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STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

CHIYOME LEINAALA FUKINO, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
File:

Committee on Health

HB 2652, RELATING TO MEDICAL PROCEDURES

**Testimony of Chiyome Leinaala Fukino, M.D.
Director of Health**

February 5, 2010

9:30 a.m.

1 **Department's Position:** We respectfully oppose the measure.

2 **Fiscal Implications:** None

3 **Purpose and Justification:** The bill requires that the patient, patient's guardian, or legal surrogate be
4 given information regarding the amount of radiation exposure and attendant health risks from x-rays and
5 computed tomography (CT) scans prior to obtaining consent to the proposed medical or surgical
6 treatment or a diagnostic or therapeutic procedure.

7 While we agree that patients and physicians should communicate adequately before treatments,
8 this proposal will place physicians in a situation where they must advise patients on radiation health
9 risks without having the patient's entire history of radiation exposure. The lifetime amount of radiation
10 exposure is not commonly available or obtained. For example, exposures from air travel are not tracked.

11 For specific treatments, determining exposure quantity before examination, particularly from
12 fluoroscopy and CT systems, can be quite difficult, very labor intensive on the part of a qualified
13 medical physicist, and the calculated exposure is almost never the same as the actual exposure. The
14 difference may confuse and worry the patient.

1 Communications must also deal with important variables beyond those of the specific proposed
2 treatment. In the case of a cancer patient with previous radiation treatment, it is extremely difficult to
3 balance the cancer-treating potential of further radiation versus the risk from the radiation treatment
4 itself.

5 Thank you for the opportunity to testify on this bill.

HMSA



An Independent Licensee of the Blue Cross and Blue Shield Association

February 5, 2010

The Honorable Ryan Yamane, Chair
The Honorable Scott Nishimoto, Vice Chair

House Committee on Health

Re: HB 2652 – Relating to Medical Procedures

Dear Chair Yamane, Vice Chair Nishimoto and Members of the Committee:

The Hawaii Medical Service Association (HMSA) appreciates the opportunity to testify in support of HB 2652 which would require patients be informed of the potential harmful effects of receiving X-rays or computed tomography scans (CT scans).

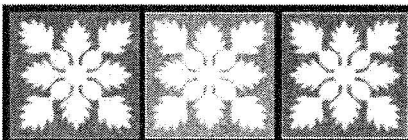
HMSA recognizes that some providers may already comply with the requirements of HB 2652, but there should be a set standard for all to follow. HMSA is committed to improving the health and well-being of all our members and encourages them to take an active and participatory role in their health care. By providing patients with information regarding the risks associated with radiation exposure for X-Rays and CT scans, they are able to make an informed decision regarding the services they will be receiving.

Thank you for the opportunity to testify today.

Sincerely,

A handwritten signature in black ink, appearing to read 'JD' or similar, with a long horizontal stroke extending to the right.

Jennifer Diesman
Vice President
Government Relations



Hawaii Association of Health Plans

February 5, 2010

The Honorable Ryan Yamane, Chair
The Honorable Scott Nishimoto, Vice Chair
House Committee on Health

Re: HB 2652 – Relating to Medical Procedures

Dear Chair Yamane, Vice Chair Nishimoto and Members of the Committee:

My name is Howard Lee and I am President of the Hawaii Association of Health Plans (“HAHP”). HAHP is a non-profit organization consisting of seven (7) member organizations:

AlohaCare
Hawaii Medical Assurance Association
HMSA

Hawaii-Western Management Group, Inc.

MDX Hawai‘i
University Health Alliance
UnitedHealthcare

Our mission is to promote initiatives aimed at improving the overall health of Hawaii. We are also active participants in the legislative process. Before providing any testimony at a Legislative hearing, all HAHP member organizations must be in unanimous agreement of the statement or position.

HAHP appreciates the opportunity to testify in support of HB 2652 which would require patients be informed of potentially serious side effects of radiation prior to receiving an X-ray or computed tomography scan (CAT scan).

In health care, physicians and patients continuously accept risks in return for benefits. For example, patients know that general anesthesia carries risks, and they accept the risks in return for the benefits of the surgery. While there is risk in relation to many treatments, in most instances patients are made aware of these risks so they can make an informed decision. It is unclear if this type of information is being routinely and uniformly provided to patients in Hawai‘i when they receive X-rays or CAT scans. We believe that the provision of this information to patients by their doctors will lead to more informed health care consumers and can only benefit the system as a whole.

Thank you for the opportunity to testify today.

Sincerely,

Howard Lee
President

SAM BURRIS

Representative Ryan I. Yamane, Chair
Representative Scott Nishimoto, Vice Chair
House Committee on Health

Friday February 5, 2010

Support for HB 2652 Relating to Medical Procedures

As the author of HB 2652, I rise in support of this bill relating to improving the safety of x-rays/ imaging.

Presently, the average lifetime dose of diagnostic radiation in the U. S. has increased sevenfold since 1980.* 1. At least four million Americans under age 65 are exposed to high doses of radiation each year from medical imaging tests according to a new study in the New England Journal of Medicine. About 400,000 of those patients receive very high doses, more than the maximum annual exposure allowed for nuclear power plant employees or anyone else who works with radioactive material.*2

In 2007, Mrs. Alexandra Jn-Charles died after 27 days of radiation overdoses at University Hospital in Brooklyn, New York. The 32 year old breast cancer patient and mother of two was given three times the prescribed radiation amount in each dose. A linear accelerator with a missing filter would burn a hole in her chest, leaving a gaping wound so painful that this mother of three considered suicide.*3

On Monday July 27, 2009 I had x-rays taken at Queens Medical Center after a doctor consultation. The x-ray machine was within the physician's office area. No warnings or discussions of any kind were made regarding the risks I might be exposed to.

