
University of Miami
Medical Campus
NW 14th St
2D
ATM
23°

What is Global Oncology?

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In Adults in the US

In Men cancer death rates have dropped 21%

In Women 12%

Overall 2/3 of patients live for 5 years or longer compared to less than 50% several decades ago

American Cancer Society 2009-2012

Photo Credit: G Lopes, Chicago 2013

For those of us who treat patients in low and middle income countries most of these advances are an inspiration and represent hope for the future...

...but not our current reality

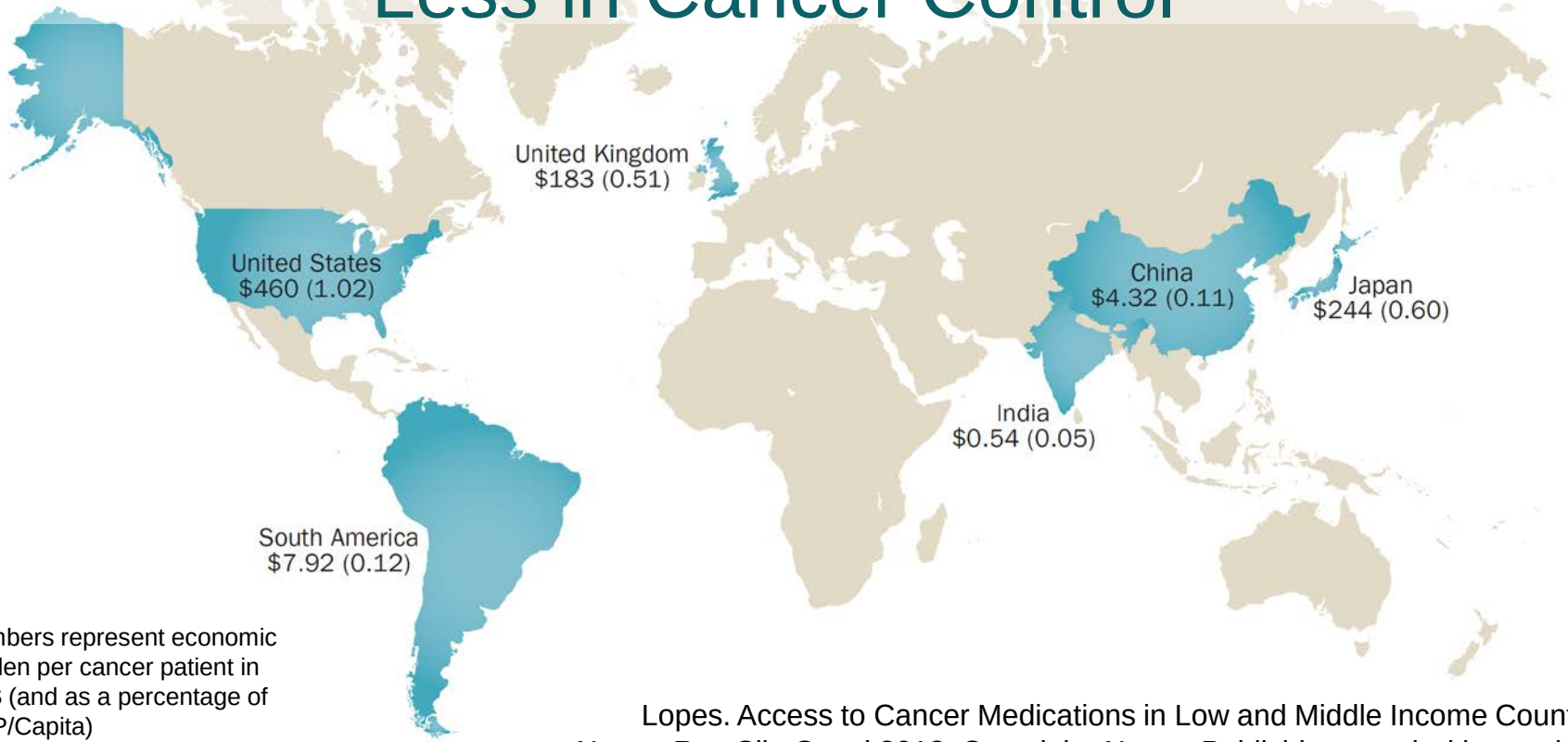
Cancer mortality to incidence ratios

USA	Europe	LMICs
0.36	0.48	0.68

Lopes [Senior Author]: Global Health Equity: Cancer Care Outcomes Disparities in High, Middle and Low Income Countries. J Clin Oncol special issue on Global Oncology.
Based on Data from GLOBOCAN

