

## The prevention of cancer in South Africa

The war on cancer started in earnest in 1971 when Richard Nixon empowered the National Cancer Institute to eradicate cancer. Forty years later, after spending close on a trillion dollars and involving approximately 100 000 cancer researchers, roughly 50% of the cancer problem remains to be solved. Achieving this could take another 40 years.

In the quest to control cancer, there are two main objectives. The one is to find a cure for it, and the other is to prevent it. At the Cancer Association of South Africa (CANSA), we believe the best cure for cancer is prevention. Prevention is the main anti-cancer road to be followed in South Africa because it is cheaper, more democratic, more assured of successful, incremental steps, and more certain to result in the collateral prevention of other diseases, while also holding the promise of a healthier planet, than searching for a cure for cancer.

By “prevention” we mean first and foremost the removal of carcinogens, and oncogenic, epigenetic factors from the environment. Examples are the removal of aflatoxin-contaminated peanut butter from the food chain and the banning of the polycarbonate baby bottle in order to prevent exposure to bisphenol A (BPA) which can affect the chromatin epigenetically, and which has been linked to more than 60 PubMed-listed studies on breast cancer. Today, we also realise that there is 1 000 times more BPA in thermal invoice paper than there is in the baby bottle. A safe alternative to BPA is urgently sought for thermal receipts and epoxy lining in tin cans which also contain BPA. In America, close on 100% of the population is now contaminated with BPA.

Another major and successful approach to prevent cancer is avoidance of exposure to oncogenic viruses, such as hepatitis B, humanpapilloma virus (HPV) and human immunodeficiency virus (HIV)-1. Of cardinal significance here is the role of vaccination, which is one of the most elegant disease-preventing innovations of man. Babies are vaccinated against hepatitis B in South Africa today. This cause of hepatocellular carcinoma will be eradicated in South Africa in the future. Next year, the HPV vaccine programme will be rolled out by the state. This will prevent this virus from causing cancer in cervical cells. Another important example of averting cancer by avoiding exposure to carcinogens is the raft of legislation against smoking and tobacco. Smoking is still the main cause of cancer, but it is indeed gratifying to see the sea-change, with only one in three men smoking in America today, compared to two in three 50 years ago.

We also believe that cancer can be prevented by maintaining optimal health. Carcinogenesis is a complicated process. The human body contains many biochemical mechanisms

that can substantially reduce the risk of carcinogenesis. We now know that many different kinds of cancer cells release molecules that incapacitate the natural immune defence of the body. *De novo* super antioxidants, like glutathione, can bind to carcinogens like aflatoxin, and enhance excretion of this potent carcinogen before it can do harm. There is also a growing body of evidence that omega fatty acids, such as alpha-linolenic acid and docosahexaenoic acid, can help to lower the risk of cancer. We also know of at least 20 natural products, such as curcumin from turmeric, sulforaphane and indole-3-carbinol from broccoli, and most recently, tocotrienols from concentrated palm oil, which help to prevent cancer. We don't know everything about how these molecules work, but the inhibition of inflammation is a theme that is receiving more and more support. Although the mode of action requires further elucidation, reputable studies strongly suggest that there is correlation between the intake of these molecules and a lower cancer incidence.

Cancer can also be prevented by early ablation, such as treating diagnosed cervical dysplasia with colposcopy and loop electrosurgical excision, or removing a very early melanoma or colon polyp by surgery.

In summary, we recognise four modalities of cancer prevention:

- Removal of the carcinogen from the environment through legislation.
- Obstructing carcinogenesis through molecular interaction with the carcinogen (vaccination).
- Blocking carcinogenesis biochemically (inhibiting inflammation with natural molecules).
- Early ablation of precancerous lesions.

South Africa is well positioned to become one of the leading countries in the world in terms of cancer prevention. We have achieved considerable successes and are poised for more.

For example, we have:

- Implemented excellent legislation against smoking and tobacco.
- Established a longstanding vaccination programme against hepatitis B.
- Introduced fortified maize meal.
- Banned trans fats above 2%.
- Banned polycarbonate baby bottles.
- An abundance of cheap natural products, such as rooibos tea, which increases glutathione.
- Gifted scientists working to reduce the impact of HIV, and consequently HIV-related cancer.
- A dedicated team aspiring to control cervical cancer in South Africa.

CANSA is proud of what these team members have achieved, and also because they are the first multi-million type D research team that CANSA has selected and financed. These multidisciplinary and multi-institutional teams, referred to as type D, intend to engage with cancer problems of national importance, such as cervical cancer. They are also expected to interact with the Department of Health in order to set into motion the symbiosis between science, procedure and policy. These goals have been achieved to a large extent, as witnessed by the publications in this special supplement which does justice to the sterling research (and advocacy) that has been carried out.

It is gratifying that the Minister of Health in South Africa,

Aaron Motsoaledi, has stated that “South Africa’s healthcare model needs to shift from being ‘hospicentric’ to more preventative, if the country is to win the fight against the burden of disease”.

CANSA’s policy of seeking to prevent and control cancer is in harmony with this sentiment. Nevertheless, conceptualising cancer prevention programmes and making them work are daunting challenges, as perceived by the greatest thinkers of all time. Albert Einstein remarked that: “Intellectuals solve problems. Geniuses prevent them”.

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