

Global philanthropy and health research: An implications in global cancer control

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ABSTRACT

Globally, cancer is the primary source of disease burden, accounting for almost 19.3 million cases and 10 million deaths in 2020. In order to improve outcomes and comprehend the factors that contribute to cancer as well as the impact of therapies, research is essential. Our objective was to examine worldwide trends in public and charitable funding for cancer research. For the purpose of this content analysis, we looked up funding grants for human cancer research from public and private funders between January 1, 2016, and December 31, 2020, using the Uber research dimensions database and cancer research UK data. Project and program grants, fellowships, pump priming, and pilot projects were among the award categories that were covered. Awards pertaining to the operational provision of cancer care were not included. The study period, cross-cutting research theme, and kind of cancer were used to categorize award.

Keywords: Cancer; Philanthropy; Health research; Endeavors; TB

INTRODUCTION

The global philanthropy, is open to all, while we look for the exiting opportunities, to work in the developing countries, often by leveraging the countries capacity to drive the economies, to be, part of highly performing economies [1].

The commission for macro-economics and the health, is largely been globally endorsed, to work on the crucial issues of the health well in the macro economic frameworks [2].

The research resource allocations, capital flows, across the countries, foreign direct investments, and national share for the health research, should be a part of the national scientific and innovation councils, development agendas [3].

It is not just drafting, the agendas, but it is to make the systems work for the people, often, making the nations scientific ecosystems well conducive for the massive health investments, by the bilateral and multilateral and inter agency groups.

Global financial tracking systems, while, we look at the dynamics of the capital flows form the rich and first world countries, to the second and third world countries, gives a good clue, of the successful global initiatives and ventures, on global South-South and North-South scientific co-operation [4].

The bilateral, trilateral and multilateral, scientific co-operations, in the global scientific, endeavors, should ideally be well adopted by the national governments, and inter-governments, and regional countries, to ensure, the equity in resource allocation, and eliminating the disparities, across the countries, well in the globe [5].

The global forum for health research, has come out with its own, report on how to make the equitable health investments, across the globe, largely eliminating the disparities in the resource allocation. The 10/90, gap, in its, report, appreciates, the facts, that, only ten, percent of the health research investments, are made, in the countries, while, they need to address the ninety percent of the disease burden [6].

The global priorities, on the research resource allocations, largely bound by the diseases, its burden they pose to their populations, in their own countries. The pooling of the funds, and global philanthropy, is one stop, access, to the all the national and inter country research initiatives. The private philanthropy, is well active, in the knowledge industry, to cater the research needs, nationally, regionally and globally. The some of the prominent, private international philanthropies, to name a few are, well come trust, Rockefeller foundation, global Fund by the Bill and Melinda Gates

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foundation. The global fund, for the health research, is very crucial for the health infrastructure development, in the low and middle-income countries, to address the global grand challenges to ensure health security of the populations in these countries [7].

The global fund, for the malaria, HIV, and TB, from the Bill and Melinda gates, foundation, is a financial commitment by a way of philanthropy, to address the disease specific challenges in these disease groups.

Internationally, the massive scientific endeavors are equally been extensively funded, by the inter country development co-operation agencies. The major, global players to name a few, in the health research are, Swiss development co-operation agency, Japan international co-operative agency, inter-American development banks, Islamic development fund, South Asian association of

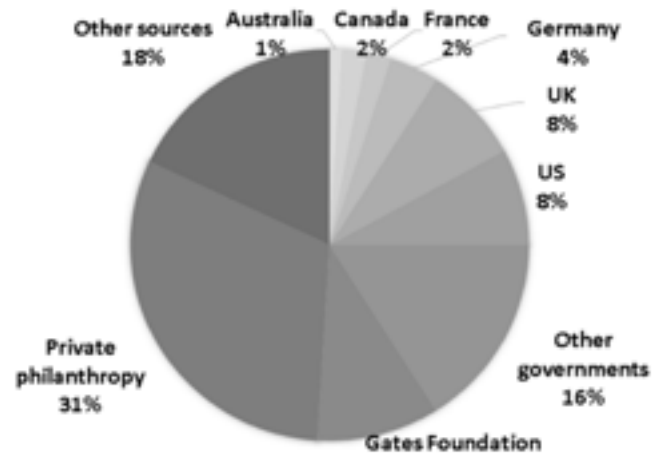
Fig. 1. Cross country comparison and, share of the global health research resource allocation in the fiscal year, for NCD containment.

regional countries, development fund, well within the SAARC region [8].