Photo Credit: G Lopes, Copacabana Beach, Rio de Janeiro 2013

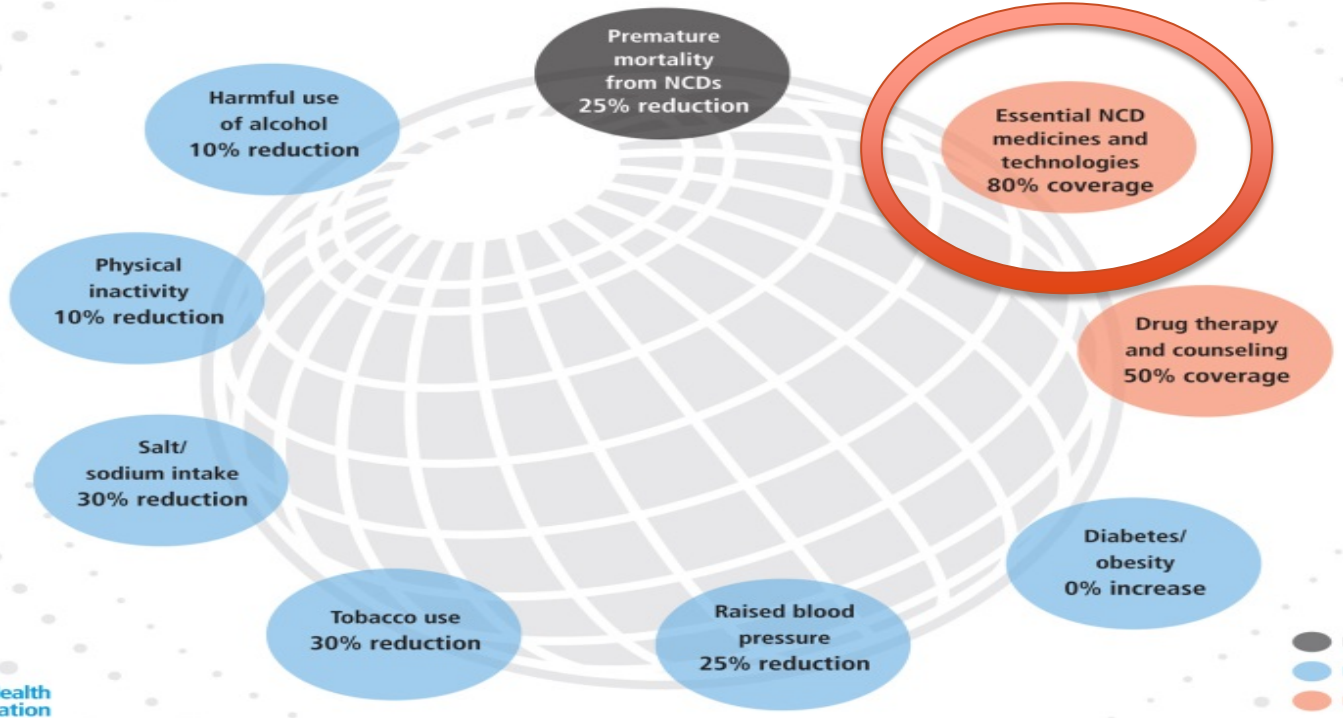
Low and Middle Income Countries Spend Less in Cancer Control



Numbers represent economic burden per cancer patient in US$ (and as a percentage of GDP/Capita)

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013. Copyright: Nature Publishing, used with permission

Set of 9 voluntary global NCD targets for 2025



World Health Organization

"What gets measured, gets done"
WHO DG, Margaret Chan

UICC Task Team

The UICC-convened task force was charged with creating a new framework for evaluation of drugs for inclusion in the WHO Essentials Medicines List

Members of the Task team include:

DFCI, UICC, ASCO, NCCN International, NCI, ESMO - working in collaboration with the WHO EML Secretariat

For a detailed account of the process, email me at glopes.md@gmail.com for a copy of our JCO article on the WHO Essential Medicines List

BHGI-Like Approach: Metastatic Colon Cancer

Level	Drugs	ICER US$
Basic	BSC Alone	
Limited	5FU Alone	450
Enhanced	+ Oxaliplatin, Irinotecan	44,500
Maximal	+ Cetuximab/Panitumumab, Bevacizumab	80,000

Source: **Management of colon cancer: resource-stratified guidelines from the Asian Oncology Summit 2012.** *Lopes [Senior Author] in Ku et al, Lancet Oncology* **Vol 13 November 2012**

16 Were Approved

"Following a review requested by the previous Expert Committee in 2013, the Committee recommended the addition of 16 new medicines and endorsed the use of 30 medicines listed currently as part of proven clinically effective treatment regimens. These medicines will be included on the complementary list of the EML for the treatment of specific cancers. The Committee recommended that the Model Lists should specify the cancers for which use of each medicine is recommended."