The 14 x-rays I was given, and not necessary, were in excess of any amount I would ever have agreed to. I now feel I should have been informed beforehand about both the number and amount of x-rays given. Later I was advised to telephone the radiologist about the amount of exposure I had received. The radiologist referred me to www.radiologyinfo.org.

After going to the site I found that I had been exposed to the outside equivalent of *approximately six years of natural background radiation!*

Here in Hawaii and across the nation doctors work under an "informed consent" system with no written information having to be given to the patient, only verbal. In reality this becomes, "uninformed consent". The result is patients end up not knowing the risks of the radiation and doctors are left open to lawsuits.

SB 2779 addresses this problem by caling for the patient and the doctor to share in the decision as to whether the patient should have an x-ray or not after the patient is shown a written information card describing the risks of x-rays. This would be signed and dated by the patient before the x-ray is given. Both doctor and patient would have a copy.

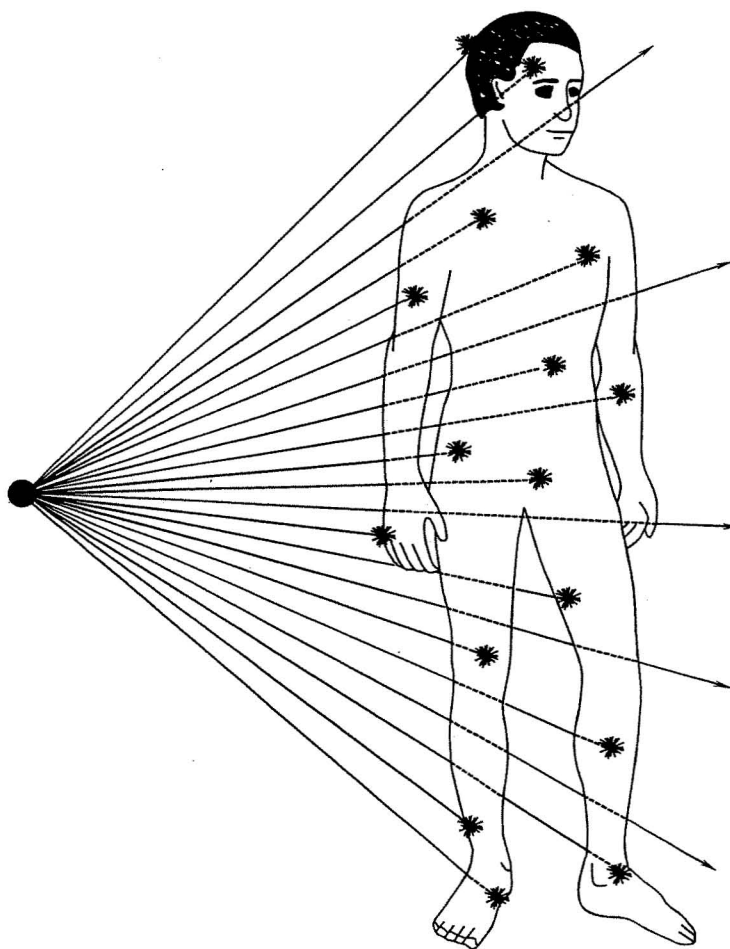
X-rays are a valuable instrument for many things but all sides need to be on a level playing field before such instruments are used.

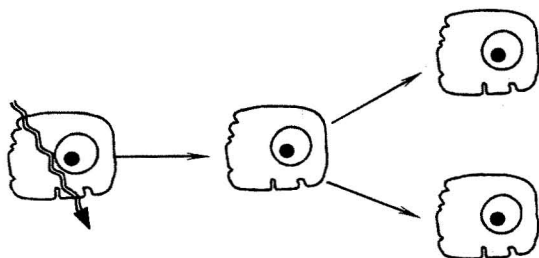
1. Physics Today, Wednesday January 27, 2010
2. Honolulu Star Bulletin, Friday 08/28/09.
3. Honolulu Star Bulletin, Sunday 01/24/10

Attachments: 1, 1A, 2,3,4,5,6,7,8,9,10

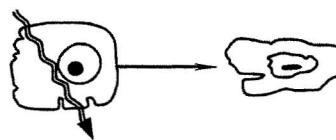
Biological Effects of Radiation

Whether the source of radiation is natural or man-made, whether it is a small dose of radiation or a large dose, there will be some biological effects. This chapter summarizes the short and long term consequences which may result from exposure to radiation.

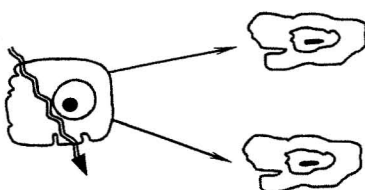




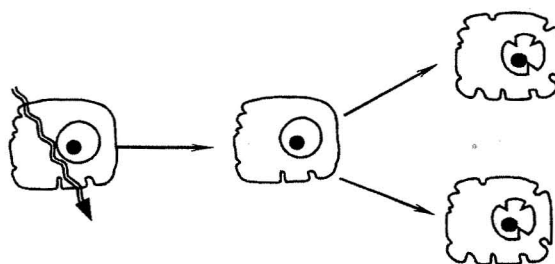
NORMAL REPAIR OF DAMAGE



CELL DIES FROM DAMAGE



DAUGHTER CELLS DIE

NO REPAIR OR NON-IDENTICAL
REPAIR BEFORE REPRODUCTION

Cells, like the human body, have a tremendous ability to repair damage. As a result, not all radiation effects are irreversible. In many instances, the cells are able to completely repair any damage and function normally.

