Everyday drugs could stop cancers before they hit

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Editorial: "Aspirin, the cancer wonder drug"

People at high risk of cancer may soon be advised to take readily available drugs such as aspirin to reduce their chances of succumbing to one of the world's biggest killers.

Although cancer screening programmes already exist, offering women regular smear tests or mammograms, for example, to detect early signs of cervical or breast cancer, these look for precancerous changes to cells or suspicious lumps, rather than identifying people who are at high risk of cancer in the future. For many of these people, even those who possess a gene mutation that puts them at high risk, watchful waiting is the norm.

That could be about to change. It looks as if common drugs may be able to slash a person's chances of developing cancer – dubbed chemoprevention. "For people at high risk of cancer at least, chemoprevention is finally coming of age," says John Burn of Newcastle University, UK.

Breast cancer set the trend. Women over the age of 50 are often offered mammograms to detect early signs of cancer. Such screening has drawn controversy, as it can flag up harmless lumps as cancerous, leading women to undergo unnecessary investigation. However, mounting evidence suggests mammograms of healthy breasts might provide vital information on a woman's cancer risk in future, and that this information is not being put to good use.

"All the routine mammogram does is look for early cancers," says Jack Cuzick of the Wolfson Institute of Preventative Medicine in London. "But within this mammogram there's a lot of information about who is at risk." What's more, tamoxifen, a cheap drug that is already used to treat breast cancer, could significantly reduce the risk of the disease developing in the first place.

Several groups have found that healthy women with dense tissue in 75 per cent or more of the breast – around 5 to 10 per cent of the female population – were around four times as likely to develop breast cancer within 10 years following the diagnosis.

Breast density relates to the amount of connective and glandular tissue in the breast, and this produces hormones that can encourage cells to divide. "We think that this combination creates an environment in which changes are more likely to occur that can give rise to cancer in the future," says Norman Boyd of the Ontario Cancer Institute in Toronto, Canada.

Now, Cuzick and his colleagues have shown that treating women at high risk with tamoxifen can reduce breast density, cutting their risk of developing the most common form of breast cancer by up to 63 per cent. The results were presented at the Frontiers of Cancer Prevention Research meeting in Boston last week.

Tamoxifen does have some side effects, but for women whose mammograms suggest that they
are at high risk, it could be an attractive option, says Cuzick.

Related drugs called aromatase inhibitors also show promise – one has been shown to reduce the occurrence of breast cancer by 65 per cent (The New England Journal of Medicine, DOI: 10.1056/NEJMoA1103507).

Chemoprevention isn't just focusing on breast cancer. Last week, a study in The Lancet showed that aspirin dramatically reduces the risk of developing colorectal cancer in people with a family history of the disease. "We set out to see if aspirin would prevent cancer, and it does," says Burn, who led the study.

This is especially significant for developing countries, where cancer rates are escalating at a staggering rate (see "Poor countries need cancer drugs").

Burn and his colleagues studied 861 people with a hereditary form of colorectal cancer called Lynch syndrome, who began taking two 300-milligram tablets of aspirin a day or a placebo at some point between 1999 and 2005. By 2010, there had been 19 new colorectal cancers in those who had taken aspirin and 34 in the placebo group. In people who had taken aspirin for more than two years the effects were even more pronounced (The Lancet, DOI: 10.1016/S0140-6736(11)61049-0).

"It provides the first evidence that aspirin is effective in reducing the very high risk of cancer that these individuals have," says Peter Rothwell of the University of Oxford, who earlier this year found that a daily dose of 75 mg of aspirin for more than five years reduced the risk of dying from all cancers by 34 per cent.

Both Burn and Rothwell say they now regularly take aspirin for cancer prevention, but emphasise that self-medication is a personal decision: everyone has to weigh up the pros and cons for themselves. "Up until now, the main reason to take aspirin was to prevent vascular events. I think it will become clear that cancer prevention is the main benefit of aspirin in healthy middle-aged people," says Rothwell.

Lung cancer is another disease where preventative therapy could reap rewards: especially for the millions of ex-smokers who remain at increased risk of disease. In a trial of 152 smokers and former smokers, a drug called iloprost significantly reduced abnormalities in cells lining the airways over the course of six months in those who had kicked the habit, but not in current smokers. "If this holds up, it suggests that former smokers could reduce their risk of developing lung cancer by taking a drug," says Robert Keith of the University of Denver in Colorado, who also presented his results in Boston last week. Iloprost is a synthetic version of a naturally occurring molecule called prostacyclin, which can suppress cell growth and division.

Bringing such preventative drugs to market may not be so easy, however. One of the biggest barriers is the need to test these drugs in large numbers of healthy individuals, which will inevitably produce side-effects in some people. "Chemoprevention is tremendously appealing, but it is a more difficult path to traverse than developing a therapeutic drug," says Michael Thun of the American Cancer Society.

It is also an issue for people like Cuzick, who want tamoxifen and related drugs made available as a precaution for people at high risk. "Treatment can't be the whole answer," he says. "We've got to do something about prevention."
Poor countries need cancer drugs

Surprisingly, cancer now kills more people in developing countries than malaria, AIDS and tuberculosis combined. More than 2.4 million lives could be saved each year using affordable and readily available drugs to prevent or treat cancer.

So says a report released last week by the Global Task Force on Expanded Access to Cancer Care and Control in Developing Countries (GTF.CCC).

Better drugs mean that more people in developing countries survive infectious diseases. But they are starting to fall prey to the same illnesses that strike in richer countries – cancer, cardiovascular disease and diabetes. By 2030, nearly 70 per cent of the projected 27 million new cancer cases each year will occur in those countries with the least infrastructure to deal with it. "Unless we take action now, these countries will be overwhelmed by the economic burden of disease," says David Kerr of the University of Oxford, who has set up a network of collaborations in India and Africa to improve cancer care. "It's not a success story to say we've avoided death in the first five years of life, and we've avoided death in childbirth, but we ignore what happens with cancer."

According to the report, 26 of 29 key drugs that could treat the most prevalent and curable cancers are off-patent, meaning people could receive a course of treatment for less than $100.

For example, the survival rate for childhood leukaemia in Canada is around 90 per cent, but in low-income countries, only 10 per cent survive because they do not have access to the drugs, even though they are off-patent.

"A couple of hundred million dollars would treat all of these childhood leukaemias," says Julio Frenk, Dean of Harvard School of Public Health and co-chair of the GTF.CCC. "It's just lack of access."