WHO, May 2015

High Cost Medications

Including:

- Imatinib for CML and GIST
- Trastuzumab for early and advanced HER2 Breast Cancer
- Rituximab for lymphomas

The 6 That Were Not

Nilotinib and Dasatinib for CML

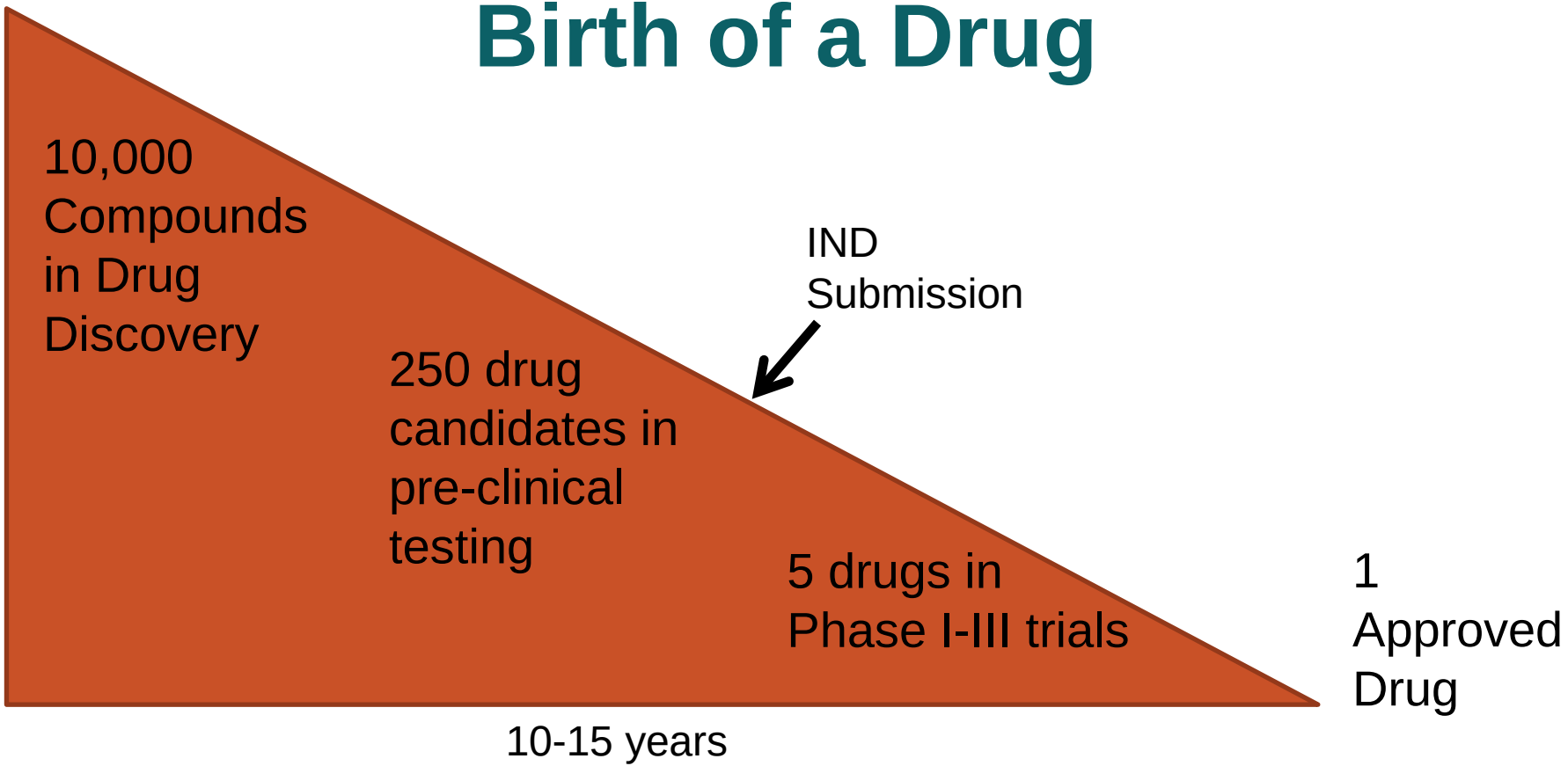
Arsenic Trioxide for APL

Gefitinib and Erlotinib for EGFR mutated NSCLC

Diethylstilbestrol for prostate cancer

Photo Credit: G Lopes, Garden @ WHO, 2015

Birth of a Drug



Lopes, Nature Reviews 2013; Munos, Nat Rev Drug Disc 2009; Pammolli, Nat Rev Drug Disc 2011

