  
Technetium Tc-99m Aggregated Albumin Kit

**INDICATIONS AND USAGE:** Technetium Tc 99m aggregated albumin is indicated as a lung imaging agent to be used as an adjunct in the evaluation of pulmonary perfusion.

**CONTRAINDICATIONS:** Technetium Tc 99m aggregated albumin should not be administered to patients with severe pulmonary hypertension.

The use of Tc 99m aggregated albumin is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

**WARNINGS:** The possibility of allergic reactions should be considered in patients who receive multiple doses.

Theoretical, the intravenous administration of particulate material such as aggregated albumin imposes a temporary small mechanical impediment to blood flow. While this effect is probably physiologically insignificant in most patients, the administration of aggregated albumin is possibly hazardous in acute cor pulmonale and other states of severely impaired pulmonary blood flow.

This radiopharmaceutical preparation should not be administered to children or to pregnant or lactating women unless the expected benefits to the patient are deemed to outweigh the potential risks.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capacity should be performed during the first few (approximately 10) days following the onset of menses.

**PRECAUTIONS:** In cases of right-to-left cardiac shunt, additional risk may exist due to the rapid entry of aggregated albumin into the systemic circulation.

The contents of the kit are not radioactive. However, after the sodium pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

The labeling reactions involved in preparing the agent depend on maintaining the liquid in the reduced state. Any oxidant present in the sodium pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, sodium pertechnetate Tc 99m containing oxidants, or other additives, should not be employed without first determining that it is without adverse effect on the properties of the resulting agent.

The contents of the vial are sterile and non-pyrogenic. It is essential that the user follow the directions carefully and adhere to strict aseptic procedures during administration of the radiodiagnostic.

Technetium Tc 99m aggregated albumin is physically unstable and as such the particles will settle with time. Failure to mix the vials contents adequately before use may result in non-uniform distribution of radioactivity.

It is also recommended that, because of the increasing probability of agglomeration with aging, a batch of Technetium Tc 99m aggregated albumin not be used after the stated time of reconstitution. Refrigerate at 2° to 8°C after reconstitution. If blood is withdrawn into the syringe, unnecessary delay prior to injection may result in clot formation in situ.

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**Augmented reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m aggregated albumin should be used in pregnant women only when clearly needed.**

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient, consistent with proper management, and to insure minimum radiation exposure to the occupational worker.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides.

**ADVERSE REACTIONS:** The literature contains reports of deaths occurring after the administration of aggregated albumin to patients with pre-existing severe pulmonary hypertension. Instances of hemodynamic or idiosyncratic reactions to preparations of Tc 99m-labeled aggregated albumin have been reported.

Hypersensitivity reactions are possible whenever protein-containing materials such as Tc 99m-labeled aggregated albumin are used in man. Epinephrine, antihistamines and corticosteroid agents should be available for use.

**DOSEAGE AND ADMINISTRATION:** The recommended intravenous dose range for the average patient (70kg) is 1 to 4 milliequivalents. The volume of the dose may vary from 0.2 to 3.1 ml.

The recommended number of aggregated albumin particles to be administered per dose is 200,000-700,000 with the suggested number being approximated 250,000.

For easy and accuracy in dispensing the prepared agent, it is recommended that prior to reconstitution, concentrated sodium pertechnetate Tc 99m be further diluted to a volume of 8ml with fresh, preservative-free sodium chloride injection (U.S.P.).

**HOW SUPPLIED:** PULMOLITE™ Technetium Tc 99m Aggregated Albumin Kit is supplied in kits of five (5) or thirty (30) vials, sterile and non-pyrogenic, each vial containing in lyophilized form:

- Aggregated albumin (human)-1.0mg
- Normal human serum albumin-10mg
- Sodium chloride-10mg
- Stannous chloride diphosphate, maximum-0.07mg

Each vial contains 3.5-6.5 x 10^11 aggregated albumin particles. PULMOLITE contains no preservative; after reconstitution the shielded vial should be stored at 2°-8°C.

