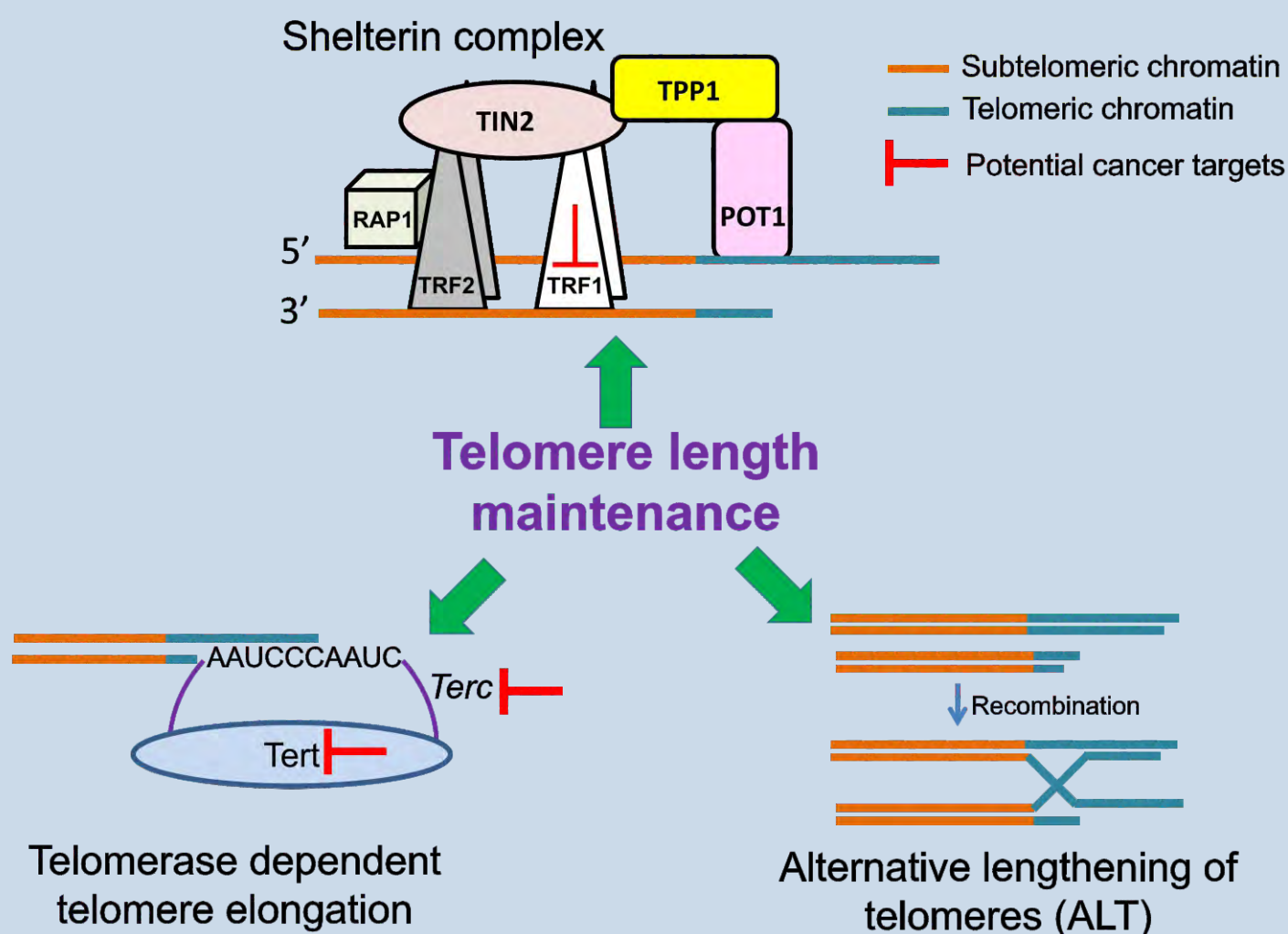


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Editorial: Breast/Cervical Cancers: Issues at Stake