MATERIALS AND METHODS

The poverty related diseases, tropical diseases research initiatives, gains special importance, while, they have been extensively been funded, by the UN systems, by itself. The global share of the private and inter-governmental philanthropically initiatives, to address the disease burden associated, with the non-communicable and communicable diseases, are of the global concern and key predictors, to ensure the global health security across the countries.

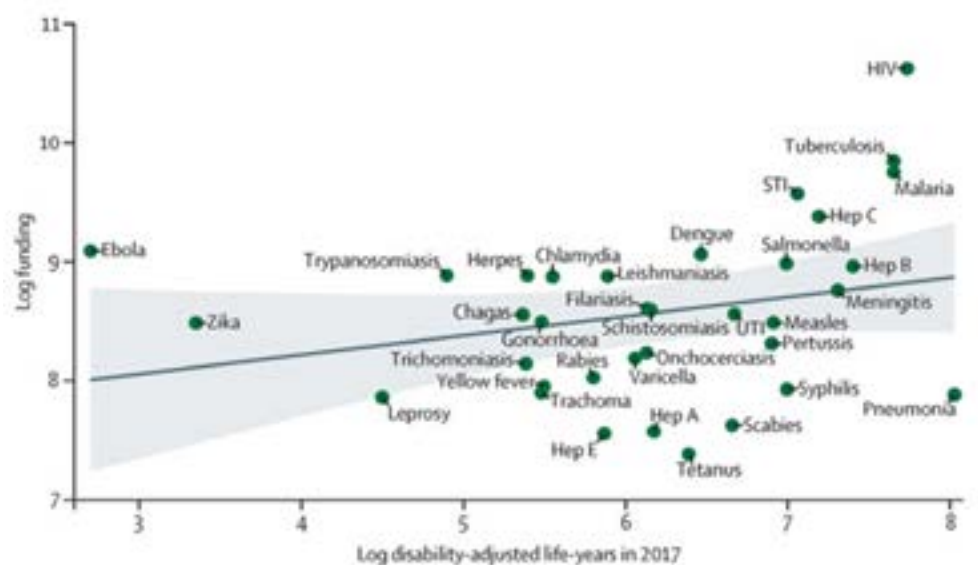
Cross country comparison and, share of the global health research resource allocation in the fiscal year, for NCD containment, 2019 (Fig. 1.) [9].



Inter-country resource allocations for health investments, for communicable diseases: The diseases specific disability adjusted

limited years, infectious diseases, and global fund allocation, in the fiscal year 2017 (Fig. 2.) [10].

Fig. 2. The diseases specific disability adjusted limited years.



The global trends in the resource allocations, are highly been bound to the contexts with which the countries are being extensively funded. The low and middle-income countries, and the health systems performance, while meeting the health care needs are of the utmost importance, while we make an attempt to support the universal health coverage in their countries [11].

The disability limited years, while we estimate the disease burden associated with the infectious diseases and non communicable diseases, can always be guiding principle, often being highly objective in making wise health investments.

RESULTS AND DISCUSSION

The financial tracking system and the country context analysis, and the disability adjusted limited years, that the massive health investments, can revert back is of utmost global health and development concern.

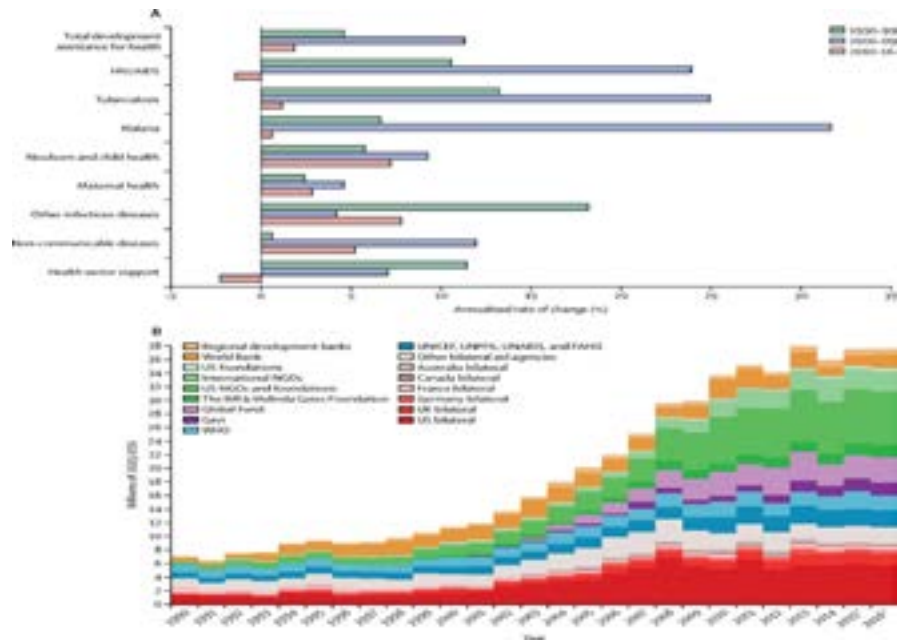
The greater emphasis, will always be given, while we optimize the research resources, and the returns of the health investments, while extensively been associated, with the disability adjusted limited years, for both the non-communicable and communicable diseases [12]. The non-communicable diseases, such as cancers,

