



## **Cancer Screening Tests**

IAFF continues to receive questions about new cancer screening tests. Many different tests are being marketed ranging from blood, breath and urine tests to imaging tests. We have prepared this information sheet in response.

### **What are some of these tests?**

Blood tests: This is the biggest category and includes ONCOblot®, GeneNews (ColonSentry, BreastSentry, EarlyCDT-Lung), Guardant, OneTEST™, and IvyGene® just to name a few that we have been asked about

Breath tests: “cancer-sniffing” dogs (also used on urine samples)

Imaging tests: total body CTs or ultrasounds, DermSpectra for skin photographs

### **How do these tests work?**

Blood tests: manufacturers state that they test for different chemicals in the blood that are shed or produced by cancer cells but not by normal cells. The chemicals and cancers that are tested for vary by test.

Breath tests: chemical detection machines using gas chromatography and mass spectroscopy or trained dogs detect chemicals in the breath of people with cancer that are reportedly different than in the breath of people without cancer.

Imaging tests: tests are designed to detect masses inside the body or on the skin.

### **Why isn't IAFF recommending these tests in fire fighters without symptoms or cancer?**

IAFF understands that fire fighters are concerned about reducing the cancer risks that have been observed in recent studies.<sup>1,2</sup> However, IAFF does not support the use of any of these tests for screening (testing in people without any symptoms or signs of cancer) unless the use is part of an approved research study. Here are the reasons why:

- ***Cancer screening is challenging***

There are established criteria for any screening test:

- How the disease progresses must be known
- Acceptable, non-invasive screening test
- Early stage of disease to screen for
- Accepted treatment is available when early stage disease is diagnosed. Treatment must result in reduced disease severity and likelihood of death
- Benefits of screening must outweigh the risks. Importantly, the less chance of disease in the population screened, the higher the risk for a false-positive results where the screening test is positive but the disease is actually not present.
  - “False-positives” are a major risk with cancer screenings because they may result in unnecessary additional testing which have risks such as bleeding and infection. False-positive screening tests can also result in significant anxiety as well as other mental health concerns.

An example of challenges in screening, researchers have spent decades studying ways to screen for lung cancer, but early detection did not always result in better outcomes. It used to be thought that chest X-rays would detect lung cancer masses early enough to treat them before the cancer spread. However, although masses could be detected on chest X-rays before symptoms developed, the risk of dying remained the same because no treatment changed the outcome. People just learned they had the disease earlier. The same proved true for sputum cytology (where people cough up material from deep in their lungs). Currently, low dose CT is recommended for certain groups of smokers based on the latest research.

The experience with Prostate Specific Antigen (PSA) is another example. Prostate cancer is very common but, in certain men the cancer does not grow or cause symptoms and they die of completely different causes. The PSA test does not separate those who will have aggressive prostate cancer that could result in death from those who have a small nodule that will never affect them. Treatment for prostate cancer has serious risks including urinary incontinence, impotence, occasional bowel problems from radiation and even a small risk of death from surgery. Therefore, most organizations do not routinely recommend PSA testing for all men over a specific age. Instead, they recommend a discussion of the risks and benefits of PSA testing so the patient can decide if he wants the test.

- ***Few, if any, of these new tests being marketed to fire fighters have been studied in large populations followed over time to see if the risk of dying from cancer is decreased. Few have been compared to standard screening tests over time to see if they are better.***
- ***The company websites for many of these tests do not recommend them for cancer screening unless as part of a research program***
- ***These tests are not recommended by the major organizations that make cancer screening recommendations such as the American Cancer Society and the US Preventive Services Task Force***

- **Many of these tests are developed and marketed by rapidly changing organizations. For example, less than three years after being marketed to IAFF, the ONCOblot® test became part of IvyGene® but currently appears completely unavailable.**
- **Many of these tests are not covered by health insurance and in order to be tested, an individual would have to incur significant out of pocket costs**

### **What is the response of regulatory agencies?**

The Food and Drug Administration (FDA) sent a letter to Pathway Genomics (<https://www.fda.gov/media/93493/download>) on September 21, 2015 about their test CancerIntercept™ Detect. FDA noted that this blood test was marketed as a screening tool for the early detection of up to 10 different cancer types in high risk populations. FDA wrote: “We have also examined published literature and have not found any published evidence that this test or any similar test has been clinically validated as a screening tool for early detection of cancer in high risk individuals.” FDA commented that the scientific article referenced at the company’s website in support of this test had been conducted in patients already diagnosed with cancer, not as a screening test in healthy individuals.