Included in each five (5) vial kit is one (1) package insert and six (6) radiation labels. Included in each thirty (30) vial kit is one (1) package insert and thirty-six (36) radiation labels.

This reagent kit is approved for use by persons licensed by the U.S. Nuclear Regulatory Commission pursuant to Section 35.14 and 35.100 Group III of 10CFR 35 or under licenses of Agreement States.

Catalog Number NRP-415  
August 1976
Diagnosis: pyelonephritis of right upper pole

**Kidney**

5 min

15 min

25 min

35 min

**Imaging information:**
- **Instrument:** Ohio Nuclear Sigma 410 Gamma Camera
- **Dose:** 15 mCi GLUCOSCAN
- **Counts/image:** 800 K for first postflow images, then same time for succeeding images

**GLUCOSCAN™**
Technetium Tc 99m Glucopate Sodium Kit

New England Nuclear™

Please see following page for brief prescribing information.
**INDICATIONS AND USAGE:** Technetium Tc 99m Glucenate Sodium is used for brain imaging. Technetium Tc 99m Glucenate Sodium is indicated for renal perfusion imaging as an aid in the diagnosis, localization and evaluation of kidney disease. It may provide useful information about renal size, shape, and position and may delineate lesions affecting renal blood flow.

**CONTRAINDICATIONS:** None known.

**WARNINGS:** The contents of the GLUCOSCAN vial are intended only for use in the preparation of Technetium Tc 99m Glucenate Sodium and are NOT to be directly administered to the patient.

Ideally examinations using radiopharmaceuticals — especially those elective in nature — of a woman of childbearing capability should be performed during the first ten days following the onset of the menses. Dehydration and/or patient positioning may result in failure to visualize urinary excretory structures in the presence of normal function. Adequate patient fluid intake and repositioning may reduce the incidence of such false positive studies.

**PRECAUTIONS:** Technetium Tc 99m Glucenate Sodium, as well as any radioactive agent, must be handled with care. Once sodium pertechnetate Tc 99m is added to the kit, appropriate safety measures should be used to minimize external radiation exposure to clinical personnel.

Care should also be taken to minimize radiation exposure to patients in a manner consistent with proper patient management.

The Technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m Glucenate Sodium depends on the maintenance of ionic in the dialyzed state. Any cation present in the sodium pertechnetate Tc 99m employed may adversely affect the quality of the prepared agent. Thus, sodium pertechnetate Tc 99m containing oxidants should not be used without first demonstrating that it will not adversely affect the properties of the resulting agent.

The use of bacteriostatic sodium chloride as a diluent for sodium pertechnetate Tc 99m may adversely affect the biologic distribution of the prepared agent, and its use is not recommended.

No long term animal studies have been performed to evaluate carcinogenic potential.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Glucenate Sodium should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken when a patient is administered radioactive material. Safety and effectiveness in children have not been established.

**ADVERSE REACTIONS:** Although infrequent, erythema has been reported in association with the use of Technetium Tc 99m Glucenate Sodium.

**DOSAGE AND ADMINISTRATION:** The recommended dose for the average (70kg) adult patient is 10-20 milliequivalents for both renal and brain imaging. Technetium Tc 99m Glucenate Sodium is intended for intravenous administration only.

Technetium Tc 99m Glucenate Sodium should be used within six hours after aseptic reconstitution with sodium pertechnetate Tc 99m. For optimal results, this time should be minimized. The reaction vial contains no bacteriostat.

Optimal results for both renal and brain imaging are obtained one hour after administration. Studies have shown that although optimal target-to-background ratios for brain lesions are obtained at two hours post-injection, there is no improvement in diagnostic efficacy after one hour.

Radiopharmaceuticals should be used by persons with specific training in the safe handling and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate governmental agencies authorized to license the use of radionuclides. The components of the New England Nuclear GLUCOSCAN Kit are supplied sterile and non- pyrogenic. Aseptic procedures normally employed in making additions and withdrawals from sterile, non- pyrogenic containers should be used during addition of pertechnetate solution and the withdrawal of doses for patient administration.