The Cost of Developing New Drugs Has Escalated

US$ 2.6 billion
2015

US$ 802 Million
2000

US$ 318 Million
1987

US$ 138 Million
1975

Lopes, Nature Reviews 2013; DiMasi , J Health Econ 2003 and press release from the Tufts group in 2015

How to Improve Cost Effectiveness?

Decreasing Cost and Increasing Value of Cancer Medications

Making Treatment and Drug Development Cheaper and More Effective Using Biomarkers

Using Generics, Biosimilars, Price Discrimination and Access programs

Biomarkers Improve Cost-Effectiveness

Sorafenib in HCC (No biomarker):	1.6 LY at a Cost of US$ 80k/LY
Trastuzumab (Her2Neu):	1.44 QALY at US$ 19 k/QALY and generates societal income in the adjuvant setting
Oncotype Dx in Adjuvant Breast:	Generates Cost Savings
EGFR Mutation Testing and EGFR TKI:	Generates Cost Savings

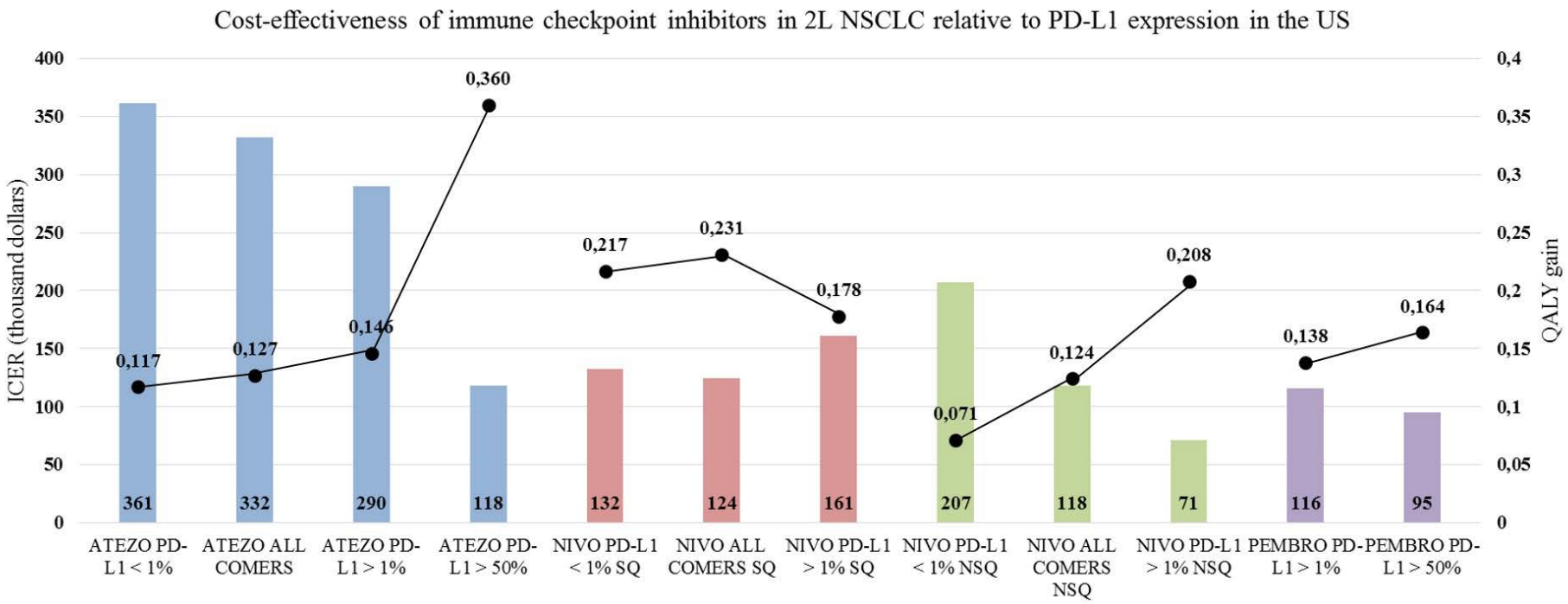
Lopes, JCO 2007, ASCO GI 2009, BMC Cancer 2010, ASCO and WCLC 2011, Cancer 2012

