

## RESEARCH COMMENTARY

# Five Types of Parabens Detected Intact in Human Breast Tumors

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## BACKGROUND

Parabens have been used as preservatives since the 1920s. Chemically, parabens have a simple structure. They consist of a 6-member carbon ring with a hydroxyl group on one side (-OH) of the ring and a side chain called an alkyl ester on the opposite side of the ring. The side chains can be of varying lengths. Parabens are used to prevent the growth of bacteria in a wide range of consumer products, including a variety of foods and pharmaceutical drugs. The most prevalent use has been as a preservative in cosmetics, including facial and body cosmetics, skin care products, shampoos and conditioners, sunscreens, underarm products (antiperspirants and deodorants), colognes and perfumes, and soaps, including liquid hand soap. One of the most widely quoted sources of information on use, exposure and safety of the four most commonly used parabens was published in 1984 in a report authored by Elder (1). This report estimated that parabens were used in over 13,200 different cosmetic products.

Parabens have been widely accepted and used because of past reports of their effectiveness as preservatives, low cost, and rapid excretion from the body (both human and animal testing). However, recently some scientists have raised concerns that further assessment of parabens may be needed. This is based on recent evidence from over a dozen scientific studies indicating that several types of parabens can bind to the estrogen receptor and can cause estrogen-like responses when tested in laboratory animals or in a variety of tissue culture assays (see <http://envirocancer.cornell.edu/Bibliography/Bibliography.cfm> under Endocrine

Disruption Bibliographies). In whole-animal studies, the estrogenic effects of parabens were not seen when fed to the animals, but only when applied to or injected under the skin. But, these were short-term, high-dose studies. Little to no information exists on whether use of products with low levels of parabens over many years results in accumulation of parabens in body tissues and whether there are or are not any health effects associated with use of paraben-containing consumer products.

## OVERVIEW

The study by P. Darbre and colleagues (2) was conducted to assess whether any of the six parabens commonly used in consumer products in Europe could be detected in human breast tumors. The names of the parabens studied were: methylparaben, ethylparaben, propylparaben, isobutylparaben, butylparaben and benzylparaben. The prefix (e.g. "methyl") indicates the name of the side-chain structure of each paraben. In this study, 20 samples of human breast tissue were obtained from patients undergoing surgery at the Edinburgh Breast Unit in Scotland, UK. The samples were frozen, and then tumors were minced and homogenized to help break up the tissue. Solvents were used to extract the parabens from the tumor sample, followed by the use of thin-layer chromatography to isolate any of the parabens present in the samples. Another method called high-pressure liquid chromatography with mass spectrometry was used to identify the type and the concentration of each paraben. For each batch of

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samples, a blank was included that had no tumor tissue, which was run through the same extraction and detection procedure. The authors were surprised that the blank was not zero, but had some parabens. The authors thought parabens in the hand soap used by technicians or in the detergent used to clean the glassware may have contaminated the laboratory equipment. Blank values were subtracted from sample paraben values to correct for this problem. At least one type of paraben was detected in 19 out of 20 tumors. Methylparaben was the most commonly observed paraben (18/20) and was detected at the highest average level.

**COMMENTARY**

This study is the first report of the detection of parabens in human breast tumors. The authors are careful to point out that the results of this study do not show that any of the parabens caused breast cancer in these women. This study is not evidence of cause and effect. The study did show that five of the six parabens widely used in consumer products can be detected intact (not changed or metabolized) in human tissues. This is an important initial finding, but more research is needed to see if exposure to parabens does or does not affect breast cancer risk.

For instance, this study did not show if levels of the parabens in breast tumors were any different from nearby normal breast tissue in these women. Also, this study did not include any women without breast cancer. To evaluate breast cancer risk, a study would need to compare levels of parabens in women with breast cancer (cases) to women of similar age without breast cancer (controls). This study was very small, with only 20 tumor samples. A larger, case-controlled study would be needed to more fully evaluate whether parabens do or do not affect breast cancer risk. This study did have some other problems, such as the contamination of the blank samples mentioned above. Another problem reported was in the analytical method. An important way to measure the ability to accurately detect the chemical includes adding (spiking) a known amount of paraben to a sample to see how much of the known amount can be recovered from the sample. For instance, if you add 100 units, you would like to have a high recovery of over 90%. In this study, the recoveries of added paraben averaged just under 50%. Hence, the method used to extract the parabens from the sample needs to be improved.