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Non-communicable diseases (NCDs) including cancer account for an estimated 38 million global deaths annually and a projected economic loss of US\$ 47 trillion between 2012 and 2030. NCDs form the biggest reason of mortality globally and hence demands urgent action, large increase in public health infrastructure, technology and financial inputs. In the current Indian scenario, a majority of our population lives in rural areas, and consequently 70% of India's disease burden is primarily examined at the Primary Health Centres. Thus, it is imperative to strengthen our Primary Health Centre facilities. In the past thirty years, India has undergone a rapid epidemiological change in the disease profile with a drastic epidemiological shift in the disease burden from communicable and transmissible infectious diseases to non-communicable diseases including cancer, diabetes, cardiovascular diseases, etc. A tremendous improvement in child and maternal health is clearly visible on the Indian scenario, although major health inequalities exist in the maternal, pediatric, neonatal, nutritional, metabolic diseases between urban and rural India, with a bias in the infrastructure of the medical and health facilities in urban India and minimal health facilities available in rural India containing the bulk of Indian population. Diagnosis of non-communicable diseases such as Cancer, Diabetes and Cardiovascular Diseases at the early stages of the diseases is a must and will result in life and money saved.

India ranks 143 out of 184 countries for health-related Sustainable Goals, with the government expenditure on health being one of the lowest in the world at 1.4% of gross domestic product, with biomedical, basic and translational research funding inadequate by several standards. Our Medical Schools and Universities lack appropriate research training, approach and attitude, inbuilt in the students in most medical centres of education. Besides, truly there is a dearth

of medical doctors with the doctor patient ratio in India close to 1:1000, abysmally below par. Despite consistent increase in number of cancer patients and the estimated number of cancer patients to increase to two million new cases diagnosed each year by 2030, perhaps an underestimate, 'Prevention of cancer' through systematic screening is not a priority, and our population size of 1.3 billion makes 'Prevention' a difficult proposition. Besides, the two most common cancers in women, that is breast and cervical cancers, receive far less funding, advocacy, public and political attention. Just over 14.9 million new cancer cases worldwide were diagnosed and 8.2 million deaths were recorded in 2013. Of these, 8.0 million new cases and 5.3 million deaths occurred in low-income and middle-income countries including India. Breast and cervical cancer are major threats to the health of women globally, more so in India. Cancer should be a major global, social and political priority, and women's cancers should be a tangible socioeconomic policy target, a mandatory priority health concern in every country with a drive towards improved cancer control and care.

The Universal Health Coverage

endorsed by World Health Organisation, World Bank and United Nations Sustainable Health Goals, constituting prominent global health policies, are a guide to most nations for a robust health policy setting in our health care system. Cancer control is one of the most complicated and complex global health challenges to the achievement of Universal Health Coverage and the health targets of the Sustainable Development Goals. Addressing the global inequities in women's cancers can serve to influence policy making to mobilize resources and improve cancer care and control. Women's cancers need to be considered an integral part of women's health policy. The thousands of women who die from breast cancer in India is preventable, with >95% cure rate of breast cancer in several high income countries with cost-effective, lifesaving interventions of screening and early detection, accessible and affordable treatments. In India, maternal and child health programs have brought about a drastic improvement in their health. A focus and efforts in clinical and better understanding of breast cancer, will ensure greater success in India. Investing in the health of girls and women is an investment in the development of nations

and their futures, and is crucial to successfully drive radical transformation to close the cancer divide for women. It is amazing as well as incongruous that very few states in India currently direct health policy towards prevention of cervical cancer as there is the availability and access of efficacious and safe High Risk Human Papilloma (HR-HPV) vaccines in India. State Health Department purchase of bulk quantity of HR-HPV vaccines could reduce the price of the vaccines to make it affordable, citing the purchase power and price of the GAVI nations negotiated to a minimal USD of five dollars per dose of the vaccine.

For fighting the cancer issue, important elements of 'Prevention and Early detection' of breast and cervical cancers include understanding the social determinants of health, human rights, community involvement and mobilisation, empowerment of women, excellent health systems that serve them, political will, and awareness of the associated problems, and a wholistic approach needs to be taken into account. Cancer health services in many of our medical facilities are understaffed, poorly equipped, inadequate and evolving. Governments need to recognize the

importance of cancer control in the health development schemes, and allocate adequate resources to improve equitable access to high-quality cancer services. Rapid improvements in breast and cervical cancer control are a good starting point. Elements of breast and cervical cancer control, such as advocacy, prevention, early detection, pain and symptom management, and effective therapies (e.g., ablative treatments for preinvasive cervical lesions), should be integrated and managed through our health systems. Health of women including cancers in women in many parts of the world including India still remains in the shadows. A healthy population is the first sign of today's civilization.

