

**PRACTICAL POINTERS**  
**FOR**  
**PRIMARY CARE MEDICINE**

**ABSTRACTED MONTHLY FROM THE JOURNALS**

**A Free Public-service Publication**

**JUNE 2013**

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**JAMA, NEJM, BMJ, LANCET**

**ARCHIVES INTERNAL MEDICINE**

**ANNALS INTERNAL MEDICINE**

**PUBLISHED BY PRACTICAL POINTERS, INC.**

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**400 AVINGER LANE, SUITE 203**

**DAVIDSON NC 28036 USA**

**[www.practicalpointers.org](http://www.practicalpointers.org) A free public-service publication. To request monthly issues go to [Rjames6556@aol.com](mailto:Rjames6556@aol.com)**

**26<sup>th</sup> YEAR OF PUBLICATION**

Practical Pointers is published every month on the internet as a public service.

The complete content of all issues for the past 10 years can be accessed at

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Richard T. James Jr. M.D.

Editor/Publisher.

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## *Spiritual Care Is A Key Component Of Medical Care at End of Life*

### **6-1 PROVISION OF SPIRITUAL SUPPORT FOR PATIENTS WITH ADVANCED CANCER BY RELIGIOUS COMMUNITIES AND ASSOCIATIONS WITH MEDICAL CARE AT THE END OF LIFE: Observational study**

Spiritual care—care that recognizes patients’ religion and/or spirituality and attends to spiritual needs—has been incorporated into the National Consensus Project for Quality Palliative Care.

Data suggest that provision of spiritual care by medical teams (including chaplains) to terminally ill patients is associated with better patient quality of life.

(Q-o-L), greater hospice utilization, and less aggressive medical interventions at the end of life (EoL). .

Patients facing advanced illness often are connected to religious communities that act as key providers of spiritual support. Spiritual care guidelines include religious communities as principal providers of spiritual care.

Spiritual care at EoL is particularly relevant among highly religious community and racial/ethnic minorities.

The “Coping with Cancer Study” is a multi-institutional study of patients with advanced cancer designed to investigate how psychosocial, religious and spiritual factors influence patients’ QoL and medical care at EoL.

#### STUDY

1. Recruited patients from 7 large outpatient sites emphasizing cancer treatment.
2. Entered 670 patients with a diagnosis of advanced cancer in 2002. At end of study (2008) 379 had died. (The 379 were the subjects of this study.) They were outpatients at the beginning of the study, but later were admitted to hospital. The spiritual support questions were asked in the outpatient clinic.
3. Spiritual support from religious communities was assessed by asking: “To what extent are your religious/spiritual needs being supported by your religious community?” Spiritual care from the medical team was assessed by “To what extent are your religious/spiritual needs being supported by the medical system (doctors, nurses, chaplains)?”
4. Caregivers assessed patient QoL near death with 3 items stressing psychological distress, physical distress, and overall QoL. (Caregiver assessments of patient QoL near death are considered an adequate surrogate. )

## RESULTS

1. Patients reporting high religious community support for their spiritual needs were more likely to be: racial/ethnic minorities, less educated, and to have lower rates of health insurance. At baseline, as outpatients, they also reported better QoL, existential well-being, and social support. They were less likely to have advanced care planning.
2. Patients died a median of 116 days after the baseline interview.
3. There were no significant relationships between patients' baseline spiritual support from religious communities and QoL near death.
4. There were significant relationships between spiritual support from religious communities and less hospice care, greater aggressive medical interventions, and more deaths in the ICU.
5. In all cases, the associations between spiritual support and EoL discussions from medical teams and EoL outcomes were significantly different from, and in the opposite direction to, spiritual support from religious communities. Less aggressive care, more hospice, and fewer deaths occurred in the ICU in those receiving support from medical team. This suggests that a possible intervention among patients receiving high religious community spiritual support is the medical team's provision of spiritual support and EoL discussions in order to reduce aggressive care near death in this population.