cardiovascular diseases, stroke and mental health disorders, deserves, special attention, while thewe make crucial health investments.

Global caner control and global philanthropy: The international union for cancer control, and the international agency for the research on cancers, and other Intergovernmental agencies, are well in to global cancer control, by their innovative, global agendas, with the special emphasis on the Low, Middle Income Countries (LMICs) and least Developed Countries (LDC). The LMICs and the LDCs are highly vulnerable for the cancer development, due to the epidemiological, demographic and economic transitions, where, the global cancer burden is a global grand challenge [13].

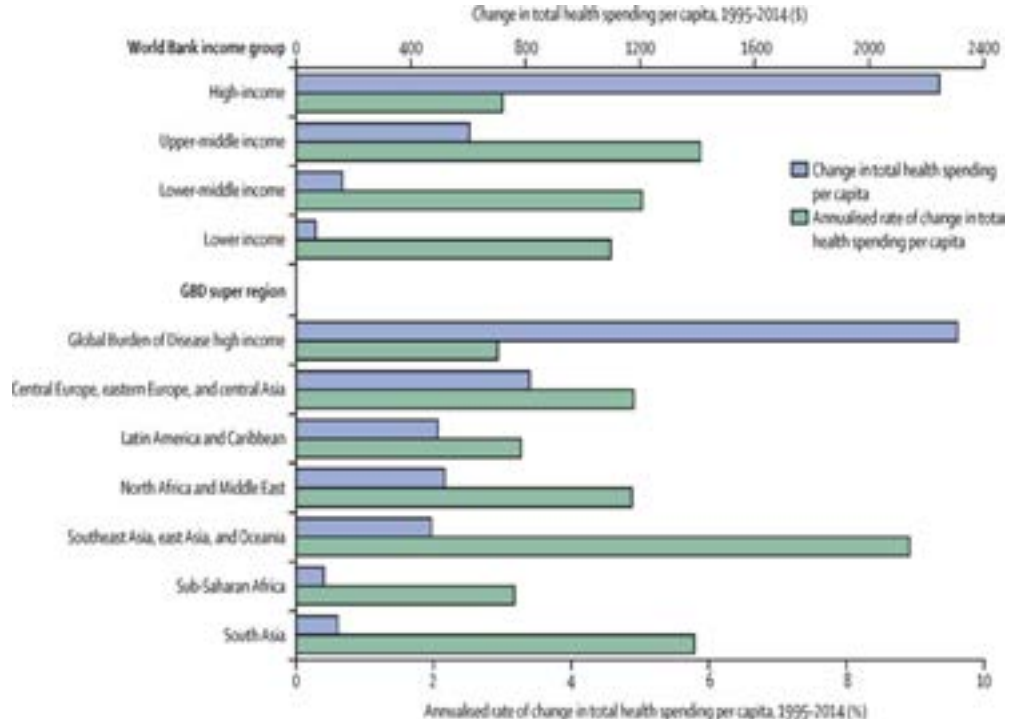
The health investments, are very crucial, to address, the challenges, while we prepare the health systems to meet the cancer care needs of the populations. The investments in the health systems is highly promising, in the LMICs and LDCs, as is the huge widow of opportunity to contain the disease burden associated with the NCDs including the cancers [14].

Fig. 3. Trend analysis of development assistance, to health, by global philanthropy:- Decadal experience (1990-2016) Regional trends in the health spending:Trend analysis, [22].