If the damage is severe enough, the affected cell dies. In some instances, the cell is damaged but is still able to reproduce. The daughter cells, however, may be lacking in some critical life-sustaining component, and they die.

The other possible result of radiation exposure is that the cell is affected in such a way that it does not die but is simply mutated. The mutated cell reproduces and thus perpetuates the mutation. This could be the beginning of a malignant tumor.

For this procedure:	Your effective radiation dose is:	Comparable to natural background radiation for:
Abdominal region:		
Computed Tomography (CT)-Abdomen and Pelvis	10 mSv	3 years
Computed Tomography (CT)-Body	10 mSv	3 years
Computed Tomography (CT)-Colonography	10 mSv	3 years
Intravenous Pyelogram (IVP)	3 mSv	1 year
Radiography-Lower GI Tract	8 mSv	3 years
Radiography-Upper GI Tract	6 mSv	2 years
Bone:		
Radiography-Spine	1.5 mSv	6 months
Radiography-Extremity	0.001 mSv	Less than 1 day
Central Nervous system:		
Computed Tomography (CT)-Head	2 mSv	8 months
Computed Tomography (CT)-Spine	6 mSv	2 years
Myelography	4 mSv	16 months
Chest:		
Computed Tomography (CT)-Chest	7 mSv	2 years
Radiography-Chest	0.1 mSv	10 days
Children's imaging:		
Voiding Cystourethrogram	5-10 yr. old: 1.6 mSv	6 months
	Infant: 0.8 mSv	3 months
Face and neck:		
Computed Tomography (CT)-Sinuses	0.6 mSv	2 months
Heart:		
Cardiac CT for Calcium Scoring	3 mSv	1 year

Study finds radiation risks in imaging tests

BY ALEX BERENSON
New York Times

At least 4 million Americans under age 65 are exposed to high doses of radiation each year from medical imaging tests, according to a new study in the New England Journal of Medicine.

About 400,000 of those patients receive very high doses, more than the maximum annual exposure allowed for nuclear power plant employees or anyone else who works with radioactive material. The paper, published

yesterday, was based on a survey from 2005 to 2007 covering almost 1 million patients insured by UnitedHealthcare.

It did not estimate the number of cancer cases that the radiation might cause over the next several decades.

The radioactive tests are given for hundreds of purposes in the last two decades, they have become especially common in cardiology, where physicians use them to check for the buildup of plaque in the arteries and the heart's ability to pump blood.

Some cardiologists now encourage their patients to have routine heart scans even if they do not have clinical symptoms of heart disease, like chest pain or shortness of breath.

The use of the tests has risen sharply in the last two decades, as more and more physicians have bought CT and PET scanners and installed them in or near their offices.

In 2007, the Department of Health and Human Services estimated that the number of CT scans given to Medicare patients had almost quadrupled from 1995

to 2005, while the number of PET scans had risen even faster.

The new study's lead author, Dr. Reza Fazel, a cardiologist at Emory University, said the use of scans appeared to have increased even from 2005 to 2007, the period covered by the paper. "These procedures have a cost, not just in terms of dollars, but in terms of radiation risk," Fazel said.

The researchers calculated the amount of radiation received by the patients by looking at insurance codes for various kinds of imaging tests. Exposure is

measured in millisieverts; the average American receives about 3 millisieverts a year from all sources.

The paper found that in at least one of the three years, 1.9 percent of the UnitedHealthcare patients received at least 20 millisieverts of radiation, or nearly seven times the average. Of that

group about 10 percent, or 0.2 percent of all patients, received at least 50 millisieverts, more than the annual maximum that nuclear regulators allow.

Those figures suggest that about 4 million Americans receive cumulative doses exceeding 20 millisieverts a year.

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MEDICAL RADIATION: ACCIDENTS PROBABLY UNDERREPORTED

Life-saving tool turns deadly

The increased use and complexity of radiation treatment can result in errors

BY WALT BOGDANICH
New York Times

NEW YORK >> As Scott Jerome-Parks lay dying, he clung to this wish: that his fatal radiation overdose — which left him deaf, struggling to see, unable to swallow, burned, with his teeth falling out, with ulcers in his mouth and throat, nauseated, in severe pain and finally unable to breathe — be studied and talked about publicly so that others might not have to live his nightmare.

Sensing death was near, Jerome-Parks summoned his family for a final Christmas. His friends sent two buckets of sand from the beach where they had played as children so he could touch it, feel it and remember better days.

Jerome-Parks died several weeks later in 2007. He was 43.

A New York City hospital treating him for tongue cancer had failed to detect a computer error that directed a linear accelerator to blast his brain stem and neck with errant beams of radiation. Not once, but on three consecutive days.

Soon after the accident, at St. Vincent's Hospital in Manhattan, state health officials cautioned hospitals to be extra careful with linear accelerators, machines that generate beams of high-energy radiation.

But on the day of the warning, at nearby University Hospital in Brooklyn, a 32-year-old breast cancer patient named Alexandra Jn-Charles absorbed the first of 27 days of radiation overdoses, each three times the



NEW YORK TIMES

Scott Jerome-Parks of New York, with his wife, Carmen, was 43 when he died in 2007 from a radiation overdose. For his last Christmas, he rested his feet in sand his friends had sent from a childhood beach.

had hoped that others might learn from his misfortune, the details of his case — and Jn-Charles' — have until now been shielded from public view by the government, doctors and the hospital.