## DISCUSSION

1. Patients receiving high levels of support from religious communities were less likely to receive hospice care, and more likely to receive aggressive medical interventions at the EoL and to die in an ICU setting.
2. These findings were strongest among racial/ethnic minorities and highly religious patients.
3. Among patients receiving high levels of support from religious communities (43% of this cohort) a provision of additional spiritual support from the medical team and discussions about EoL were associated with reduced aggressiveness of EoL care.
4. In contrast with the medical team, religious congregations may be unaware of the biomedical realities surrounding terminal illness and may not be addressing issues of death and dying owing to lack of clarity regarding whether or when death will occur.
5. Within many religious traditions, including Christians (the majority of this

cohort), there is a strong belief in miracle-healing. Religious people may consider medicine to be a primary means of divine intervention—God acting through physicians to cure illness. Thus, religious congregations may view withholding medical technologies as curtailing the principal avenue by which divine healing can take place, or even taking the trajectory of the person’s life out of “God’s hands”. This concept touches on religious sentiments regarding the sanctity of human life, which may further motivate the continuation of aggressive medical therapy, even in the setting of advanced terminal illness.

6. Religious community spiritual support may result in greater aggressive care by emphasizing hope found with suffering.
7. However, high religious community support was not associated with higher QoL near death. This is in contrast with the association with their better QoL at baseline, and the bettered well being associated with medical team support near death.
8. Religious communities’ focus on spiritual support in fighting disease may uphold QoL earlier in the course of advanced illness when combating illness remains feasible. And which may become increasingly incongruent or even in conflict with patients’ spiritual needs as death becomes imminent.
9. Conversely, medical team support may be better at addressing spiritual needs that become increasingly central to patient QoL as terminal illness progresses, such as finding acceptance and spiritual peace in dying.
10. This suggests possible mechanisms of reducing greater aggressive care at EoL among patients receiving high spiritual support from religious communities—provision of spiritual care and of EoL discussions from the medical team. By addressing EoL decisions in a manner that embraces patients’ spiritual values and goals, the medical team is assisting patients in avoiding aggressive interventions at EoL.
11. Some patients and families may discover that a belief in miracles can be as firmly held in the hospice setting as in the ICU, and that choosing to withhold aggressive EoL measures does not constitute taking the matter out of ‘God’s hands’.
12. There is a need for clinician spiritual care training.

## CONCLUSION

Terminally ill patients receiving high spiritual support from religious communities received less hospice care, more aggressive interventions, and more ICU deaths, particularly among racial/ethnic minorities.

Among patients well supported by religious communities, receiving additional spiritual support from the medical team was associated with higher rates of hospice use, fewer aggressive interventions, and fewer deaths in the ICU.

Spiritual care is a key component of medical care at EoL

JAMA Internal Medicine June 24, 2013; 173: 1109- 16 Original investigation, first author Traycy A Balboni, Dana Farber Cancer Institute, Boston Mass.

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*This article differs from the usual medical report I abstract, I struggled with it. It is important.*

*Clinicians attending terminally ill patients should have some idea of the patients' spiritual needs.*

*Do we not have an obligation to relieve spiritual pain as well as physical pain?*

*Primary care clinicians often do not consider spiritual things and are generally not taught to deal with them Spirituality is important. One way of introducing a conversation about spirituality is simply to ask the patient "Are you at peace?" And proceed from there.*

*I have had very cordial relations with hospital chaplains. They are dedicated, capable, and ready to help.*

*At EoL, clinicians are ethically bound to provide comfort and relief of pain. This includes relief of spiritual discomfort and pain. They are not bound to provide unlimited life-support if, when life is prolonged, the patient faces continued pain, dependency, and disability with no chance of returning to any quality of life.*

*There may be disagreements between physicians and families, and between family members concerning continuation of supportive care. Some family members will want "everything done". Physicians are not ethically bound to continue life support indefinitely, or to apply interventions considered inappropriate.*

*What kind of life will the patient endure if life is continued?*

*I believe more patients are completing advanced directives and holding conversations with family members limiting interventions at EoL.*

## **6-2 ADVANCING RESEARCH ON SPIRITUAL INFLUENCES AT THE END OF LIFE:**

### **Commentary**

*(This article comments and expands on the previous. )*

Although there is still lack of consensus over what constitutes core spiritual needs, most investigators agree that multiple dimensions are involved. Spiritual assessment includes: beliefs and

meaning; vocation and obligations; experience and emotions; courage and growth; ritual and practice; community; and authority and guidance.

It is important to distinguish between spirituality, which is the broader of the 2 constructs, and religion, which refers primarily to the social-institutional components. Specifically, the primary measure of spiritual care asks how well the patient's religious/spiritual needs are being met by his or her religious community.