*To evaluate breast cancer risk, a study would need to compare levels of parabens in women with breast cancer (cases) to women of similar age without breast cancer (controls).*

This study has received attention in the popular press because the authors are interested in exploring the hypothesis of whether estrogenic parabens used in underarm products (like deodorants and antiperspirants) increase breast cancer risk. This study did not test this hypothesis. The results did show that intact parabens can be detected in human tissue. It did not however, make any attempt to find out the source of the parabens. The women who donated the tumor samples were not interviewed. In fact, no reports of their age or tumor status were included in this study. No information on other factors that may have influenced their breast cancer risk, or information on past use or patterns of use of products with parabens was obtained. It is not known if the major exposure was due to the parabens from food or via topical application of a certain type or a variety of personal care products.

Better studies are needed of whether or not long term use of paraben-containing consumer products affect human tissue levels. Given the ubiquitous nature of paraben use in consumer products and recent evidence of the estrogenicity of parabens, I would agree with other scientists who have called for a reassessment of the safety of parabens. Most of the risk assessments conducted on the safety of parabens were done before it was known that parabens can act as an environmental estrogen and before it was known that levels are detectable in human tissue. A recent study on the safety of propylparaben does acknowledge the estrogenicity of this chemical, but does not fully explore possible human health risks (3). More recent data is needed to update the

1984 study by Elder, which is one of the few reports estimating exposure to parabens from food, drug and cosmetic products. While use of parabens is widespread, product-to-product use is variable. In a survey of products in my own bathroom and kitchen, I found a type of paraben listed as an ingredient in liquid hand soap, two hand lotions, one out of three shampoos (the “natural” brand was the one with the paraben), one out of two hair conditioners, and three out of five sunscreens (including two made for use by children), but in none of the three antiperspirants that my family uses.

At this point in time we do not have information on whether or not paraben-containing products are used at a level that affects human health. But, research indicating that several parabens can act as weak environmental

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# Activist Update: A History of the New York State Breast Cancer Network

By Andi Gladstone

Several of us founded the Ithaca Breast Cancer Alliance (IBCA) in 1994 because the Tompkins County office of a large, well-established national cancer organization was unable to give us any help when we were diagnosed. We realized that we needed to create local services for people in our community with a breast cancer diagnosis so others would not encounter the frustration that we had experienced during those initial critical times after diagnosis.

By 1996, IBCA was providing support, education, and advocacy for people affected by breast cancer, educating ourselves on the policy issues affecting the breast cancer community, and struggling to fundraise to keep our doors open. We had no idea who else was doing what we were trying to do in central New York, which was to build a community-based, survivor-driven organization that would respond to the needs of people with breast cancer in our local community. We wanted to connect and communicate with other groups similar to ours.

We had so many wide-ranging questions. How do we develop tools and training to enable our volunteers to support a client in her medical choices when that volunteer may personally disagree with that choice? How can we decide which version of the Neighbor Notification Bill, legislation that would require 48 hours notification to neighbors before pesticides are sprayed, to support? How can a small, community-based organization compete with national organizations coming into our communities to fundraise with their sophisticated public relations mechanisms and superior resources? Were other breast cancer

groups in New York State facing these issues? What did they do to get their voices heard with such limited resources?

We tried unsuccessfully for another year to find other breast cancer organizations in central New York. We even called the National Alliance of Breast Cancer Organizations, but they told us that contact information about other groups was confidential. By 1997, growing demand on IBCA's services then forced us to turn our energy back to keeping IBCA's doors open.

In 1998, Capitol Region Action Against Breast Cancer (CRAAB!), another community-based breast

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cancer organization, was established in Albany. CRAAB's founder, Pat Brown, attended the National Breast Cancer Coalition Advocacy Conference in May 1998. At the conference she began talking to other New York attendees about creating a statewide network of community-based, survivor-driven breast cancer organizations that could share information and programs, and advocate for policies that responded to the needs of people with breast cancer all over New York State.