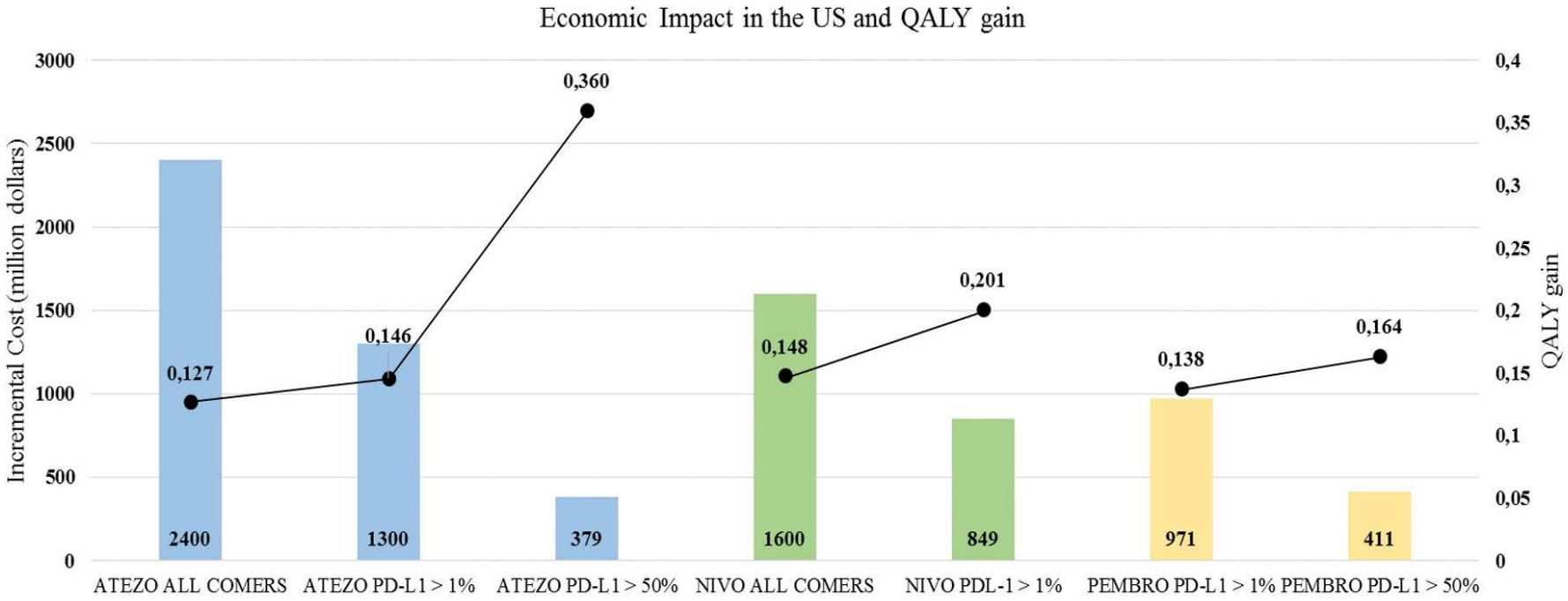
IASLC
International Association for the Study of Lung Cancer
IASLC 17TH WORLD CONFERENCE ON LUNG CANCER
WWW.IASLC.ORG DECEMBER 4–7, 2016 VIENNA, AUSTRIA