### **The test is not very risky. Why wouldn’t a fire fighter want this information?**

- If the test is positive, there is no medical information to help decide what to do next. One option for blood, urine or breath tests would be CT or MRI scans. But CT scans expose patients to radiation which we know causes cancer. And what parts of the body should be scanned?
- More testing means more chance of “false-positive” tests, which as mentioned above, means the test is positive for disease but the person does not really have the disease. If the test is positive, additional testing or procedures, like a biopsy or surgery, will likely be needed. In some cases, the additional testing may lead to complications.
- With any new test, there is the risk that the cancer is just diagnosed earlier but not in time to reduce the risk of death as discussed above with early screening for lung cancer.
- An inaccurate test result could also lead to extra time away from work, unnecessary anxiety, and other potential harms.
- Health insurance often does not pay for non-traditional tests.

Regarding the use of ultrasound for thyroid cancer screening, the U.S. Preventive Services Task Force has stated that although ultrasound of the neck followed by needle biopsy if positive, can identify thyroid cancers, it is unclear if “screening can decrease mortality rates or improve important patient health outcomes. Screening that results in the identification of indolent thyroid cancers, and treatment of these overdiagnosed cancers, may increase the risk of patient

harms” (<https://www.uspreventiveservicestaskforce.org/Page/Document/evidence-summary/thyroid-cancer-screening1>).

Although not a cancer screen, the risks from ultrasound are stated even more clearly by the U.S. Preventive Services Task Force regarding screening for carotid artery blockage in people with no symptoms: “Ultrasound screening does not by itself cause physical harm. However, this screening often leads to a cascade of follow-up testing and surgeries that can cause serious harms, including stroke, heart attack or death. In addition, screening all adults will lead to many false-positive results because few people have carotid artery stenosis. This is when a test result says a person has a condition that he or she actually does not have. False-positive results lead to unneeded tests and surgeries.” (Screening for Carotid Artery Stenosis: Consumer Guide at: <https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/carotid-artery-stenosis-screening>).

Finally, a recent American Society of Clinical Oncology and College of American Pathologists Joint Review on tests of genetic variation in tumor DNA in blood/serum samples concluded that there was no evidence that such tests were useful for cancer screening, outside of a clinical trial.<sup>3</sup>

### **What does IAFF recommend?**

**Prevent exposure** — Fire fighters should continue to use self-contained breathing apparatus during all fire suppression and overhaul activities. Fire fighters should decontaminate their skin after fire suppression activities with wipes at the scene and shower as soon as possible after firefighting and/or overhaul activities. Station uniforms should be laundered as soon as possible after firefighting activity. Turnout gear (to include helmets, gloves and boots) and equipment should be cleaned as soon as possible per the manufacturers’ recommendations in order to reduce exposure to chemical contaminants.

### **Wellness Fitness Initiative**

Cancer screening: should be part of an annual medical physical consistent with NFPA 1582. The cancer screening in NFPA 1582 is based on recommendations of established organizations such as the American Cancer Society and the US Preventive Services Task Force with modifications to address the increased risk of certain cancers in fire fighters.

(<https://www.cancer.org/healthy/find-cancer-early/cancer-screening-guidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer.html>).

Fire fighters interested in any of these new tests should only pursue them by collaborating with researchers in clinical trials that have received approval by an Institutional Review Board. Participation in clinical trials will permit fire fighters to be appropriately consented to the potential medical risks and benefits of the technique, under appropriate ethical oversight. Such participation would also improve the likelihood that the results of such testing would further inform the scientific literature.

Reduce non-occupational risks: fire fighters should avoid tobacco (smoking and smokeless) and vape products, maintain a healthy weight, exercise regularly, eat a diet rich in fruits, vegetables, and whole grains, and use sun screen.

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## References

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<sup>1</sup> LeMasters GK, Genaidy AM, Succop P, Deddens J, Sobeih T, Barriera-Viruet H, Dunning K, Lockey J. Cancer risk among firefighters: a review and meta-analysis of 32 studies. *J Occup Environ Med.* 2006;48:1189-202

<sup>2</sup> Daniels RD, Kubale TL, Yiin JH, Dahm MM, Hales TR, Baris D, Zahm SH, Beaumont JJ, Waters KM, Pinkerton LE. 2014 Mortality and cancer incidence in a pooled cohort of US firefighters from San Francisco, Chicago and Philadelphia (1950-2009). *Occup Environ Med.* 71(6): 388-97.

<sup>3</sup> Merker JD, Oxnard GR, Compton C, et al. Circulating Tumor DNA Analysis in Patients With Cancer: American Society of Clinical Oncology and College of American Pathologists Joint Review. *J Clin Oncol.* 2018;36:1631-1641