Before the conference was over, Pat arranged an informal meeting of New Yorkers interested in the idea. Those present in Washington that day agreed that a founding meeting should be held in the Albany area later that year. She took the idea back to CRAAB!, and that wonder-

ful organization began the arduous task of creating the Network we all wanted.

The group held its first meeting and several other meetings to set up a structure for this new statewide entity. Founding members named the new organization the New York State Breast Cancer Network (NYS-BCN). As its first major activity, the new Network decided to plan what became the first New York State Breast Cancer Network Advocacy Day, in March 1999.

Now, in 2004, The New York State Breast Cancer Network has 24 member organizations located in communities throughout New York,

from Buffalo to Long Island. We consciously call ourselves a Network because we value our differences and believe that being a Network of groups with shared values and different priorities makes us stronger. For some of our groups, providing meaningful support services is their first priority. Others have environmental action and cancer prevention as theirs. Still others have access to good, responsible healthcare as their first priority. But we all embrace all of these important goals and are committed to supporting each other in our work. We believe that if we add our voices to each other's message, our messages are more likely to be heard. This has turned out to be true.

In 1999, the Neighbor Notification Bill was presented for

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the ninth year and still had not been passed into law. That year the New York State Breast Cancer Network made the Neighbor Notification Bill one of our main priorities at our first Advocacy Day in March, 1999. Most of us were new to Albany and the political process there, but a few of our members knew what to do and they taught the rest of us. We went out and talked to our legislators about the importance of that bill to us as people living with breast cancer. We talked about our own experiences with pesticides, our concerns about what that exposure might have done to us and what it might do to our children. We continued our campaign and in 2000, after a 10-year effort, the Neighbor Notification Bill was passed.

In 1999, the Network recognized that although the state had funding mechanisms for early detection and research, there were no funding mechanisms for services for people diagnosed with breast cancer. It was as if once you were diagnosed, it was too late to put resources towards your care and well-being.

We began a comprehensive program of teaching our elected officials that those of us diagnosed with the disease needed community-based, survivor-driven support and education services to find, access, and get maximum benefit from treatment. We wrote letters and position papers, shared our personal stories, and met with legislators and the Governor’s staff. Slowly, our representatives in Albany began to understand that early detection did not address the needs of the 210,000 New Yorkers living each day with a breast cancer diagnosis. Although the job is not yet complete, our work has, for the first time, led to new funding opportunities for community-based groups from both the legislature and, in 2002, from the Governor’s office.

In 2001, Superfund, the funding

mechanism for cleaning up toxic sites in New York, ran out of money and needed to be refunded. It was confusing because there were several competing bills for refinancing Superfund, and some of those bills weakened the standards of clean-up established in the original legislation. We worked with our environmental action Network members to research the best bill for us to support. After identifying the bill that – though not as popular – called for the “gold standard” of stringent clean-up efforts, we went out and fought for it. We carried the Superfund legislation for two years and in 2003, Superfund was refinanced in a compromise bill that held on to the important high standards we were supporting.

In 2003, our steering committee understood that we had built the only statewide network of community-based breast cancer organizations in New York State. We had an opportunity to accomplish even more than we were already doing. Now we could begin to respond to some of those original questions IBCA had in 1996, and other groups, it turned out, shared those same questions. Since many of our groups were providing services in their communities and had developed real expertise in some of those services, we knew that if we could organize and coordinate efforts, we could not only share expertise with each other but we could also make

these services available to more people in our state.

In the summer of 2003, we created an arm of the Network called the New York State Breast Cancer Support and Education Network (NYSBCSEN) whose purpose was to do just that. We are beginning by creating a monthly electronic newsletter of educational events and services offered by Network organizations, which will be distributed to all our members each month. We also have begun the process of creating a database of services offered by Network organizations. This database will allow us to refer to each other, to learn different services from each other, and to become a portal of entry for people diagnosed with breast cancer who do not have a local organization but who can still use telephone or on-line services provided by our organizations. Next, we want to establish a website.

But of course, all non-profit efforts require fundraising to carry out substantial projects. We have begun to fundraise and have, so far, received a grant from the New York State Assembly to begin to coordinate our support and education services.