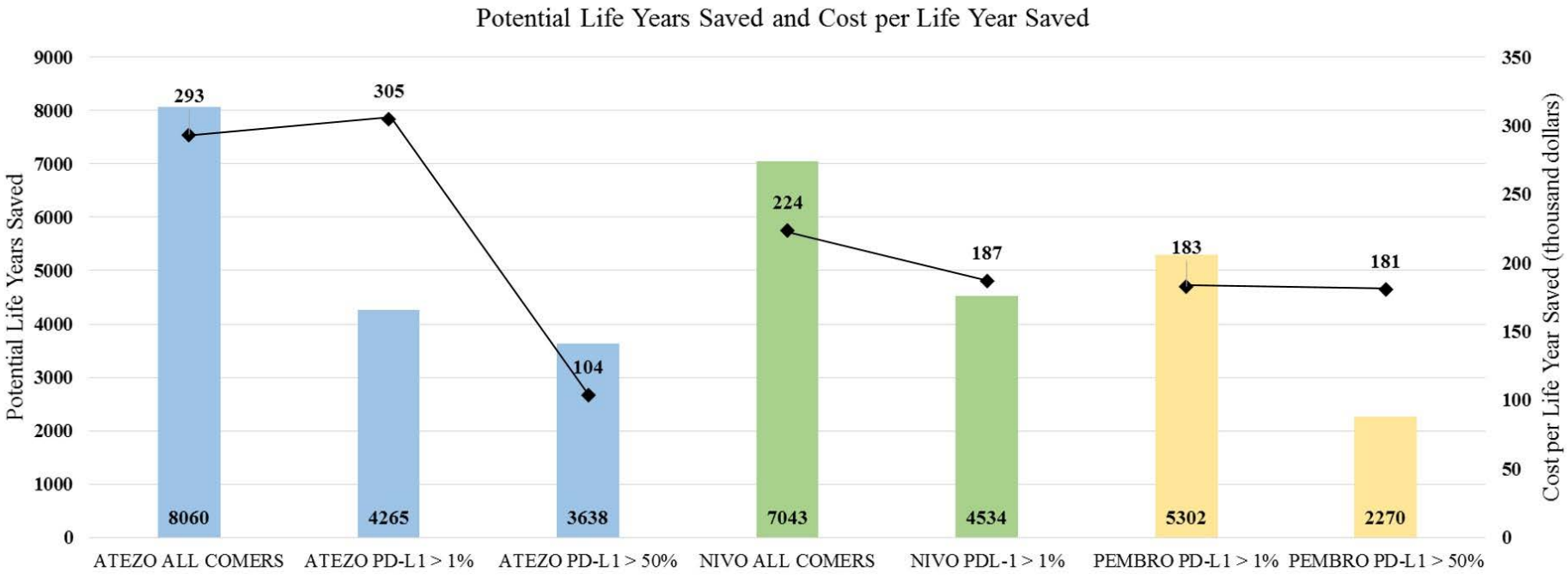
Estimate of Economic Impact of Immune Checkpoint Inhibitors for NSCLC Relative to PD-L1 Expression in the US

Pedro Aguiar Jr[1], Ramon De Mello[2], Hakaru Tadokoro[1], Ilka Santoro[1], Hani Babiker[3], Kiran Avancha[3], Barbara Gutierres[4], Carmelia Barreto[1], Gilberto Lopes[5]

1 Universidade Federal de São Paulo, São Paulo/Brazil, 2 Universidade do Algarve, Faro/Portugal, 3 Honor Health, Scottsdale, AZ/United States of America, 4 Universidade Paulista, São Paulo/Brazil, 5 Sylvester Comprehensive Cancer Center at the University of Miami


Cost-effectiveness of immune checkpoint inhibitors in 2L NSCLC relative to PD-L1 expression in the US
ICER (thousand dollars)
QALY gain
400
350
300
250
200
150
100
50
0
0,4
0,35
0,3
0,25
0,2
0,15
0,1
0,05
0
0,117
0,127
0,146
0,360
0,217
0,231
0,178
0,071
0,124
0,208
0,138
0,164
361
332
290
118
132
124
161
207
118
71
116
95
ATEZO PD-L1 < 1%
ATEZO ALL COMERS
ATEZO PD-L1 > 1%
ATEZO PD-L1 > 50%
NIVO PD-L1 < 1% SQ
NIVO ALL COMERS SQ
NIVO PD-L1 > 1% SQ
NIVO PD-L1 < 1% NSQ
NIVO ALL COMERS NSQ
NIVO PD-L1 > 1% NSQ
PEMBRO PD-L1 > 1%
PEMBRO PD-L1 > 50%


Economic Impact in the US and QALY gain
Incremental Cost (million dollars)
QALY gain
3000
2500
2000
1500
1000
500
0
0,4
0,35
0,3
0,25
0,2
0,15
0,1
0,05
0
0,127
0,146
0,360
0,148
0,201
0,138
0,164
2400
1300
379
1600
849
971
411
ATEZO ALL COMERS
ATEZO PD-L1 > 1%
ATEZO PD-L1 > 50%
NIVO ALL COMERS
NIVO PDL-1 > 1%
PEMBRO PD-L1 > 1%
PEMBRO PD-L1 > 50%


Potential Life Years Saved and Cost per Life Year Saved
Potential Life Years Saved
Cost per Life Year Saved (thousand dollars)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
350
300
250
200
150
100
50
0
293
305
104
224
187
183
181
8060
4265
3638
7043
4534
5302
2270
ATEZO ALL COMERS
ATEZO PD-L1 > 1%
ATEZO PD-L1 > 50%
NIVO ALL COMERS
NIVO PDL-1 > 1%
PEMBRO PD-L1 > 1%
PEMBRO PD-L1 > 50%