Americans today receive far more medical radiation than ever before. The average lifetime dose of diagnostic radiation has increased sevenfold since 1980, and more than half of all cancer patients receive radiation therapy. Without a doubt, radiation saves countless lives, and serious accidents are rare.

But patients often know little about the harm that can result when safety rules are violated and ever more powerful and technologically complex machines go

no central clearinghouse of cases. Accidents are chronically underreported, records show, and some states do not require that they be reported at all.

In June, the Times reported that a Philadelphia hospital gave the wrong radiation dose to more than 90 patients with prostate cancer — and then kept quiet about it. In 2005, a Florida hospital disclosed that 77 brain cancer patients had received 50 percent more radiation than prescribed because one of the most powerful — and supposedly precise — linear accelerators had been programmed incorrectly for nearly a year.

Dr. John Feldmeier, a radiation oncologist at the University of Toledo and a leading authority on the treatment of radiation injuries, estimates that 1 in 20 patients will suffer injuries.

Most are normal complications from radiation, not mistakes, Feldmeier said. But in some cases, the line between the two is uncertain and a source of continuing debate.

"My suspicion is that maybe half of the accidents we don't know about," said Dr. Fred Mettler Jr., who has investigated radiation accidents around the world and has written books on medical radiation.

Identifying radiation injuries can be difficult. Organ damage and radiation-induced cancer might not surface for years or decades, while underdosing is difficult to detect because there is no injury. For these reasons, radiation mishaps seldom result in lawsuits, a barometer of potential problems within an industry.

In 2009, the nation's largest wound care company treated 3,000 radiation injuries, most of them serious enough to require treat-



Alexandra Jn-Charles:
The cancer patient died after 27 days of radiation overdoses

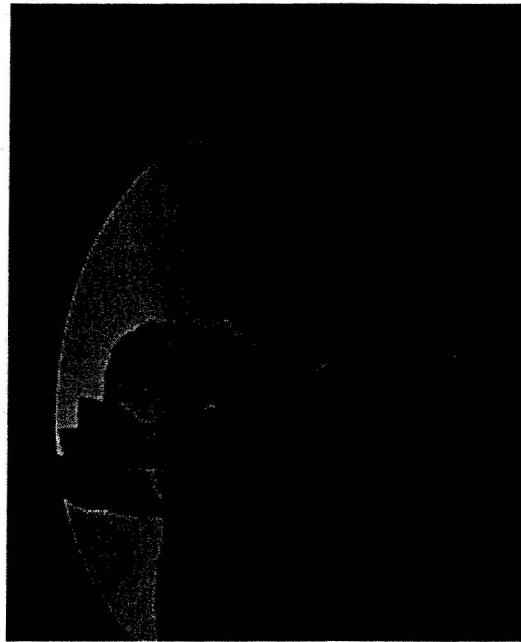
faulty programming, poor safety procedures or inadequate staffing and training. When those errors occur, they can be crippling.

"Linear accelerators and treatment planning are enormously more complex than 20 years ago," said Dr.

CT Scans: Just How Safe Are They?

•
•

- 10 of 37
- View All



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STAPLES

Computed tomographic (CT) scans help doctors zoom in on everything from head trauma to kidney stones. But some researchers are worried that unnecessary scans may increase your lifetime cancer risk. Long-term studies investigating a tumor connection are under way, but in the meantime, patients may be getting some serious radiation exposure. A study of 1,243 randomly chosen hospital patients showed that, on average, they had been exposed to 45 millisieverts (mSv) of radiation (the typical chest X-ray delivers 0.02 mSv), and 12% had been exposed to more than twice that amount. And not all of this exposure may even be necessary. Earlier studies have suggested that some doctors order duplicate scans, while others prescribe CTs in an abundance of caution, just to rule out potential diseases.

Read more:

http://www.time.com/time/specials/packages/article/0,28804,1860289_1859694_1859766,00.html#ixzz0aSzHbjAh

Doctors to tally radiation exposure in tests

2-1-10 Hon. Adv.

BY LIZ SZABO
USA Today

Concerned that Americans may be accumulating too much lifetime radiation exposure from medical tests, doctors at the National Institutes of Health will begin recording how much radiation patients receive from CT scans and other procedures in their electronic medical records.

A study in the Archives of Internal Medicine in December estimated that radiation from such procedures, whose use has grown dramatically in recent years,

causes 29,000 new cancers and 14,500 deaths a year.

A second Archives study that month said the problem could be even worse, calculating that patients get four times as much radiation from imaging tests as previously believed.

These exposures do not include the rare cases of machine malfunctions or mistakes, such as the disclosure by Cedars-Sinai Medical Center in Los Angeles in October that it had accidentally given hundreds of patients up to eight times the normal radiation dose

during a stroke scan.

Even though most machines function properly, hospitals rarely record how much radiation patients receive. Doses can vary, depending on the size of the patient, how large of an area is scanned or the number of scans performed.

At NIH, doctors now will routinely record such information in records that patients can take with them, according to an announcement today in the Journal of the American College of Radiology.

If other hospitals follow

NIH's lead, this information will enable researchers eventually to compare the cancer risk of patients with high versus low radiation exposures, authors David Bluemke and Ronald Neumann of NIH say in their paper.

The NIH by itself doesn't treat enough patients to measure such risks, which would require data from hundreds of thousands of patients, they write. But they hope to eventually pool data from many institutions to measure cancer risk.