Dimensions of religious congregational support include: instrumental support (goods and services), socio-emotional support (making the recipient feel loved, valued and cared for), and spiritual support (reinforcing core beliefs and helping the recipient to understand and live out his or her faith more fully).

Other aspects of religion and spirituality that predict well-being in the general population may deserve consideration in relation to EoL outcomes for terminally ill patients: 1) meaning, or the sense that one's life has had a purpose,

2) forgiveness and reconciliation, 3) emotional support such as gratitude.

The role of "spiritual struggles" or negative experiences of spirituality encountered by patients at EoL are significant. Three types might be particularly relevant: 1) "divine struggles" in which the patient might wonder why God, especially a good and loving God, would allow them to suffer so much. This may lead to feelings of divine abandonment, 2) religious doubts, in which the patient comes to question core elements of beliefs, 3) spiritual struggles involving relationships with individuals in one's religious community. This might occur when the community attempts too much (impinging on patient's privacy) or engaging in well intended support efforts that are poorly matched with the needs of the patient. This may explain why support from religious communities does not positively influence QoL near EoL.

There are important questions regarding the role of race/ethnicity in these types of relationships. Are associations between spiritual support and EoL decisions contingent on membership in minority groups? African Americans have a difficult history with the spiritual establishment stemming from past and present experiences of discrimination. They tend to report less satisfactory care and less trust in health care providers. This might explain why they are reluctant to relinquish EoL care "prematurely" in favor of more aggressive EoL treatments. African Americans are 1) more religious than most other segments of society, 2) their religion involves strong community ties, 3) a personal spirituality and a practical theology have evolved to assist in coping with suffering, 4) their churches often deliver greater support and their clergy often have more expansive roles in the lives of their congregations.

African Americans derive greater mental and physical health benefits from various aspects of religious and spirituality compared with white patients.

The association between spiritual support and EoL outcomes could vary with race. Racial/ethnic groups must be separated from each other and not lumped into one “minority” group.

JAMA Internal Medicine June 17, 2013; 173:1117-18

doi:10.1001/jamainternmed.2013.922

Commentary, first author Christopher G Ellison, University of Texas, San Antonio,

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*Neither article stressed family interactions at EoL. They are as important, or more important than community interactions. Family interactions include: forgiveness, reconciliation, expressions of gratitude, and love.*

***“Would Result In Increased Use Of Antihypertension Drugs At Great Expense And For Little Benefit”***

**6-3 WASTE AND HARM IN THE TREATMENT OF MILD HYPERTENSION: Viewpoint  
“Less is More”**

The 2012 Cochrane Review on “Pharmacotherapy for Mild Hypertension” concluded that the antihypertension drugs used in otherwise healthy adults with mild hypertension (140-159 / 90-99) have not been shown to reduce mortality or morbidity in randomized clinical trials.

Will this landmark conclusion affect clinical practice and slow the inexorable expansion of disease categories? It certainly should, because over diagnosis and over treatment are potent causes of both waste and harm, and seem to be operating in the interest of the pharmaceutical industry.

WHO symposium on mild hypertension sponsored by 3 pharmaceutical companies in 1983 asked all attendants to endorse the proposed conclusion that the threshold for prescribing medication should be lowered to a diastolic of 90.

In 1999, the effect of changing disease definitions, including that of hypertension, was described. Redefinition hypertension as 140/90 instead of 160/100 would create at least 13 million new hypertensive patients in the US. Also in 1999, more than 800 physicians and pharmacists and scientists from 42 countries signed an open letter to the Director-General of the WHO outlining fears that the WHO’s new hypertension guidelines, which suggested that the goal of treatment should be restoring BP to levels defined as: normal < 130/85; optimal <120/80; would result in increased use of antihypertension drugs at great expense and for little benefit.

In 2003, new European guidelines suggested a BP above 140/90, with no age restriction, as appropriate thresholds for intervention. The physician was expected to inform patients that they were at increased cardiovascular risk.

In 2003, a study in Norway provided BP data for 62 000 adults between ages 20-79 in the period between 1995-1997. When the European guidelines were applied, half the population was considered to be at increased risk by the age of 24, and 90% to be at risk by age 49. Yet, the current life expectancy at birth in Norway was 79 years for men, and 83 for women—one of the longest-living populations in history. In this context, the thresholds cannot be appropriate.