Biomarkers Decrease Clinical Trial Risk and Cost of Drug Development

In Breast Cancer, the use of Her2 increases the rate of success by 50% and decreases cost by 30%

In Lung Cancer, the use of biomarkers increases trial success rates from 11 to 60% and decreases development cost by 27%

Parker, Lopes et al, Breast Cancer Res Treat 2012

Falconi, Lopes et al, ASCO 2013, WCLC 2013, JTO 2014

REVIEWS

Access to cancer medications in low- and middle-income countries

Gilberto de Lima Lopes Jr, Jonas A. de Souza and Carlos Barrios

Abstract | Major breakthroughs have been realized in controlling cancer in the past five decades. However, for patients in low- and middle-income countries (LMICs), many of these advances are nothing but an aspiration and hope for the future. Indeed, the greatest challenge we face in oncology today is how to reconcile small, incremental and significant improvements in the management of cancer with the exponentially increasing costs of new treatments. Emerging economies are attempting to address this important issue of access to cancer medications. In this Review, we examine how LMICs are using generic and biosimilar drugs, expanding participation in clinical trials, implementing universal health-care schemes to pool resources, and using compulsory licensing schemes as well as increasing multiple-stakeholder public–private partnerships to increase access to cancer medications for their citizens. Any truly effective programme will require multiple stakeholder involvement—including governments, industry and civil society—to address the issue of access to medication. Only with the creation of a global entity to fight cancer that is supported by a global fund—for example, in the mould of the GAVI alliance and the International Finance Facility for Immunization—will we truly be able to improve cancer care in LMICs and drive down the high mortality rates in these regions.

Lopes, G. L. Jr *et al. Nat. Rev. Clin. Oncol.* **10**, 314–322 (2013); published online 9 April 2013; doi:10.1038/nrclinonc.2013.55

Table 1 | Improving access to cancer medications in LMICs

Initiative	Description	Benefits	Challenges
Access to care			
Universal health-care coverage	The provision of insurance coverage for the whole population of a country or region	Pooling of resources Financial protection	Financing through taxation or contribution in areas with low resources Rising health-care costs and expenditures once enacted Lawsuits against the state or government when drugs are not supplied
Generic drugs and biosimilars	Pharmaceutical products that are produced without a license once the patent or exclusive rights expire	Lower cost of drugs through increased competition Increased access	Public and health-care worker perception on quality Regulatory pathways for biosimilars are still uncertain in many jurisdictions
Compulsory licensing	WTO Trade-Related Aspects of Intellectual Property Rights agreement permits governments to issue compulsory licenses on the grounds of public interest, without the consent of a patent holder, to permit the production of generic medications while intellectual property rights remain in effect	Early introduction of generic drug competition	Might lead to trade sanctions and decreased incentives for innovation
Research			
Participation in clinical trials and research	Participation in industry-funded, government-funded or otherwise-funded clinical studies	Access to standard and research medications and treatments that might not be widely available because of high cost	Ethical issues include the adequacy of informed consent, independent review and oversight, ethnic differences and conflicts of interest
Drug development in emerging markets	Pharmaceutical development of agents for exclusive use in LMICs	Lower cost of development might lead to cheaper medications and increased access	Regulatory scrutiny seems less rigorous Efficacy and safety issues
New payment methods			
Price discrimination	Practice of charging different prices for the same product in different markets based on the ability to pay and elasticity of demand	Companies expand the number of customers who are able to afford its products Successful distribution of medications in the developing world	Parallel imports can lead to decreased profits in higher paying markets, political backlash because of lower prices in other jurisdictions and perceived inequity
Access programmes	Industry-led price discrimination in the form of rebates or discounts or in extra products	Companies expand the number of customers who are able to afford its products	Parallel importing
Risk-sharing agreements	Payment method in which the provider company only gets paid if certain conditions are met	Decreases overall costs as no payment is made for patients who do not benefit from drug	Complexity, lack of consensus on adequate surrogate end point and definition of benefit
Cooperation among stakeholders			
Health technology assessments	The use of formal economic techniques to assess the cost-effectiveness of health care Set insurance coverage and product pricing based on clinical and economic value	Pricing process for a new medications is objective and attuned to its clinical and economic benefit	Complexity, lack of agreement for universal willingness-to-pay threshold
Public–private partnerships and philanthropy	Schemes that are funded and operated through a combination of government and private entities and charities	Multiple stakeholder involvement and sources of finance	Often haphazard, leading to wasted efforts Sometimes unsustainable in the long term

Abbreviations: LMICs, low- and middle-income countries; WTO, World Trade Organization.