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Radiation from CT scans linked to cancers, deaths

By Liz Szabo, USA TODAY

CT scans deliver far more radiation than has been believed and may contribute to 29,000 new cancers each year, along with 14,500 deaths, suggest two studies in today's *Archives of Internal Medicine*. One study, led by the National Cancer Institute's Amy Berrington de Gonzalez, used existing exposure data to estimate how many cancers might be caused by CT scans.

Another study in the journal suggests the problem may even be worse. In that study, researchers found that people may be exposed to up to four times as much radiation as estimated by earlier studies. While previous studies relied on dummies equipped with sensors, authors of the new paper studied 1,119 patients at four San Francisco-area hospitals, says author Rebecca-Smith Bindman of the University of California-San Francisco. Based on those higher measurements, a patient could get as much radiation from one CT scan as 74 mammograms or 442 chest X-rays, she says.

CANCER FORUM: Describe your last CT scan

TWITTER: Follow this reporter @LizSzabo

Young people are at highest risk from excess radiation, partly because they have many years ahead of them in which cancers could develop, Smith-Bindman says. Among 20-year-old women who get one coronary angiogram, a CT scan of the heart, one in 150 will develop cancer related to the procedure.

Not all doctors agree about those risks. Scientists have not yet determined whether low doses of radiation actually increase cancer risk or whether the risk rises only after exposure levels reach a certain threshold, says James Thrall, chairman of the American College of Radiology.

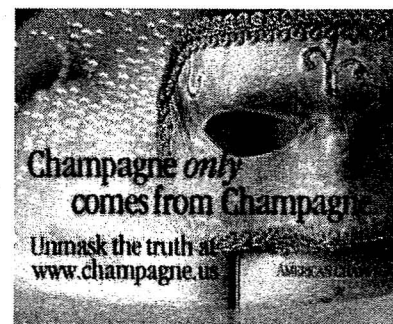
He says it's also tricky to compare cancer rates between people who have had CT scans with those who haven't. People undergoing scans may have underlying health problems that predispose them to cancer, he says.

In many cases, CT scans can be lifesaving. In other cases, there's no evidence a CT scan is really better than other approaches, Smith-Bindman says. Up to one-third of all CT scans are unnecessary, according to an accompanying editorial by Rita Redberg, also of UCSF.

Doctors sometimes order CT scans for convenience because they don't have access to results at another facility, says Rosaleen Parsons, chair of diagnostic imaging at Philadelphia's Fox-Chase Cancer Center, who wasn't involved in the new studies.

She suggests that patients keep their medical records and ask doctors about alternatives that don't involve radiation exposure.

Patients also should ask if a facility has been accredited by the American College of Radiology, she says.



Links referenced within this article

University of California-San Francisco

<http://content.usatoday.com/topics/topic/University+of+California,+San+Francisco>

Describe your last CT scan

<http://www.usatoday.com/community/forums.aspx?pickForumPage=ForumDiscussion&pickDiscussionId=Cat%3aec018ff9-2afb-4253-a3a7-c229861d7279Forum%3afdb15af3-5f88-4d87-8296-779a70344735Discussion%3a03800e24-bca9-4307-bef2-e234b8c7c53c>

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Find this article at:

http://www.usatoday.com/news/health/2009-12-15-radiation15_st_N.htm

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Cancer risks from airport x-ray scanners

Background: Collective doses from full body scanners using x-rays could increase the risk of cancer among travelers according to *The New York Times*. Full-body scanners already in use in airports use a less powerful millimeter wave technology which does not pose the same risk. With the December 25th bomb scare, Congress has appropriated funds for 450 scanners to be deployed in American airports although the article is not clear which type(s) of scanner would be chosen.

Our View: Any additional exposure to ionizing radiation, the kind that comes from the nuclear weapons and power technologies and from x-ray machines, should be thoroughly studied before wide swaths of population are exposed. People should be educated about the risks and benefits. In the case of airport full-body scanners the risk one receives from the exposure is not necessarily worth the benefit since these machines may be no more effective, according to security experts, than other screening techniques and may not have caught the December 25th bomber. Even though the disease and deaths from full-body scanners may be hard to distinguish from background occurrences this should not be used as an excuse to expose people to more radiation from other nuclear technologies such as power reactors and weapons facilities. Any additional exposure will only increase disease; therefore such exposure should be avoided, especially if there are more effective security techniques.

The French Nuclear Medusa

Areva loses an investor and a reactor deal with Abu Dhabi

The French oil company, Total, has opted not to invest in Areva after the French nuclear company lost a bid to build two new reactors in Abu Dhabi, United Arab Emirates. Total's director general also questioned whether it was possible to make the EPR – Areva's flagship new reactor – less expensive without compromising safety. "That's the real question," he told Reuters news agency. The UAE deal was considered a crown jewel for the struggling Areva whose EPR has been the subject of postponements and cancelations in major markets like the U.S. and China. South Korea won the UAE deal – said to be worth as much as \$40 billion with four new reactors planned. It is believed that the recent joint statement by the Finnish, British and French nuclear safety bodies, asking that the EPR's control and safety systems should be changed to avoid both failing at once, contributed to the French loss of the UAE contract.

Beyond Nuclear In the News

Beyond Nuclear was featured in the *Michigan Messenger* on Jan. 12th for its leadership of environmental coalition efforts to block the new reactor targeted at Fermi nuclear power plant in Michigan, this time due to quality assurance violations. An article in *Inside NRC* on Dec. 21, 2009 also reported on Beyond Nuclear's QA contentions at Fermi 3 (but we cannot link to that article due to copyright restrictions).