In 2004, the 7th report of the Joint National Committee sponsored by the US National Heart, Lung and Blood Institute published the thresholds even lower, stating that pre-hypertensive individuals (BP 120-139/80-89 require health-promoting lifestyle modifications to prevent the progressive rise in BP and cardiovascular disease.

The UK Quality and Outcome Framework expects a BP of no more than 150/90. This drives the medication of many people with stage 1 hypertension who have no comorbidity and who, according to the Cochrane Review, will derive no benefit. They will, however, be at harm.

Every practicing clinician knows the fear aroused in patients by a diagnosis of hypertension. The Cochrane Review reports that anti-hypertension drug treatment for mild hypertension caused 9% of patients to withdraw due to adverse drug effects for no established benefit.

The waste in terms of costs of medication and investigations, and the time of both patients and health care professionals is enormous.

In view of the mounting evidence of both waste and harm, it is time to return to the higher threshold of 160/100 for pharmaceutical treatment of hypertension in otherwise healthy persons.

Sooner or later, the drug treatment of mild elevations of BP seem likely to be consigned to what the novelist Amitav Ghosh has described as “medicine’s vast graveyard of discredited speculations”.

JAMA Internal Medicine June 10 2013; 173: 956-57 “Viewpoint” by Iona Heath, Royal College of General Practitioners, London

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*Does “not been shown to reduce mortality and morbidity” mean “it does not reduce mortality and morbidity” Large randomized trials would take decades to compare outcomes of large groups of people with untreated BP 150-159 with a large groups with untreated BP < 140.*

*The word “hypertension” should be used with caution. If there is no risk from BP 140-159 / 90-99, should patients having BP at this level be classified as “hypertensive”? A fundamental question: What is “hypertension” The answer: It varies.*

*In primary care practice, it will be difficult to redefine the present goal of <140/90 to < 160/100. I do believe, however, that many patients with BP in the 140-159 range are over treated, especially the elderly. If a patient with BP 155/95 begins drug therapy, I believe antihypertension drug should be started at a low dose (half dose).*

## **6-4 SHOULD ELECTRONIC CIGARETTES BE AS FREELY AVAILABLE AS TOBACCO?**

### **A Debate**

YES “E-c will remain orders of magnitude safer than tobacco cigarettes.”

“At last, smokers have a safe alternative to tobacco.”

Because drugs that contain nicotine (nicotine replacement gum and patch) are unattractive and not very effective, people addicted to nicotine tend to continue to use tobacco.

Electronic cigarettes (e-c) are about to change this. They have been very successful in the US. Sales have doubled every year since 2007.

Some governments and regulation agencies in Europe want to over-regulate e-c. A proposed European Union directive limits the nicotine content to 2 mg (much too low), regulates them as drugs and prohibits use in public. This is excessively cautious and harmful to public health. It makes no sense to cripple a safe product by excessive regulation and allow a dangerous one to maintain its monopoly.

The risk of e-c must be compared with the risk of cigarettes. Because e-c are used by current and former smokers, either for enjoyment or to reduce or quit smoking, and rarely, if at all, by people who have never used tobacco, e-c do not need to be absolutely safe. They need to be safer than tobacco. Even if some risks are identified in the future, e-c will remain orders of magnitude safer than tobacco cigarettes.

E-c should not be regulated more tightly than tobacco cigarettes. They should not be regulated as drugs because they are not drugs as long as vendors make no health claims.

Regulation of e-c should cover only quality control to ensure that they do not deliver any unexpected substances, are not marketed to minors, and not advertised or sold to those who do not use tobacco.

There is no evidence that e-c are a gateway to cigarette smoking for young non-smokers.

If smokers switch massively to e-c, the pool of nicotine users will eventually need to be refilled with new, young consumers. This is why the marketing and sales of e-c to young non-smokers should be controlled. But teenage smokers should be allowed to switch to e-c.

In a society where nicotine is widely available, some young people will inevitably try nicotine. It is preferable for them to use e-c rather than tobacco cigarettes.

Even if some former smokers remain addicted to the nicotine delivered by e-c, this is not a public health problem, because e-c have not been proved to be toxic.

No Tobacco companies “seem blasé about possible harmful effects”.