The cancers, cardiovascular diseases, mental health and stroke are largely been funded by the global philanthropy, given its

Fig. 4. Regional trends in the health spending:Trend analysis.



The commission for health research for development, COHRED, and macroeconomics for the health, are largely in to disease containment by their agendas, and strategies, well within the frame work of the international development and diseases.

The health financing system of the WHO, and the private philanthropical contributions, to the disease containment, are massive and considerable well in the era of globalization, while aligning their countries priorities to the global goals.

The global alignment of the national priorities, and fiscal considerations, are the levers for the global cancer control. The cancers attract massive share of the global philanthropy, by very nature of its magnitude of the impact, it is going to make, while bettering the lives of the people.

Trend analysis of development assistance, to health, by global philanthropy: Decadal experience (1990-2016)

The overseas, development assistance, ODA, from the Northeran countries, to the Southeran part of the world is around, (0.7) percent, as per the UN resolution which was amended, in the year 1990. The present scenario and the trends for the overseas development assistance, is escalated, to about (1.7) percent of the Gross National Income of the Northeran world to the Southeran part of the world.

The health sector is extensively been financed, in the recent decade, as mentioned in the above graph, often by the regional prioritization in the resource allocation, to address the grand challenges, in the non communicable and communicable diseases. The trend is highly promising, as the steep increase in the development assistance from mere (6), billion US dollars, in the fiscal year (1990) to the (36) billion US dollars in the fiscal year (2016), by multilaterals, and private philanthropy as well. The overseas, development assistance, ODA, from the Northeran countries, to the Southeran part of the world is around, (0.7) percent, as per the UN resolution which was amended, in the year 1990. The present scenario and the trends for the overseas development assistance, is escalated, to about (1.7) percent of the gross national Income of the Northeran world to the Southeran part of the world.

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Global cancer control and regional implications: The global cancer control is at its renaissance, given the bio- globalization, well in place across the globe. The technology transfers for the better cancer management well in the second and third world, is promising, while meeting the needs of cancer care, across the private and public sectors. The health care markets in the countries of emerging economies are well accessible for those, making the cancer care technologies, accessible and affordable, making the tertiary care inclusive in the low, middle and least developed countries.

The novel therapeutics, and the innovations, are consistently thriving, hard to prolong the life expectancies, often, by extending the cancer survival rates, particularly in these countries, which poses enumerable risks for the disease development.

The global cancer control, hypothetically, well segregated in to the, global cancer investments and financing, Flagship initiatives, for global disease burden estimation and disability adjusted limited years. The surveillance epidemiology and end results SEER, and technology transfers across the regional and global technology inclusion initiatives.

Global cancer care investments and financing: Globally, major proportion of the funds, are been, diverted, to address, the “global burden” by the federal, and private philanthropies, according to the “financial tracking system, by the global forum for philanthropy. The overseas development assistance, to the low and middle-income countries, for rejuvenating the health systems, are also made countable, to prepare the health systems for meeting the cancer care, needs in the globalized, medical care. The national governments, budgetary allocation, to the health sector, and the trends in the countries, with in South East Asia, escalating from mere, gross domestic product (4) percent, is very encouraging, and a new hope, for marginalized populations, to ensure the “Health Inclusions” through the Public and Private health sector, engagement, in the global emerging health care markets.

Global disease burden estimation and disability adjusted limited years: Global cancer control, and flagship initiatives, are well active in the inter country level capture of global cancer incidence, data by the country and inter country level initiatives such as the “cancer registries”. The most reliable indicator for the “disease burden measures” are, ideally should be “DALY’s, and all the investments, and interventions, across the globe, should be on highly objective, “global health measure” such as “disability adjusted limited years”, “years of potential life lost”.

Nor there is any scope relaying on the “proxy indicators” which most of the times are highly decisive. Global protocols for “universalizing the global health measures’ should evolve, in a big way, to optimize, and to adopt different approaches, all together, than the existing one, which lacks, rigor.

Learning to “rely on reliable” in the global health is very critical for assessing the countries, success stories, and failures, there by adopting, the “best practices” and “lessons learnt”. Though, we have, highest think tanks, to for global measures, and still, a great deal of skeptically, in their Reliance. At times they are “Too Theoretical and at times they are apparently seems to realistic” based on which, no policy or programmatic decisions can be made. The science of measurements, of disease, in conclusion, should adopt, different approaches.

The global cancer registry programs: The regional and global initiatives to estimate the trends and patterns of occurrence of the by global disease burden estimation, is one of the core mandate of the global cancer control agendas.