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Please consider becoming a "fan" of Beyond Nuclear on Facebook and do join Linda Gunter's Friends list to hear all the latest anti-nuclear updates from around the world! And please sign on as a member of the Beyond Nuclear "Cause" and list Beyond Nuclear as your cause on your own Facebook page.

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Beyond Nuclear aims to educate and activate the public about the connections between nuclear power and nuclear weapons and the need to abandon both to safeguard our future. Beyond Nuclear advocates for an energy future that is sustainable, benign and democratic. Beyond Nuclear staff can be reached at: 301.270.2209. Or view our Web site at: <http://www.beyondnuclear.org/>

6930 Carroll Avenue Suite 400 | Takoma Park, MD 20912 US



Points to Consider Before Taking Another X-Ray

By Dr. Ben Kim on November 10, 2004 Health Warnings



Have you ever sat or stood in front of an x-ray machine, covered with a bulky lead apron, waiting for someone who was standing behind a lead wall to press a button that would send ionizing radiation through your body? I don't know about you, but I have never felt super comfortable having that tube pointed at my head or body.

I have long believed that widespread misuse of x-rays is one of the most harmful mistakes being committed by health practitioners. Before I get into some of the realities of how x-rays are misused, here are some underpublicized facts about x-rays and other forms of ionizing radiation - like CT scans and fluoroscopy - that are used for diagnostic purposes:

- For decades, the scientific community has known that x-rays cause a variety of mutations.
- X-rays are known to cause instability in our genetic material, which is usually the central characteristic of most aggressive cancers.
- There is no risk-free dose of x-rays. Even the weakest doses of x-rays can cause cellular damage that cannot be repaired.
- There is strong epidemiological evidence to support the contention that x-rays can contribute to the development of every type of human cancer.
- There is strong evidence to support the contention that x-rays are a significant cause of ischemic heart disease.

You might be wondering: If all of the points listed above are true, then how is it that our society has come to use x-rays so frequently and almost without a thought to the harmful consequences of all forms of ionizing radiation?

Part of the answer to this question is that most health care practitioners have been educated to believe that the benefits of taking x-rays for diagnostic purposes far outweigh the negative consequences of being exposed to ionizing radiation. This attitude is well represented by the National Institutes of Health (NIH), who have this to say about x-rays:

For the exposures encountered in conventional radiography [x-rays], the risk of cancer or heritable defects (via damaged ovarian cells or sperm cells) is very low. Most experts feel that this low risk is largely outweighed by the benefits of information gained from appropriate imaging. X-rays are monitored and regulated to provide the minimum amount of radiation exposure needed to produce the image.

I strongly disagree with the NIH on this topic.

While I believe that x-rays can be extremely useful and necessary in certain situations, I also believe that they are usually taken unnecessarily and for the wrong reasons. Here are a few examples:

X-rays for Medico-legal Protection

In today's society, I believe that some health practitioners think first and foremost about protecting themselves against legal action. Rather than devote all of their energy to thinking about what is absolutely best for their patients in the short and long term, they perform diagnostic tests and give recommendations that fall in line with their professional "standards of practice." This is undoubtedly so that if trouble arises, the doctor has records to prove that he gave perfectly competent care according to his profession's standards of practice.

In deciding whether to do an x-ray or to go without it, I believe that most doctors make this decision based on their standards of practice vs. what they would do for their loved ones.

X-rays to Create the Feeling that Something has been Done

Many patients want their doctors to do something. They don't want to hear about what they should be eating or how much rest they should be getting. Some patients almost feel cheated if their doctors don't perform a blood test, take an x-ray, or do some other diagnostic test that makes them feel like answers are on the way. A doctor who does not give in to these expectations runs the risk of not having enough patients to make a living.

X-rays as a Marketing Tool

If you have already read about my first working experience as a chiropractor, you may remember my story of the chiropractor who took full-spine x-rays on all of his patients. It was absolutely clear to me that the majority of his x-rays were taken for marketing purposes.

If you study radiology, you will learn that everyone develops degenerative changes around their spines as they age – this is to be expected, just like wrinkling of your skin. Perhaps you can imagine how a health practitioner can paint these normal, degenerative changes and other clinically irrelevant findings in a frightening way to persuade a patient to receive his or her treatments.

If you don't have any training in radiology, and your health practitioner points to x-rays that show areas of your spine that are worn down or "out of alignment," and you are told that you are in danger of developing crippling arthritis in the years ahead if you don't receive his or her treatments, what are you to do?

Many health practitioners are fully aware of the authoritative power and influence that x-rays can have on selling their treatments, and unfortunately, some of them don't hesitate to use this power and influence to its fullest extent. If you are skeptical about this, you need to participate in a practice management seminar to experience firsthand how some practitioners are finely trained to translate using x-rays to making money.

So what does all of this mean for you the next time that your doctor recommends taking an x-ray?

Some Practical Recommendations on Taking or Not Taking X-rays

1. If a health practitioner recommends that you have an x-ray or CT scan done, find out exactly what the health practitioner is looking for. More importantly, find out what the practitioner will recommend that you do for each possible major finding.

If you cannot see yourself following through on any of the practitioner's recommendations for each possible major finding, it seems logical not to expose yourself to unnecessary ionizing radiation to begin with. If your practitioner is unwilling to address all of your concerns, you really need to find a practitioner who will.

2. If you decide that taking an x-ray will help you figure out what the problem is and/or help you figure out how to get better, ask the person who will take the x-ray exactly what the dose will be. If he or she cannot tell you exactly what the dose will be, it is likely that you will be exposed to a higher dose than is necessary. If this is the case, you need to find another x-ray facility, one that is fully committed to using the lowest possible dose for its x-rays.