**HOW SUPPLIED:** NEN’s GLUCOSCAN Technetium Tc 99m Glucenate Sodium Kit is supplied as a set of five or thirty vials, sterile and non- pyrogenic. Each vial contains in lyophilized form:

- Glucenate Sodium — 200mg
- Maximum Tn — 0.07mg
- Stannous Chloride (min.) — 0.06mg

Prior to lyophilization the pH is adjusted with hydrochloric acid and/or sodium hydroxide solution. Store at room temperature (15°-30° C). Included in each five vial kit is one package insert and six radiation labels. Included in each thirty vial kit is a package insert and thirty-six radiation labels.

The contents of the kit vials are not radioactive; however, after reconstitution with sodium pertechnetate Tc 99m the contents are radioactive and adequate shielding and handling precautions must be maintained.

This reagent kit is approved for use by persons licensed by the U.S. Nuclear Regulatory Commission pursuant to Section 35.14 and 35.100 Group III of 10 CFR or under equivalent licenses of Agreement States.

**Catlog Number NRP-180 (5 vial kit) 月 Catalog Number NRP-180C (30 vial kit)**

**August 1978**

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**Gallium Citrate Ga67**

**INDICATIONS AND USAGE:** Gallium Citrate Ga 67 may be useful in demonstrating the extent and extent of the following malignancies: Hodgkins disease, lymphomas and bronchogenic carcinoma. Positive Ga 67 uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease.

Gallium Citrate Ga 67 may be useful as an aid in detecting some acute inflammatory lesions.

**CONTRAINDICATIONS:** None known.

**WARNINGS:** Gallium Citrate Ga 67 should not be administered to children or to patients who are pregnant or to nursing mothers unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceutical drug products, especially those elective in nature of a woman of childbearing capability should be performed during the first few (approximately ten) days following the onset of menses.

**PRECAUTIONS:** A thorough knowledge of the normal distribution of intravenously administered Gallium Citrate Ga 67 is essential in order to accurately interpret pathologic studies.

The findings of an abnormal gallium concentration usually implies the existence of underlying pathology, but further diagnostic studies should be done to distinguish benign from malignant lesions. Gallium Citrate Ga 67 is intended for use as an adjunct in the diagnosis of certain neoplasms. Certain pathologic conditions may yield up to 40% false negative gallium studies. Therefore a negative study cannot be definitively interpreted as ruling out the presence of disease.

Lymphocytic lymphoma frequently does not accumulate Gallium 67 sufficiently for unequivocal imaging; and the use of gallium with this histologic type of lymphoma is not recommended at this time.

Gallium Citrate Ga 67, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to patients consistent with proper patient management.

No long term animal studies have been performed to evaluate carcinogenic potential.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Gallium Citrate Ga 67 should be used in pregnant women only when clearly needed.

Gallium Citrate Ga 67 has been found to accumulate in breast milk and should not be used in nursing mothers.

Safety and effectiveness in children have not been established.

Gallium Citrate Ga 67 localization cannot differentiate between tumor and acute inflammation; and other diagnostic studies must be done to define the underlying pathology.

The expiration date of the drug is seven days after the date of calibration.

**ADVERSE REACTIONS:** Severe itching, erythema and rash were observed in one patient of 300 studied.

**DOSAGE AND ADMINISTRATION:** The recommended adult (70kg) dose of Gallium Citrate Ga 67 is 2.5mCi. Gallium Citrate Ga 67 is intended for intravenous administration only.

Approximately 10% of the administered dose is excreted in the feces during the first week after injection. Daily laxatives and/or enemas are recommended from the day of injection until the final images are obtained in order to cleanse the bowel of radioactive material. Obtain a repeat excretory study with no possibility of false positive studies.

Studies indicate the optimal tumor to background concentration of ratios are often obtained about 48 hours post-injection. However, considerable biological variability may occur in individuals, and acceptable images may be obtained as early as 6 hours and as late as 120 hours after injection.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Radiopharmaceuticals should be used by persons who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agencies authorized to license the use of radionuclides.