The cancer registries and building capacities, to capture the cancer data at the population based and hospital based, registries, is a global priority to ensure the metrics, related to cancer incidence, across the globe. The global efforts to strengthen the cancer data systems, are at its peak, building capacities, among the researchers in the laics and least developed countries, to ensure, the smooth data, transition, form the local data platforms to global data platforms.³⁰ The research councils, academics, and intergovernmental and interagency groups are made part of the initiative by building the coalition and generating the momentum for the quality cancer data across the countries.

Surveillance epidemiology and end results: The Surveillance, Epidemiology, End results, SEER, are well instituted, in laics and least developed countries, with the data triangulation and big data, by strengthening the data systems across the countries.

Global cancer screening programs: The screening of the cancers, while at their preliminary stages, is a global priority and well in the global cancer control agendas. The low and middle-income countries and the least developed countries, given its transitions, in the disease patterns, epidemiologically, epidemiological transitions, and economic transitions, urbanization, industrialization, and globalization poses, the populations to higher risks for the cancer development.

The high-risk approach and common risk factor approach, often by the targeted interventions, well in place, to mitigate the risks associated with the non-communicable diseases, including those of the cancers.

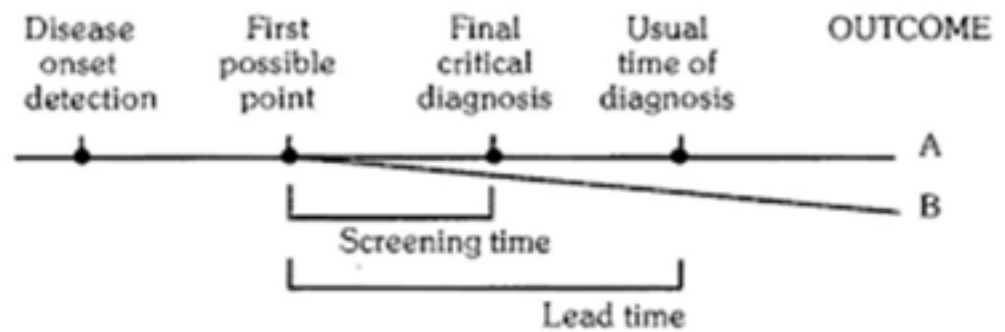
The inter-country screening programs, is a well come move, by the global cancer control agencies, for early cancer detection and

eventual prevention. The early presentation, detection and the treatment for the cancers are very crucial for the cancer's survivals and eventual aversion of the disease specific disability adjusted limited years.

The disability adjusted limited years, of the cancers, shares the major proportion of the DALYs associated with the Non communicable diseases, globally. The countries, well in OECDEs, poses, enormous risks for the cancers, well, by the change in the life styles, dietary practices, and the access to the tobacco and the alcoholic, and lack of the physical activity, as they are the best buy ins in the non-communicable diseases.

The targeted interventions, while we avert the risk factors the cancer development are highly successful. The screening programs, provides the enough lead time for the cancer development, where in interventions can well be placed, in the interim period of the early cancer detection and the active disease development. The global success of the screening programs, while they detect the cancers much early in the disease development process (**Fig. 5.**).

Fig. 5. Model for early detection programmes.



Technology transfers and Inclusions among the low, middle income and least developed countries

The global inclusivity report, insists on mainly mainstreaming, the marginalized, well in the health and development. The technological, financial, political, health inclusions are extensively been debated, in the global forums by the global institutes. The industry and innovations, while we make an attempt to equitable access to the novel technologies, should be prioritized. The technologies, should be made affordable to all strata of the populations. The technology transfers, across, the countries, are highly bound by the international regulations of the international trade and the trade related intellectual property rights.

The health technology assessment of the World Health Organization (WHO) has its own guidelines, for the country level preparedness of the health systems for the transitions in the technologies, and the suitable embedment, while they deliver the health services. The cancer technologies, are very expensive, and highly regulated. There is a greater need for the inter country level, technological harmonization, transfers and the inclusion, while we make it, affordable to the marginalized populations, while we deliver the cancer care, in the least developed countries.

Globally, the global cancer agencies have their massive initiatives, often prioritizing, and technological inclusion as part of their global agendas, to be well instituted in the global South.

The health systems in the Global south, while we evaluate for their performance, are well in addressing, the complex challenges, in the service delivery, in meeting the cancer care needs.