3. If you have x-rays taken, know that these x-rays belong to you. If you don't feel good about your doctor's interpretation of your x-rays, you can take your x-rays to other practitioners to ask for as many other opinions as you wish. You may be asked to sign a form in order for your doctor or x-ray facility to release your x-rays to you, but make no mistake about it - your x-rays belong to you.

4. I believe that babies, growing children, and pregnant women should not be exposed to x-rays unless they are faced with a life or limb-threatening situation. Fetuses, babies, and growing children have rapidly growing cells that are much more susceptible to genetic damage when exposed to ionizing radiation than the slower growing cells of adults.

If you want to learn more about why avoiding unnecessary x-rays is important to experiencing your best health, I highly recommend that you read Radiation from Medical Procedures in the Pathogenesis of Cancer and Ischemic Heart Disease: Dose-Response Studies with Physicians per 100,000 Population, by John Gofman, MD, PhD.

reference



JAMM AQUINO / JAQUINO@STARBULLETIN.COM; RIGHT, COURTESY ART

Dr. John Pearce talks with Kimi Valdez, a Queen's employee, at the Queen's Medical Center's latest MRI machine used to detect breast cancer. At right, actual scans from the advanced MRI system.

Queen's unveils new tool to detect breast cancer

The advanced MRI system delivers clearer pictures using a more comfortable setting during an often-dreaded test

BY HELEN ALTONN
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An advanced breast magnetic resonance imaging system has been installed at the Queen's Medical Center as "a powerful new tool" for cancer detection and treatment management, says Dr. John Pearce, director of breast imaging.

The system isn't approved for screening and doesn't replace routine mammography, but it is valuable for certain women at high risk for breast cancer, he said.

He said the American Cancer Society has recommended MRI imaging for women with a significant family history or genetic predisposition for breast cancer and to assess the extent of the disease for better operative and treatment planning.

"It produces some of the best images I have ever seen in my long experience of breast imaging," said Pearce, who was in charge of breast imaging for many years at the University of Southern California and at Lehigh Valley Hospital in Allen-

"It produces some of the best images I have ever seen in my long experience of breast imaging."

Dr. John Pearce
Director of breast imaging at the Queen's Medical Center

town, Pa. He has been at Queen's since 2005 and is a professor of radiology at the University of Hawaii's John A. Burns School of Medicine. Darlena Chadwick, Queen's vice president for patient care, said the technology "utilizes a revolutionary, prone biopsy system, allowing the radiologist 360-degree independent access to each breast."

Pearce said the table is designed "for creature comforts," with padding so a patient can lie comfortably on her stomach as the table advances into the magnet for scanning, which takes about 40 minutes.

The program began with volunteers, including staff members, "to make sure all the calculations were correct," Chadwick said.

Among them was her secretary, Kimi Valdez, 35, who said she had



never had a mammogram because she "got scared." She said she had a cousin on the mainland who died at a young age from breast cancer after a mammogram "that missed something."

When volunteers were invited to test Queen's new MRI system, she said, "I figured it was my opportunity to check without the pain" of a mammogram squeezing her breasts.

She said she was so comfortable lying face down on the ergonomically designed table with memory foam conforming to her body that "if it wasn't for the loud noise, I could probably fall asleep."

She also got some good news from the images, she said.

Pearce noted Queen's was one of just 1 percent of more than 5,700 registered hospitals in the country that recently received national accreditation for its breast center. Its patient navigation program also recently received a national award from the American Cancer Society.

Because of the high cost and high demand for MRI scanning, Pearce said national studies are developing clinical criteria for its use for breast cancer diagnosis and breast care management.

He said mammograms and ultrasound records are needed to individualize MRI imaging, which requires integration of all other breast imaging for proper analysis.

AAPM Response in Regards to CT Radiation Dose and its Effects

< P The American Association of Physicists in Medicine (AAPM) is a scientific and professional society comprised of scientists (medical physicists) who establish radiation measurement procedures and perform them on radiation emitting devices, including computed tomography (CT) scanners. There have been a number of CT related issues in the news over the past months pertaining to radiation dose, however there have been several misleading statements made with respect to radiation hazards from CT scanning. The AAPM believes in an open discussion, but one that is based on facts. The goal of this statement is to present these facts.

We should state from the outset that medical physicists are partnering with technologists, radiologists, regulators, manufacturers, administrators and others to strive for CT scans that are medically indicated; and when they are performed that the minimum amount of radiation is used to obtain the diagnostic information for which the CT scan was ordered. >

CT brain perfusion overexposures

ERRORS The Food and Drug Administration (FDA) issued an alert in regards to high dose levels used in head CT perfusion studies at a hospital in Southern California(1). Over 200 patients apparently received excess radiation during these time-lapse (repeated) CT studies of the head. Subsequently, similar incidents have been identified at two other hospitals in Southern California and potentially in other locations as well. Early investigations of these incidents revealed a misunderstanding of some of the automated dose selection features on the scanner, and this led to an estimated 8 fold increase in radiation to the patient. This was discovered when a number of the patients experienced some temporary hair loss (epilation) and skin reddening (erythema).

Apr-10-3. < # This incident apparently resulted from a lack of adequate training of CT technologists and perhaps an overreliance on the use of preselected CT protocols. There is no excuse for such radiation overexposures, and improved training as well as machine interface features may need to be improved to prevent future occurrences. News of these incidents has led to a nationwide mobilization of medical physicists, working with hospital administrators, radiologists, and CT technologists to get a better handle on CT protocols at each individual institution. Longer term, the AAPM has responded to this incident by developing a scientific symposium on this topic to be held in late April 2010, which will be led by two medical physicists who have vast experience with developing and managing CT protocols at large institutions. This course will be open to lead CT technologists, radiology managers, radiologists, medical physicists, and all others interested in learning more about CT protocol optimization and management. (www.aapm.org).