**HOW SUPPLIED:** Gallium Citrate Ga 67 is supplied sterile and non- pyrogenic for intravenous use. Each ml contains 2mCi of Gallium 67 on the calibration date. As a complex formed from 67Ga chloride Ga 67, 2mg of sodium citrate, 6.8mg sodium chloride, and 0.9% benzyl alcohol w/v as preservative. The pH is adjusted to between 4.5-7.5 with hydrochloric acid and/or sodium hydroxide solution.

Wals are available from 3mCi to 18mCi in increments of 3mCi on calibration date.

**Contents of the vial are radioactive and adequate shielding and handling precautions must be maintained.**

**Catalog Number NRP-121 December 1979**
Abscess

Gallium Citrate Ga67

Diagnosis: intranephric abscess

Imaging information: Instrument: Cleon 760 Whole Body Imager
Scan time: 48 hours postinjection
Speed: 5 cm/min

Dose: 5 mCi Gallium Citrate Ga 67

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Technetium Tc 99m Medronate Kit

BRIEF SUMMARY OF PRESCRIBING INFORMATION

indications and usage
Technetium Tc 99m Medronate may be used as a bone imaging agent to delineate areas of altered osteogenesis.

contraindications
None known.

warnings
This class of compound is known to complex cations such as calcium. Particular caution should be used with patients who have, or who may be predisposed to, hypocalcemia (i.e., alkalosis).

This radiopharmaceutical drug product should not be administered to children, to pregnant women, or to nursing mothers, unless the expected benefit to be gained outweighs the potential risk.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

precautions

general
Technetium Tc 99m Medronate as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patients consistent with proper patient management.

To minimize radiation dose to the bladder, the patient should be encouraged to void when the examination is completed and as often thereafter as possible for the next 4-6 hours.

This preparation contains no bacteriostatic preservative. Technetium Tc 99m Medronate should be formulated within six (6) hours prior to clinical use.

pregnancy category C
Adequate reproductive studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Medronate should be used in pregnant women only when clearly needed.

nursing mothers
It is not known whether this drug is excreted in human milk. As a general rule nursing should not be undertaken while a patient is on the drug since many drugs are excreted in human milk.

pediatric use
Safety and effectiveness in children have not been established.

adverse reactions
No adverse reactions specifically attributable to the use of Technetium Tc 99m Medronate have been reported.

how supplied
Union Carbide’s Technetium Tc 99m Medronate Kit is supplied as a sterile, pyrogen-free kit containing 5 vials. Each 10 ml vial contains 10 mg medronic acid, 0.17 mg (minimum) stannous chloride (maximum stannous and stannic chloride 0.29 mg), and 2 mg ascorbic acid. The pH has been adjusted to 4-8 with either HCl or NaOH prior to lyophilization. Following lyophilization, the vials are sealed under a nitrogen atmosphere.

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NATIONAL CONFERENCE OF NUCLEAR MEDICINE TECHNOLOGISTS. September 13-17, 1982, Washington, D.C. Call for papers. Details from: Mary Ann Stahl, Membership Director, 5310 N. Marine Dr., Chicago, IL 60640. (312) 763-3155.

ACADEMIC MEDICINE. The Official Publication of the Association of American Medical Colleges. 2001 H St. NW, Suite 200, Washington, DC 20006. $35 per year (4 issues) for subscribers, including: book reviews, articles on academic medicine, and a directory of academic medical institutions.
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The reservation deadline is January 15, 1981. For further information call (800) 558-7990. (Wisconsin residents call (414) 327-6030) or write Dr. Jagmeet S. Soin, M.D., Division of Nuclear Medicine, 8700 W. Wisconsin Ave., Milwaukee, WI 53226. (414) 257-5968.