Gene-expression signatures of primary breast cancers that predict clinical outcome generally do not overlap and range from a 70-gene "poor-prognosis" signature (detected with the use of the MammaPrint test) to a hand-picked set of 21 "recurrence" genes (detected with the use of the Oncotype Dx test) that guide decision making treatment with specific chemotherapeutic drugs to establish a drug-sensitivity profile. Molecular Biomarkers with variable expression in malignant tissues,

are currently and consistently used to predict susceptibility to cancer, response to treatment and prognosis, and is a repeated theme for quantitative evaluation of cancer biomarkers. Quantitative real-time RT-PCR (RT-qPCR) is a valuable molecular technique in translational biomedical cancer research as a clinical tool. An important aspect of the analytical interpretation is normalization of the data with respect to technical variations within the sample to reflect stability, repeatability and reproducibility of the data, intra/inter assay variability between samples and for comparative studies between national and international laboratories. The reference internal control genes traditionally used included GAPDH, β 2-microglobulin and β -Actin are found wanting as these are also regulated in various experimental milieu in different tissues. Inappropriate reference gene selection has profound influence on study conclusions ranging from divergent statistical outcome to inaccurate data interpretation of significant magnitude. Dr. Narendra Joshi and his team from Advanced Centre for Treatment, Research and Education in Cancer, Mumbai, India, have systematically evaluated a panel of endogenously

expressed genes to identify those for normalization of qPCR data in Breast Cancer prototype cell lines – MCF7, MDA-MB-231 and BT474, with typical clinical breast cancer pathologies of ER, PR and Her2 positivity or negativity and triple negative characteristics. The authors investigated PUM1, RPS13, RPL13A, TBCA and PSMB, and confirmed PUM1 as an appropriate reference control gene. Further PSMB proved an additional reference gene for quantitative expression analysis using Real Time qPCR in breast cancer studies.

An additional commentary is provided by Dr. Ekta Khattar, Sunandan Divatia School of Science, NMIMS (Deemed-to-be University). The article highlights and brings to focus mechanisms maintaining telomere homeostasis, with a critical role in normal cells, senescent cells, stem cells and cancer cells. The molecule gives us a basic understanding of cell growth and cell death, and has a translational potential in cancer therapy.

The article by Dr. Pratip Shil and colleagues from National Institute of Virology, Pune, switches gears to infectious diseases covering transmission of the influenza viruses during epidemics, in the article entitled

‘Estimation of epidemiological parameters for historical ship outbreaks of Influenza’. Influenza epidemics are a Public Health concern with excessive burden due to the disease epidemic and the economic burden on the populace. The authors studied transmission of Influenza in humans in a confined area of on-board sailing ships obtaining historical data from two ship outbreaks reported in the Fluweb Historical Influenza Database hosted by the School of Public Health, University of Melbourne, Australia. The outbreak studies included Influenza A (H3N2) on-board USS Arkansas in 1996 and Influenza A (H1N1) on Boonah ship in 1919. The epidemiological parameters were assessed using principles of Mathematical Epidemiology, and the analysis indicated intense and rapid transmission in the clustered population, with overall attack rate of 28% in the

Influenza A (H3N2) and 39% in Influenza A (H1N1), with a major portion of the population unaffected. The authors discussed the limitations of the available data study to conduct transmission dynamics.

The article by Dr. Brijesh S. and Miloni Thakkar from Sunandan Divatia School of Science, NMIMS (Deemed-to-be University), Mumbai, on ‘Stability-indicating HPLC Method for Primaquine Diphosphate: An Application to Niosomal Formulation’. The authors details a novel, rapid reverse-phase high performance liquid chromatographic method for quantitative determination of an essential antimalarial drug and its degradation products under acidic, basic, oxidative, photolytic and high temperature conditions. The method was validated and used for primaquine diphosphate loaded niosomes.