Cancer Risks from CT in the United States

Two articles were published back-to-back in the Archives of Internal Medicine (2,3) recently, suggesting that increased use of diagnostic CT leads to the cancer deaths of tens of thousands of Americans each year. The fact that large radiation exposures to an individual can cause cancer is not controversial, however the supposition that much smaller radiation exposures (such as with CT) to many individuals can cause "substantial" increases in cancer incidence is certainly controversial and not universally accepted. — by who?

Indeed, many of the series of assumptions used in these articles (and their source materials) make use of worst case scenarios and most conservative assumptions. One example of this is in the Smith-Bindman article(2), where the risk of cancer was illustrated in Figure 2 for 20 year old women. The authors acknowledge that this is an extreme example because younger women are the most susceptible group to radiation induced cancers, even though the median age for women undergoing CT scans is well into the 5th decade(3); in fact CT scanning of women in their 20s is relatively uncommon.

If we accept the claim that 29,000 cancers were caused by CT in 2007 among the 70 million people in the U.S. receiving about 13.8 mSv from one CT session as reported in the Berrington de Gonzalez article(3), then it follows that 21,000 cancers are likely to be induced from background radiation levels of 3.1 mSv to the other 230 million Americans who have not had CT. The average background level of 3.1 mSv per year is 22% (3.1/13.8) of the average effective dose from CT.

Predicting cancer deaths from radiation is not the same as assessing deaths from other causes such as automobile accidents or gun shots – in these latter cases the victims can be counted without much ambiguity in the cause of death. Because radiation induced cancers are exactly the same clinically as normally occurring cancers, there is no way to know who died from a radiation induced cancer and who died from a naturally occurring cancer. This issue is compounded by the fact that the number of predicted radiation induced cancers is tiny compared to the very large cancer incidence rate in humans (~25-30%), making the impact of radiation on cancer rate very hard to measure.

Observations and Recommendations in Regards to CT Examinations

Most of the 70 million CT scans performed each year in the U.S. are medically indicated, resulting in more accurate diagnostic assessment of patient health, which in turn results in more appropriate treatment and better health outcomes. Many CT scans, however, are ordered without sufficient medical justification and the most efficacious way to reduce CT radiation levels to the U.S. population is to substantially reduce unnecessary CT scans. Patients and their referring physicians should discuss the risks of a CT scan, as well as the risks of not having a CT scan (i.e. potentially compromising an accurate diagnosis). A radiologist should be consulted if there remains any ambiguity as to whether or not a CT scan should be performed. By confirming the presence or absence of disease or injury, an appropriately-ordered CT examination is of tremendous benefit to the individual patient, and far outweighs the radiation risks in the vast majority of cases.

Providers of CT scanning services – hospitals, clinics, and radiologists – have in general made good progress in reducing the dose levels of CT scanning, however the patient should ask the CT technologist if all appropriate measures for dose reduction for a particular CT study have been used – and if an adequate answer is not obtained from the technologist, they should insist on talking to the radiologist prior to the scan. Patients and referring physicians should inquire if their CT facility is accredited by the American College of Radiology – if so, this is an excellent way of assuring that the CT facility is practicing state of the art, low dose CT.

How do we know?
Where is the study?

Is this common?

For a patient undergoing a specific CT scan, the factors which need to be considered for reducing dose include (1) the scanned area should be limited to the region of the body where the suspicion exists, (2) the CT technique factors should be adjusted according to the size of the patient's body – newer scanners can adjust radiation output automatically, which is useful, and (3) repeated CT scans should be avoided whenever possible, and certainly if the scans are only being repeated because the physician does not have access to the images from a recent CT scan.

The patients who experienced hair loss and skin reddening from head CT perfusion studies are in general gravely ill, many are comatose, and a large fraction will die from their head injury or stroke. Indeed, the procedure itself is one way of assessing brain death. The CT perfusion study gives practitioners essential guidance as to the need for or success of interventional procedures such as angioplasty or surgery. By comparison, patients with cancer routinely lose all of their hair when treated with some forms of chemotherapy, but this is presumed to be an acceptable consequence of the treatment. While there is no excuse for unnecessarily high radiation levels in CT perfusion, hair loss and skin reddening can and will occur even with appropriate levels of radiation when the procedure is repeated or is combined with other x-ray examinations such as interventional angiography.

SUMMARY

CT scans are a very important tool for diagnosis and assessment of response to treatment in the practice of medicine. The detailed assessment of anatomy and function that CT imaging provides does require the use of x-rays, which do result in some small, but not zero, risk to patients. Medical Physicists are working with technologists, radiologists, regulators, and manufacturers to assure that CT is practiced uniformly across the U.S. in a low dose manner.

But how the study should be

AAPM Science Council
AAPM Executive Committee

(1) FDA Safety Investigation of CT Brain Perfusion Scans: Update 12/8/2009, accessed 16 Dec 2009.

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(2) Radiation dose associated with common computed tomography examinations and the associated lifetime attributable risk of cancer, R Smith-Bindman, J Lipson, R Marcus, et Al., Arch Intern Med 169(22); 2078-2086 (2009)

(3) Projected cancer risks from computed tomographic scans performed in the United States in 2007, A Berrington de Gonzalez, M Mahesh, K-P Kim, et Al., Arch Intern Med 169(22); 2071-2077 (2009)

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