We have a steering committee of nine member organizations (see box) that take time out of their busy schedules running their own organizations to meet and keep our

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### The New York State Breast Cancer Network Steering Committee

Breast Cancer Coalition of Rochester

Breast Cancer Network of Western New York

Breast Cancer Options/Mid Hudson Options Project

Capital Region Action Against Breast Cancer (CRAAB!)

Great Neck Breast Cancer Coalition

Huntington Breast Cancer Action Coalition

Ithaca Breast Cancer Alliance SHARE (New York City)

Young Survival Coalition

# Bedbugs! Health! Pesticides? Read on...

By Mary M. Woodsen

*Editor's note: The integrated pest management approach teaches us that in order to control a pest through least toxic methods we need to understand its habits and lifecycle. We asked the NYS IPM Program to tell readers about a current household pest problem and what they should know to safely and effectively control it.*

Most of us have never seen a bedbug and wouldn't know it if we did. They are nocturnal, shy, and easily overlooked. Indeed, these small bloodsuckers had all but disappeared in the US by the late 1940s, thanks to a powerful new appliance, changing fashions in home décor—and DDT.

Now bedbugs are back—big time.

During its heyday, DDT was the weapon of choice against cockroaches. Bedbugs were an incidental casualty. But DDT is out of the picture in the US. The new selective pesticides that have been developed for pests like cockroaches and termites don't necessarily kill bedbugs.

And with global trade and travel increasing by leaps and bounds, the bedbugs' other main deterrent—the vacuum cleaner, complemented by the straight, easy-to-clean lines of modern home furnishings—no longer suffices to keep bedbugs at bay.

Besides, the bedbug is a born survivor. Small—pinhead-sized when young, up to 1/4-inch long as an adult—and tenacious, it can cling to the folds of your bedroll or secret itself in the seams of your suitcase. The rough-and-tumble life of baggage going through customs is unlikely to dislodge it.

Bedbug eggs make even better travelers. A sticky secretion glues them firmly to the frame of your wheeled luggage, the binding of your souvenir book, even your cosmetic case—whatever's handy when a female bedbug is ready to lay.

But it's the bedbug's appetite—or lack thereof—that really gives it an edge. So what if it's living in a vacation cottage that's unused eight months of the year? A bedbug can survive that long without feeding.

Of course, bedbugs aren't ones to pass up a good meal, and will feed every night if they can. They lay 3 to 4 eggs a night and can, over their lifespan, lay upward of 200 eggs.

Bedbugs inject an anesthetic when they bite so as not to awaken sleepers. People vary widely in how they react to the bite. Some get red, itchy welts. Others feel

nothing. Needless to say, someone who's allergic to bedbugs is more likely to suspect that there's a problem than someone who isn't.

Actually, bedbugs don't really rank in parasite-land. They don't damage our bodies directly the way roundworms or blood flukes do, or pass along nasty diseases with their bites—malaria, for example, or Lyme disease or West Nile virus.

Pest-control companies in Florida, a state that welcomes nearly 20 percent of international travelers to the US, have had a 10-fold increase in bedbug calls since 1999. Infestations have been reported in major cities, including Atlanta, New York and San Francisco.

But they're back in the heartland, too, in places like Elizabethtown, Kentucky (population 22,500), where bedbugs made local headlines in 2003. And Kansas State University's diagnostic lab has gotten bedbug samples from 28 states in the past two years—where before they had almost none.

Hotels, motels, cruise liners, and hostels are the most likely places you'll meet bedbugs, followed by dormitories and high-rise apartment buildings.

It pays to be cautious when you travel, for even the best hotels may occasionally suffer from an outbreak. Tips for travelers include looking for bloodstains on pillows or mattress liners, carefully checking the seams of mattresses, and peeking behind the headboard of the bed. If it's possible, move the bed away from the wall. Tuck in the linens and keep blankets from touching the floor.

And when you return home, inspect your baggage carefully—in the laundry room, if you can. If you find bedbugs, unpack right into the washing machine, then dry on high heat for at least 15 minutes. Put those things that can't be laundered into a deep freeze for a couple of days.