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Requests for further information should be directed to:

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Thallium imaging in acute myocardial infarction

Lewis C. Becker, MD
Associate Professor of Medicine
Director, Nuclear Cardiology
The Johns Hopkins Medical Institutions
Baltimore, Maryland

One of the most significant findings to come from our clinical research over the past several years has been the observation that thallium-201 imaging, performed early after onset of symptoms, can reliably distinguish high-risk and low-risk groups of hemodynamically stable patients with acute myocardial infarction. The value of such a prognostic indicator in the management of acute MI is evident. Patients determined to be at low risk could be ambulated earlier and perhaps discharged sooner than in current practice; in the future, such patients might be placed early in a progressive-care-type unit rather than be maintained in the more expensive coronary care unit.

Patients at higher risk might be found to require more intensive monitoring for even longer periods than today. And following discharge, these patients could justifiably be subjected to much closer and long-lasting followup. Most important, reliable identification of patients at high risk would permit earlier initiation of aggressive treatment directed at limiting the extent of infarction.

Predicting mortality

Our recently reported study1 covered 42 consecutive patients determined by conventional means (history, ECG, serum creatine kinase) to have suffered an acute MI. These were Killip class I or II patients—the largest group of MI patients, and those normally considered to be at relatively low risk. All 42 patients were admitted within 12 hours of onset of chest pain, and underwent thallium imaging within 15 hours of onset.

The thallium images—in the anterior, 40° LAO, and 60° LAO views—were interpreted both subjectively and by a computer-assisted quantitative technique.2 For each interpretive approach, scores for all views were summed to give a total "defect score"—the lower the score, the smaller the area of thallium defect, with a total defect score of 7 corresponding to reduction in thallium uptake involving approximately 40% of the left ventricle in at least two views. The total defect scores were then correlated with the patients' subsequent clinical course and with other clinical indices believed to have prognostic value—previous history of MI, anterior location of MI, alveolar infiltrates on admission, peak CK greater than 1,000 IU/liter, age, and sex.

Of the 42 patients, 35 survived the initial hospitalization. These survivors were followed for 6 to 20 months after discharge.

What were our results? Nonsurvivors had significantly larger thallium defects than survivors. The mean score for nonsurvivors was 14.3 vs 2.3 for survivors. In the 13 patients with a score greater than 7—ie, 40% or more involvement—the inhospital mortality was 46%; at 6 months it was 62%; and at last followup (mean 9 months) it was 92%. In the group of patients with a total defect score less than 7, the inhospital mortality was 3%; at 6 months and at last followup, it was, respectively, 7% and 7%.

These data conclusively showed that the thallium study performed within hours of admission could identify apparently stable MI patients at high-risk for mortality. In addition, when we compared the predictiveness of the thallium score with the other clinical indices—history, MI location, enzymes, etc—singly and in combination, the thallium study was significantly better.

We were, of course, very excited by our results. But, because this was a retrospective study, we felt it important to validate the findings prospectively. Over a 6-month period, we studied more than 90 consecutive patients admitted to the CCU with documented or strongly suspected MI. We applied the same scoring system and same dividing line (score 7)—and confirmed our ability to use thallium imaging to distinguish between high-risk and low-risk groups. The mortality rates of the two groups were almost identical to those established in the earlier retrospective study.
Irreversible damage and reversible ischemia

We believe the thallium study accurately predicts prognosis in MI patients because the size of the defect reflects the total hypoperfused mass of the left ventricular myocardium—both infarcted and ischemic areas. We know from observations of other investigators that the thallium defect tends to diminish with time after an acute MI. Thus the image recorded immediately after admission will show a larger defect than those recorded on serial followup over subsequent days. Our own pathologic studies have demonstrated that large thallium defects seen on post-MI images may be associated with small areas of infarction on postmortem examination.

Together, these findings strongly support the concept that areas of reduced or absent thallium on the initial post-MI images represent both ischemia and infarction, and that the “filling-in” seen on followup imaging represents resolution of ischemia due to resolution of coronary artery spasm or enlargement of coronary collaterals. Thus, the post-MI study identifies myocardium irreversibly damaged by the acute event, myocardium damaged by previous infarction, and surrounding areas of severe ischemia that are at risk for necrosis either immediately or at some future time.