The cancer care needs are so complex, despite, the health infrastructure building, by extensive financing, and ensuring the technology transfers, in the least developed countries. The grand challenges, in the health systems service delivery, well in the non-communicable diseases, are well appreciated, by the global cancer communities and eventually, the flagship programs are being highly customized in these countries, to ensure the cancer care, through their global health initiatives, aligned to the national governments.

Cancer virology vaccinology and epidemiology developing country outlook: The vaccine preventable diseases, global alliance for the vaccine initiatives, World Health organizations, and other multilateral agencies, are highly committed to the bringing down the disease burden associated with the, cancers, by the massive vaccination drives and is a matter global health security. The viral associated, tumors, poses, greater, challenges, in its prevention and the management as well. The DNA and RNA virus, are highly been, proven as the global risks for the cancer development, and the potential threats to the humanity.

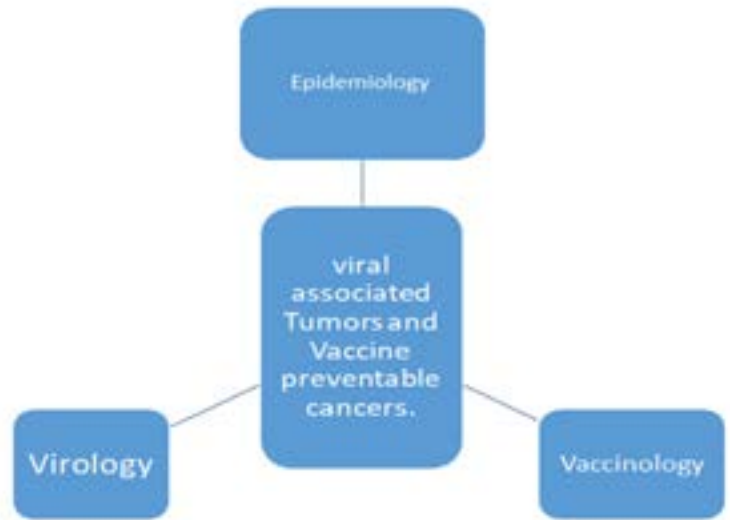
The virus such as, the Herpes simples virus group, Epstein bar virus, cytomegalo virus, and human Papilloma viruses for the greater significance, for the disease containment of the viral associated cancers. The global health institutions are extensively in to the rolling out of the vaccination programs, particularly, those of human Papilloma virus, with the sero types, 16 and 18, for the cancer cervix preventions. The single dose vaccination for the cancer cervix prevention, is a priority in the global cancer control endeavors.

The vaccine economics, and vaccine politics, are largely in to

making an access and affordability of the vaccines often eliminating the country level disparities in the vaccine access. The global initiatives, should be equitable, and highly impactful, while, they deliver the vaccines to the populations. The epidemiological

initiatives, are underway, globally, to interconnect, the virology and the vaccinology for the global good, to ensure the better health indicators, pertaining to the non communicable diseases, specifically related to those of the cancers (Fig. 6).

Fig. 6. Outlook of the global vaccinology.



The global vaccinology outlook on the development of the new vaccines, by the extensive trails among the different diseases, including cancers has been very promising in the recent decade. The massive investments on the new vaccines, while rolling out the vaccination programs has started, working out, as evidenced by the global disease burden reduction. Particularly in the cancers such as cancer cervix by human Papilloma viruses and the hepatic cancers by the Hepatitis virus groups can largely be contained by the vaccines.

the vaccination programs are 1:16 dollars. For every single dollar invested, the return of investments is (16), as according to the international vaccine institutes, technical briefs.

The global philanthropy is actively engaging themselves for the health care researchers and providers, such as industry and varsities to develop novel therapeutics, including the development of new promising vaccines across the globe, eliminating the vaccine disparities.