The vacuum cleaner is still a formidable pest management tool (and a steam cleaner may be even better for this pest), but you have to be sure to get into all the nooks and crannies and supplement it with a lot of old-fashioned elbow grease. You'll need to seal cracks in floorboards and furniture, remove peeling wallpaper, and tighten loose light switch covers. That is, attend to a hundred and one little details to remove their daytime hiding places.

What about pesticides? If you're tempted to go the conventional route, don't willy-nilly bomb the

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## A FILM TO SEE:

# Heart of the Sea



**HEART OF THE SEA:  
KAPOLIOKA'EHUKAI**  
A film by Lisa Denker &  
Charlotte Lagarde, 2002

*Heart of the Sea: Kaplioka'ehukai* is an exquisite film that does not have a dull moment. It is about Rell "Kapolioka'ehukai" Sunn who was a pioneer of women's professional surfing, one of the great women athletes of the twentieth century, a single mother, community-builder, peerless spearfisher, woman of amazing physical power and luminous beauty, and someone who died of breast cancer at the age of 47 after a 14-year struggle with the disease. Like Rell herself, the film is more about the ocean than the illness, more about connection than separation, more about being protected than being hurt.

There is no lecturing or posturing. There is only a small, quiet scene where Rell tells a group of women in her Hawaiian community that there is no explanation for her diagnosis of breast cancer at the age of 32 after a lifetime of healthy living and swimming in the sea, when she was at the peak of her physical strength, when she had no known risk factors for breast cancer. There are only childhood memories of being the best skateboarder in her neighborhood so she was the one who could always catch up with the pesticide-spraying truck and hold on to the back of it while it pulled her around the neighborhood drenching her with pesticides.

Most of all this is Rell's story, one that is bigger than illness and filled with life. Everyone should see this film. It will crack your heart wide open. 

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*Andi Gladstone was diagnosed with breast cancer in 1994. She produced documentaries for network television for 17 years and is currently director of the New York State Breast Cancer Support and Education Network.*

Available through Women Make Movies (WMM), a non-profit, feminist media arts organization and the largest distributor of films and videos by and about women in the world, HEART OF THE SEA is available on both VHS and DVD and can be ordered via phone, fax, email or mail. WMM is proud to offer breast cancer groups, community and grassroots organizations a special sale price to purchase the film for use in advocacy and outreach efforts. Contact Women Make Movies for details.

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**ACTIVIST UPDATE: A HISTORY OF THE NEW YORK STATE  
BREAST CANCER NETWORK** *continued from page 4*

Network together. We have conference call meetings on the weekends throughout the year, and we travel for face-to-face meetings a few times a year. We are all from very different communities, but we communicate with a shorthand that comes from the shared struggle and honor of being on the front lines of this epidemic.

We are always so happy to be together because we don't have to explain the difference between a community-based breast cancer organization and the local office of a national organization that operates from the top down. We all understand how it feels to have grief and loss be part of the work that we do each day. We know that research needs not only to be funded, but also to be monitored so that important research dollars are not wasted. We know that early detection is not prevention, we know that cancer cannot be controlled without cleaning up our environment, and we know how it feels to have any unexplained back pain or headache awaken our fears of recurrence.

We eagerly look forward to March of each year, when our entire membership comes together in Albany to meet with each other and then visit our local legislators to advocate for our legislative agenda. It is nothing less than exhilarating to be all together that one day during the year. It is always a push to make the trip in what is invariably a lousy

weather March day, but once we are there, the fire is lit. We spend the morning together focusing on one aspect of our agenda through a guest presentation and then we provide training on our entire legislative agenda. The morning is designed to prepare and inspire us to go out in the afternoon to fight for what we know is right.

This year Advocacy Day is on March 23. The theme is "Access to Care." We are thrilled to have Dr. Harold Freeman, who was the director of surgery at Harlem Hospital for 25 years and is currently the director of the NCI Center to Reduce Cancer Health Disparities, give a presentation on disparities in cancer care. Our legislative agenda includes the Precautionary Principle, access to care, ban on lawn care pesticides, funding for community-based breast cancer services, and adding breast cancer survivors as voting members to the Health Research Science Board. All are welcomed to join us and participate—both individuals and organizations. For registration contact: CRAAB!, 518-435-1055 or [craab@nycap.rr.com](mailto:craab@nycap.rr.com).