Clinical implications

In our patients, the highest percentage of inhospital deaths was due to sudden pump failure—possibly due to the large total volume of compromised myocardium. Postdischarge deaths were generally related to a new ischemic event. In both of these high-risk groups, the thallium study might have helped in patient management decisions. For those patients who died while in the hospital, more aggressive support might have been indicated; those whose deaths occurred posthospitalization might have been identified as candidates for coronary artery bypass.

References

Please see following page for brief summary of prescribing information.
Thallous Chloride Ti201

INDICATIONS AND USAGE: Thallous Chloride Ti 201 may be useful in myocardial perfusion imaging for the diagnosis and localization of myocardial infarction. It may also be useful in conjunction with exercise stress testing as an adjunct in the diagnosis of ischemic heart disease (atherosclerotic coronary artery disease)

CONTRAINDICATIONS: None known

WARNINGS: In studying patients in whom myocardial infarction or ischemia is known or suspected, care should be taken to assure continuous clinical monitoring and treatment in accordance with safe, accepted procedure. Exercise stress testing should be performed only under the supervision of a qualified physician and in a laboratory equipped with appropriate resuscitation and support apparatus.

Ideally, examinations using radiopharmaceutical drug products—especially thallous chloride—of childhood capability should be performed during the first ten days following the onset of menses.

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Take our TLD ring badges, for example. They’ve been designed with professionals in mind with two sizes available for optimum fit. Small and light with snag-free rounded corners, they permit maximum finger freedom. Yet, they’ll fit under surgical gloves, and they can be cold sterilized.

Siemens also provides the most reliable exposure reporting system—a complete, computerized report showing all data for each badge in the facility. The reports meet federal, state, and local regulations, yet they are flexible and can be modified to meet your specific needs. In case a high exposure is detected, you are notified immediately.

Our toll-free HOTLINE is manned by customer service pros who field your technical questions and provide competent answers immediately. You can use the HOTLINE to add or delete personnel instantly, and we see to it badges for new employees are on the way to you within 24 hours at no extra charge.

The right Nuclibadge II monitoring badge—whole-body, wrist, ring, or wallet card—is sent in plenty of time each month for distribution to your personnel who may be exposed to radiation. The wearer’s name and ID number appear on each badge which is color-coded for use during the correct monitoring period. As you can see, everything is important. It’s all part of Siemens’ professional approach to radiation monitoring.

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Some Brattles have been in clinical use for over three years in community and major hospitals. More than half of our instruments are in community hospitals and the list is growing rapidly. Upon request, we'll supply names of happy users in your area.

What's the next step? Get in touch. Ask your NEN man about Brattles and HSA Kits. He can show you a portfolio of clinical pictures and arrange to have one of our people give you a demo. Or write or call us direct. We'll send you brochures on this and other models, and will give you your own set of clinical pictures and a bibliography on gated scintigraphy. If you wish, we'll even make you a Brattle owner. (This is the best part of our story.)

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No knobs, no meters, no errors
The spartan panel above tells the second-best part of our story. If you want to photograph peak systole, press the SYSTOLE button. If, say, you want systole only at full expiration, press the EXPIRATION button as well. If only breathing is relevant, don't press the heart button.

The Brattle is connected to the patient and to your gamma (or x-ray or ultrasonic) camera. Whenever the patient is in the selected phase, both the scope and the scaler on your gamma camera are gated ON, and film is exposed. Otherwise, they are OFF.

Brattles lock onto patients — and stay locked on.
It doesn't matter if the patient's heart rate and breathing depth change while he's under the collimator because we stay right with him. Brattles contain an ECG to track heart, a plethysmograph to track respiration, and a tiny computer to deduce systole and diastole times from the heart signal. And because it's all built in, your operator need not be a physiologist.

We don't cover our tracks — we print them.
The panel lights flash whenever the patient reaches the selected phases; and pushing the RECORDER-ON button gets you an ECG tracing marked with breathing and camera-on times. You can verify function before, during and after exposure.

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