The global investments for the vaccination programs for the cancer disease burden reduction, are massive as evidenced by the health evidence network for investments. The returns of investment for

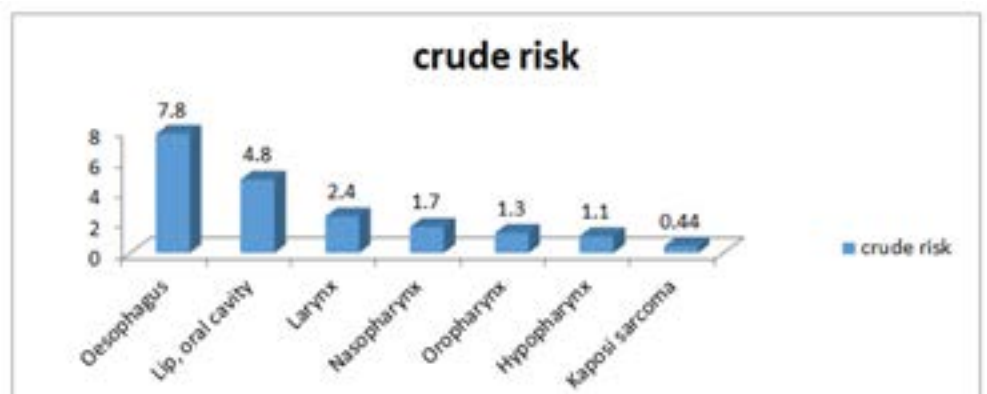
The viruses pose greater risk for the cancer cancer causation. The some of the selected virus in the Tab. 1. below are attributed to the cancer types as mentioned.

Tab. 1. The some of the selected virus are attributed to the cancer types as mentioned.

Virus type	Cancer type	Disease specific DALYs
Ebstein bar virus	Naso pharyngeal cancers	
Human immunodeficiency virus	Kaposi sarcoma	
Human papilloma virus	Head and neck cancers and cancer cervix	
Hepatitis virus group	Cancer liver	

Note: Country and disease specific, disability adjusted limited years: global health observatory, 2022

Fig. 7. Crude risks.



Cumulative risks and cancer type's insights

The Fig. 7. shows cumulative risks and cancer type's insights. **Global model for vaccine preventable cancers: An integrated approach, developing country perspectives.**

The only cost-effective interventions, in the world, for the infectious diseases, is vaccine interventions, with the good returns of 16 dollars, for a dollar invested, in the vaccine development, rolling out and vaccine evaluations, across the globe.

The cancers are not an exception, since, proving the “casual association” of major cancers well in the region of head and neck, which stands, sixth among the cancer incidence, well, among global cancer burden, and cervix, for human Papilloma virus, stain 16 and 18, among other strains. The globe, intensified, the “vaccine trails” for the head and neck cancers and the cancer cervix and proved, the “vaccine efficacy levels” to formalize, the “global strategies for the cancer control, often embedding the “HPV vaccines” as a global cancer control priorities.

Recent, inventions in the Hepatitis C, virus, which is awarded, Nobel prize, for physiology and medicine, has opened up, new frontiers for global cancer control, particularly in the “molecular oncology” of hepatocellular carcinoma.

The livery and biliary cancers, form the major proportion, often with the grave prognosis. The second and third world, given, its geo-political, socio-economical context, is at jeopardy, national governments, initiates, to ensure, social security for their citizens, and more likely, the cancer victims, are pushed to devastation, by the very catastrophic nature of the terminal illness, among these major, cancer groups, with the massive “health shocks” and eventually “poverty shocks” as well.

The global integrated model for the “Vaccine Initiatives” for cancers, should be an “umbrella approach”, particularly in developing world, where, vaccine economics, vaccine politics, vaccine disparities, with the poor vaccination coverages, well in these countries, are the major bottle necks, given its “poor governance” by the national governments.

The coalitions, such as “global alliance for vaccine initiative, international AIDS Vaccine initiative, WHO's vaccine, biological and chemicals, expert group, along with the major key players

Fig. 8. Global status of HPV vaccine introduction, in member countries: World bank.



The global status of the rolling out HPV vaccination programs, for containing the global cervical cancer burden, is as illustrated in the map above. With the special consideration, regionally, given its, demographic and epidemiological transitions, it quite convincing, targeting, the younger age group (9-14) year, well among girls. The population pyramid of India, has widened the space for the “health intervention” in teens and the mid age group.

in the global vaccinology, such as, think tanks from academia, humanitarian agencies, and other interagency groups, which are working, intensively, making the “vaccines, as window of opportunity” to contain, the major, vaccine preventable diseases, including those of the cancers.

Global pharmaceutical giants, through their, innovative, research and developments, has contributed, enormously to the global turn moil, by the infectious diseases. The recent, m-RNA vaccines, which are very novel, by itself, is a classic initiative, which often, endorsed by global health agencies, including, World Health Organization.