An executive of Reynolds America told shareholders in 2012 that, despite a lot of innovations, 90% of the research and development budget is actually directed at the combustible category—the category that is still going to be delivering a lot of growth in the future.

The tobacco industry is not investing in e-c to wean itself off cigarettes sales. Its recent oleaginous rhetoric about them saving lives is utter duplicity. Big tobacco wants smokers to use e-c as well as cigarettes, not instead of them. Its 5 goals:

- 1) Widespread dual use;
- 2) retarding smoking cessation;
- 3) re-socializing public smoking back into fashion from its forlorn exile to outside buildings;
- 4) conveying to the young that nicotine is a benign drug; and
- 5) welcoming back lapsed smokers.

If big tobacco succeeds, e-c may cause a net increase in population harm.

Public health enthusiasts for e-c see them as a way to get smokers to quit or reduce toxic exposure. But they seem blasé about possible harmful effects. Impassioned vocal testimonies have stated that e-c have helped many thousands of smokers to cut down or quit. However, the first prospective study found that there were no differences in smoking quit rates between users and non-users of e-c. Importantly, cutting down on cigarettes rather than quitting confers little if any health benefits. Dual use may be as bad as continued smoking.

We must determine whether e-c do accelerate quitting.

Drug companies have long been able to sell nicotine in small doses as a quitting aid, but have never tried to register high-dose products. The awareness of the role of nicotine in apoptosis, inflammation, and cell proliferation has always put the brakes on any temptation to have regulatory agencies allow sale of products with doses that generally compete with cigarettes.

BMJ June 22, 2013; 346: 17 BMJ2013;346:f3840 Yes Jean-Francis Etter, University of Geneva Switzerland. (Dr Etter has conflicts of interest. He has been reimbursed by a manufacturer of e-c )

BMJ June 22, 2013; 346: 17 BMJ2013;346:f3840 No Simon Chapman, University of Sydney, Australia.

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*Are e-c safe? Can they be safe? That e-c have not been proved to be toxic does not mean they are not toxic even if the sole content is nicotine.*

*Is nicotine as safe as no-nicotine. I doubt it.*

*All drugs have adverse effects*

*Nicotine is a drug*

*Therefore, nicotine has harmful effects*

*E-c will not be safe until they are strictly regulated to ensure that they contain no added toxic (unlabelled) substances, including narcotics. Many now contain possibly toxic additives which are not labeled.*

*The claim by Dr. Etter that e-c should not be regulated as drug because they are not drugs as long as vendors make no health claims is specious.*

*I believe they should be tightly regulated. Otherwise, no one can be sure of possible harmful ingredients.*

*We do not know the benefit / harm-cost ratio of e-c. No adequate study has been completed. It may take years to find out. Any randomized trial must compare e-c a treatment group consuming only nicotine in the "vapor" and possibly a glycol vs non-users. Results will not be available for years.*

*Meanwhile, what should primary care clinicians advise? E-c present a serious public health problem and an important challenge for primary care.*

*I believe, at present e-c should be made available with some restrictions:*

*Content of nicotine (in mg) should be labeled.*

*All contents should be labeled.*

*Research on benefits and harm-cost should be continued for a long time.*

*Do e-c really lead to permanent cessation?*

*Is there any adverse second-hand effect?*

*E-c may turn out to be advantageous overall. They may reduce mortality compared with smoking tobacco.*

*Primary care clinicians are in the middle of the debate. They must be able to advise patients about use of e-c. At this time, I would advise use if:*

*They are used by a tobacco smoker in a genuine attempt to quit.*

*They stop tobacco while using e-c.*

*They use a product that clearly states contents.*

*I would support regulation proposed in the UK. (See the following.)*

## **“Concerns about the safety and quality of e-c”**

### **6-5 E-CIGARETTES ARE TO BE REGULATED AS MEDICINES IN THE UK: “News” and Commentary**

After an investigation, the UK Medicines and Healthcare Products Regulatory Agency decided to license e-c as medicines beginning in 2016 to ensure their quality and safety. Their investigation included a public consultation, a review of existing studies, and the agency’s own research into the quality, safety, and marketing of these products, and an impact analysis of the consequences of regulation.

The investigation confirmed:

Concerns about the safety and quality of e-c.