Come. You won't regret it. 

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*Andi Gladstone was the founding director of the Ithaca Breast Cancer Alliance and is currently the director of the New York State Breast Cancer Support and Education Network.*

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**BEDBUGS! HEALTH!  
PESTICIDES?** *continued from page 4*

room—it won't work. Pesticides like silica gel dusts, placed in wall voids or cracks and crevices, can help get at bedbugs in those inaccessible daytime hiding places. These dusts work by abrading the bedbug's body until it dries out and dies.

Even so, all six silica gel formulations currently registered in New York State contain other pesticides: pyrethrins and piperonyl butoxide (and in one case, carbaryl) as well.

Considering that people vary in sensitivity to pesticides, and that infants and young children may be particularly sensitive, exposure can pose a problem no matter how low a pesticide's toxicity is.

If you do choose to use a pesticide, be sure to use only those that are registered for use on furniture and carpets.

For more info about insecticides currently registered for bedbugs, contact your local Cooperative Extension office. In New York, call Cornell University's Pesticide Management Education Program at 607-255-1866 or <http://pmep.cce.cornell.edu>.

For a fact sheet on bedbugs, check out: [www.nysipm.cornell.edu/publications/bed\\_bug.pdf](http://www.nysipm.cornell.edu/publications/bed_bug.pdf)

Always read the label before applying any pesticide. 

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**FIVE TYPES OF PARABENS DETECTED INTACT IN HUMAN BREAST TUMORS** *continued from page 1*

estrogens and the preliminary results of this study do support the need for more vigorous research in this area. Unlike other environmental contaminants, use of personal care products represents a choice made by the consumer and a choice by the manufacturer who determine the ingredients of the product. 

- 1) Elder, RL. Final report on the safety assessment of methylparaben, ethylparaben, propylparaben and butylparaben, *Journal of the American College of Toxicology*, vol. 3, pp. 147-209, 1984.
- 2) Darbre, PD, A Aljarrah, WR Miller, NG Coldham, MJ Sauer and GS Pope, Concentrations of parabens in human breast tumors, *Journal of Applied Toxicology*, vol. 24, pp. 5-13, 2004.
- 3) Soni, MG, GA Burdock, SL Taylor, NA Greenberg, Safety assessment of propyl paraben: a review of the published literature (Review), *Food and Chemical Toxicology*, vol. 39, pp. 513-532, 2001.

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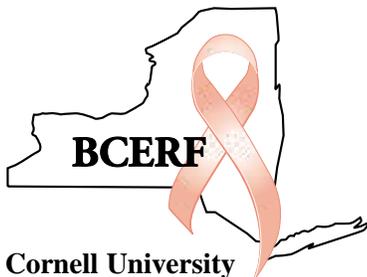
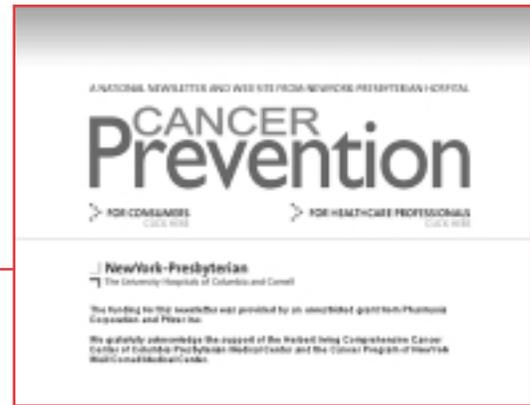
West Hill Graphics,  
Ithaca, NY

# A note from our colleagues at the Cancer Prevention Program at New York-Presbyterian Hospital

**T**he Cancer Prevention Program at New York-Presbyterian Hospital has launched a bold, new initiative: a national newsletter and website to keep both consumers and health professionals abreast of the latest developments in the field of cancer prevention and screening.

Cancer Prevention (<http://www.nypcancerprevention.org>) aims to cast cancer in a new light – to change its perception as a life-threatening disease that can only be treated to a disease that can, in many instances, be prevented. The newsletter and web site provide a forum in which the most recent cancer prevention innovations – from the laboratory to the clinic to the public at large – are presented.

We welcome your comments and feedback. 



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