“cancer vaccine initiatives” should be a global flagship initiative, often by disease specific, in nature, providing, the common vaccine platforms, in all the frontiers of vaccinology, such as, tumor virology, cancer immunology, cancer epidemiology, cancer genetics, cancer biology, cancer bio-technology, cancer bio-informatics, protein biology to name a few, to have, a fair, exchange of ideas, across, being, translational and transformative, in the science of vaccinology.

There is a greater need, to re-think, to re-design the very, global vaccination, schedules, often, embedding, suitably, the emerging and re-emerging infectious diseases, in the era of global transitions. The global vaccination protocols, should suitably accommodate, new viruses, in its global protocols for immunization, making, “cancers of viral origins”, a very strong problem statement, in the global forums, demanding collective global actions, to bring down the global cancer burden.

Global status of HPV vaccination, for cancer cervix and head and neck cancers: Global cancer control in LMICs

There are about more than, 40 strains of HPV, well in existence, few at, its, highest, cancer-causing potential, few are at its, dormancy. The HPV stains, 16 and 18, have proven, “biological risks” for the cancer cervix and head and neck region. The strains HPV 35 and 39 are under constant, scrutiny, for its potential “risks associated with the cancer causations. Epidemiologists, are very keen to explore, the possibilities, that, these strains, can pose a great deal “risk”, often by exploration. It is not just because, stains, 35 and 39, has proven plausibility, but it is out of curiosity, one can be, all the time in to “discovery research” experimenting with the, new strains, for association with the cancer causation, adopting, hybrid, infectious disease modeling, in cancer research.

The country, context analysis for India, reveals, India is best prepared, geo-politically, socioeconomically and epidemiologically, to tackle, the surge in the incidence of the cancer cervix. Though national governments has realized, the fact, the human papilloma virus should be brought, well within the routine, immunization schedules of the country, rolling out the HPV vaccination, at the country level, apparently seems to be delayed act, on part of the health ministry.

The ministry, is well prepared to introduce, the HPV vaccination, from the fiscal year, (2023), in phased manner. The first phase, is being focused on the seven states, Himachal, in the Northern India, and Tamil Nādu in the deep south. In second phase, the other states, and the Union territories, are of high focus, and extending it to the phase three in the year (2025). It is expected, that about (68.1) million will be vaccinated at the end of the tenure vaccination years, (2025). And another (112. 3) million is the target of the country level vaccination programs. Cancers needs “big money”, to meet the cancer care needs, both by the “care providers” and also “cancer care seekers” in countries with emerging and poorly performing economies, and vaccination nationwide drives are very expensive on part of the national governments.

CONCLUSION

The good proportionate, share, in cancer care provisions, among the public and private sector health care provides, though is well documented, private sector’s initiative, to the marginalized population, is a challenging, even today. It is not an easy task, to be well in to ensuring the “cancer care facilities” making access to the cancer care, and is highly “financially demanding”. Strategically, the “enterpriser ship” in cancer care, as a stat-up, suffers at its, inception, and “sustainability” is always at its stake. Global philanthropies, or national, should at its reach, in otherwise, in its, uncertainties. Cancer undoubtedly attracts, a “big money”, and it’s obvious, that, “equitable service delivery” is one of the global cancer control priorities, and “technology transfers” is yet another across the cross borders.

The cancer research, across, fundamental, clinical, translational and epidemiological, needs to be suitably integrated, to, carry forward, the global cancer control agendas, to be implemented. Optimization, is very essential, it is not always, the research, but also the “service delivery”, if it is “hybrid”, it is even more impactful. Synergies, across, the research, service delivery, global funds, either by the private philanthropies, or federal governments, is expected, to design the “next generation translational cancer research”, models, through global health initiatives. The global scientific, technological, economic and political co-operation, through the triangulation, leverages, the, cancer care outreach, to multiple folds, ensuring an inclusion, and attaining an equity. Global philanthropy forums, are open, to, researchers, clinicians, and change makers, to optimize, catalyze, and galvanize, to “generate movement” often building, coalitions. The global divide, for health research, investments, particularly for the “non-communicable diseases” is huge. The very few, countries, are being, funded, or under funded, to address, the very high, cancer burden, in country capacities. Few are over funded, with the modest cancer burden among their countries.

The private philanthropies, such as “Bill and Malinda gate foundations, Rockefeller foundation, welcome trust, research triangle international institute, and developmental co-operatives, such as to name a few, Swiss development co-operation, Japan international co-operation agency, and international, inter-governmental, international, non-governmental organizations, collectively, works for, infectious diseases, immunization, education and cancers as well.

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