Levels of nicotine varied from batch to batch. Users do not receive a constant delivery of nicotine to deal with their cravings.

E-c were often poorly manufactured, contained contaminants, and had leaks of nicotine from the cartridges.

However, it also found that the vast majority of users were current or former smokers and that many users feared that they would return to smoking tobacco if e-c were banned.

There was little evidence of the use of e-c by children who were not current smokers.

The agency found that no existing e-c would meet the new quality and safety standards required for licensing.

E-c will not be banned before compulsory licensing comes into effect.

About 10% of smokers in the UK now use e-c. Use has increased to about 1.3 million this year, up from 700 000 last year.

Other countries have introduced restrictions on the sale and use of e-c. Some have banned them completely.

Regulation of e-c in 2016 means that they cannot be promoted to people under age 16. Their packaging and flavoring may not be designed to attract young smokers. Long term safety will be monitored.

E-c will be sold as a normal commercial product until 2016

*E-c must be strictly regulated in the USA as well. Otherwise harmful unlabeled adulterants will inevitably be included*

***Is this good or bad news for public health?***

## **6-6 BIG TOBACCO LIGHTS UP E-CIGARETTES: Editorial Observation**

The tobacco company Lorillard purchased the leading e-c maker last year. Reynolds is expanding marketing for e-c. Altria has announced it will enter the e-c market later this year. Just when Big Tobacco was on the run, with US sales falling 3-4% a year, along comes a product that may save them—as well as maintaining the nicotine addiction that they depend on.

Some characteristics of e-c:

Increasingly available and cheap. Many US convenience stores sell them at about half the price of conventional cigarettes.

Can be bought singly or in packets.

They are flavored, leading the fear that they will attract young first time “vapors”.

They have a high-tech image.

They are not as offensive to others as are cigarettes.

They do not smell bad, produce no ash, and do not give you bad breath.

E-c are being promoted on TV and the web by sexy movie and rock stars who urge us to “take our freedom back”.

We do not know what is in e-c. Some manufacturers list ingredients; other do not. Varying amounts of nicotine have been found in the cartridges, as well as unlisted, dangerous ingredients.

In the US, e-c are almost completely unregulated and untaxed. The FDA has failed to classify them as a drug delivery device, which it could regulate. And has stated that more research is needed before it proposes regulations.

Stiff taxation, a potent weapon against conventional cigarettes barely applies to e-c. There is no federal excise tax.

The many ways e-c are worrisome:

Use as a substitute for tobacco cigarettes when users need nicotine but cannot smoke because they are at work, at a bar, or at home.

They help maintain the smoking habit and reduce incentives to quit.

Many revert to smoking cigarettes when they find e-c unsatisfactory.

Young “vapors” start smoking e-c lured by movie star adverts, implied safety, flavoring choices,

and permissibility to use them at any time and any where.

If e-c are not produced by regulated industry, what you get might not be what is on the label.

There may be helpful uses for e-c:

Generally as smoking cessation aids. (Advertising this use would immediately put them under FDA jurisdiction).

As with extended use of other nicotine replacement products, which is clearly better than resuming smoking tobacco. Public health advocates have admitted that, if you are going to smoke, it is better to be a vapor than a tobacco smoker.

The best possible outcome at this point is for the FDA to regulate the crap out of e-c and get the poisons, flavorings, and everything but the nicotine out of them. TV advertising should be banned, age and availability restrictions enforced. They should be heavily taxed, similar to tobacco products.

“We need to make the best of a bad situation before it gets worse.”

BMJ June 1, 2013;346: 25 BMJ 2013;346:f3418

Commentary by Douglas Kamerow, former assistant US surgeon general

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*I agree. But at less taxation than for tobacco cigarettes.*

*“Vapor” smoke from a vaporized nicotine solution; “vapors” e-c smokers*

### ***Increases Risk For Most Types Of Cancer Following CT Scan Exposure***

#### **6-7 CANCER RISK IN 680 000 PEOPLE EXPOSED TO COMPUTED TOMOGRAPHIC SCANS IN CHILDHOOD OR ADOLESCENCE: Data linkage study of 11 million Australians.**

The carcinogenic effect of ionizing radiation has been well documented at large doses, but not at doses typically delivered by CT scans.

This study reports increased risk for most types of cancer following CT scan exposure.

The cohort included all people with an Australian Medicare record age 0-19 in January 1985, and born during 1985-2005. Identified all CT scans of cohort members age 0-19 during 1985-2005. (N = 680 211 received a CT scan) They were followed until the end of 2007.

Compared cancer incidence in the CT cohort with 10 025 469 people unexposed to CT.

Mean length of follow-up = 9.4 years.

Overall 60 674 cancers occurred; 3150 in those exposed to CT.

Overall cancer incidence was 24% greater in the CT-exposed group compared with those not exposed (incidence rate ratio = 1.24) .

There was a dose-response association. Cancer incidence increased as number of CT scans increased—0.16 for each additional scan. Incidence increased for many types of solid cancers, leukemia and myelodysplasia.

Incidence rate ratios were greater following exposure at younger ages: Age 1-4 = 1.35; age 10-14 = 1.14.. For all cancers, the excess increased incidence rate was 9.3 per 100 000 person-years.

BMJ June 1, 2013;346:12 BMJ 2013;346:f2360 First author John D Matthews, University of Melbourne, Australia.

## **6-8 CT RADIATION RISKS COMING INTO CLEARER FOCUS: Editorial**

### ***As We Gather More Direct Evidence Of The Dose-Response Curve From Childhood CT***

Attention to cancer risk of ionizing radiation has prompted vigorous debate about how to quantify the risks of diagnostic imaging, and whether or how these risks ought to be incorporated into our decision making process.

The relative paucity of direct data in the lower dose range delivered by diagnostic imaging has led to conflicting opinions about the shape and slope of the radiation dose response curve.

The preceding study presents compelling data of the magnitude of cancer risk attributable to ionizing radiation. The study examined a cohort of nearly 11 million young patients in Australia, and compared subsequent incidence of cancer in 680 000 patients exposed to computed tomography (CT) and compared them with controls.

The exposure to CT in childhood increased the incidence of cancer by 24%. However, it is important to recognize that the baseline incidence of cancer in a general pediatric population is extremely small. It is necessary to consider absolute cancer risk related to the degree of exposure. The study found an overall excess risk of cancer per Sievert, which equates to an excess risk of about 0.125 cancers per Sievert. This equates to roughly one excess cancer per 1900 head CTs (each with a dose of around 4.5 mSv). The incidence would be less with the more typical doses used now—about 2 mSv.

A recent landmark UK study was powered to detect significant increase in childhood leukemia and brain tumors, The current study shows significantly increased risks across a large range of cancer types.

The increase in risk associated with low-dose radiation delivered by CT supports the most widely adopted dose-response model in which double the radiation dose is assumed to impart double the cancer risk.

What should physicians do with this information? There are many possible interventions to control patients' exposure to radiation, which can be grouped into timeframes—before and during the CT scan.

Before—there are many opportunities to control use of imaging. Although the clinical benefits of medically indicated CT scans usually far outweigh the small increase in risk of cancer, this is a time for critical assessment of what impact the imaging result might have on the patient's care plan. Special attention should be paid to patients undergoing recurrent screening. If frequently repeated scans are found to provide little benefit, the cumulative benefit / risk balance may support a decision not to image again for the same clinical presentation.

During—there are many available methods to reduce the radiation dose without negatively affecting the diagnostic quality of the examination. Existing dose reduction tools and ongoing technological improvements allow CT to be performed using substantially lower doses.

With further validation of radiation risk models, not only in children but also in adults, we will ultimately be able to perform more accurate patient-specific risk assessment to better inform imaging decisions.

BMJ June 1, 2013;346:7 BMJ20131346:f3102 Editorial by Asron Sodickson, Harvard Medical School, Boston Mass

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*I believe radiation exposure from CT scans is excessive. It is ordered too frequently (when a MRI would do) and repeated too often. (Multiple scans) Harassed ER physicians may order a CT scan in place of a more complete history and physical examination.*

*Although adults, as they age, become less subject to risk of cancer due to radiation than children, they are still at some risk. We should think twice when ordering a CT scan.*

*A personal experience: Recently, I was taken to the ER because of protracted vomiting, diarrhea, and debility due to a viral infection. The first intervention was a CT scan of the abdomen. This was done without any physical examination and without any consent on my part. I believe it was not necessary and was done in part to add to the hospital bill. Otherwise, I received excellent treatment.*