How to Increase Access

Most Important and Effective Options:

- Quality generics and biosimilars (and Compulsory Licensing?)
- Price Discrimination, aka, Affordable Pricing
- Adequate Healthcare Funding:
  - Universal Coverage
  - Value-Based Insurance Design
  - PPP - Global Fund to fight cancer in LMIC

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013

Generics

Generic medicines account for 69% of all prescriptions dispensed in the United States, yet only 16% of all dollars spent on prescriptions. (source: IMS Health)

Cost of Medication my drop by 80% after introduction of a generic

In the US the use of generics has saved greater than US$ 734 billion over a decade

Potential Savings with Generics in Low and Middle Income Countries Are Significant

- Generic substitution for four commonly used drugs can amount to savings in excess of US$800 million in India every year
- In one small retrospective study and one small prospective registry, efficacy and safety of commonly used drugs was equivalent with generic or originator drug in India

Lopes G and colleagues. Ann Oncol 2013 and IJMPO 2017

Generics and Biosimilars: Challenges

Patient and Health Care Workers Perception

Quality Issues

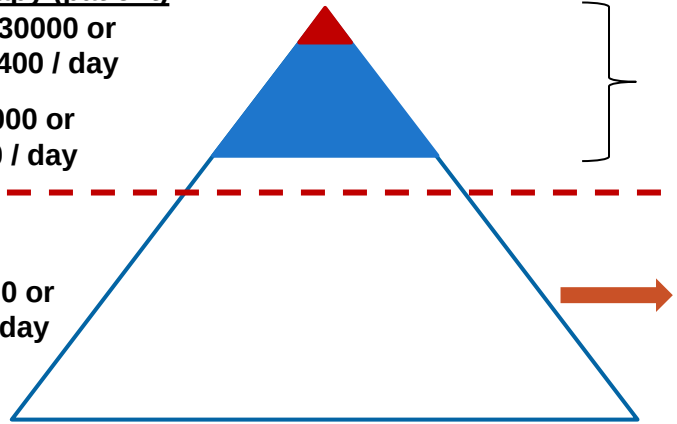
Except for growth factors such as G-CSF and EPO only India has had significant experience with Biosimilars in Oncology

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013
Chopra and Lopes, Journal of Global Oncology, in press 2017

CAN WE GET BIOSIMILARS FOR US$ 1 a day?

Manufacturing Costs		**Annual Cost of Therapy (patient)**
>$1000 /gram	Existing Innovative Products	**> $ 30000 or > $ 400 / day**
$ 500-$1000 /gram	Indian Players	**$ 7000 or $ 20 / day**
< $100 /gram	**ONE NEW player in the market!**	**$ 1200 or $ 3 / day**

Patient Access



Therapy yet to reach affordable / accessible rates

NOT TARGETED UNTIL RECENTLY
A "NEED GAP" THAT WILL BE EXPLOITED IN THE NEXT FEW YEARS

Compulsory Licensing

- WTO – TRIPS Agreement went into effect in January 1995
- Allows countries to produce/import generics while medications are still protected by patent on grounds of public interest
- Widely used for AIDS medications
- Occasionally used for cancer medications
- The US threatened its use to create stockpiles of ciprofloxacin during Anthrax scare

Lopes. ASCO Connection 2014 and Journal of Global Oncology 2016.
Compulsory Licensing: A Double Edged Sword in the fight for access to cancer medications in low- and middle-income countries.

Compulsory Licensing in Oncology

Thailand in 2008

Docetaxel, Letrozole, Erlotinib, [Imatinib]

Savings in excess of US$ 140 million

India in 2012

Sorafenib

Lopes. ASCO Connection 2014 and Journal of Global Oncology 2016.
Compulsory Licensing: A Double Edged Sword in the fight for access to cancer medications in low- and middle-income countries.

Compulsory Licensing: Challenges

Decrease in investment

- In Egypt, Pfizer pulled out of a new planned factory when the country issued a compulsory license for Sildenafil

Office of the US Trade Representative withdrew duty-free status of three Thai products

Lopes. ASCO Connection 2014 and Journal of Global Oncology 2016.
Compulsory Licensing: A Double Edged Sword in the fight for access to cancer medications in low- and middle-income countries.

Price Discrimination [including Access Programs]

Important concept in Economics and Business

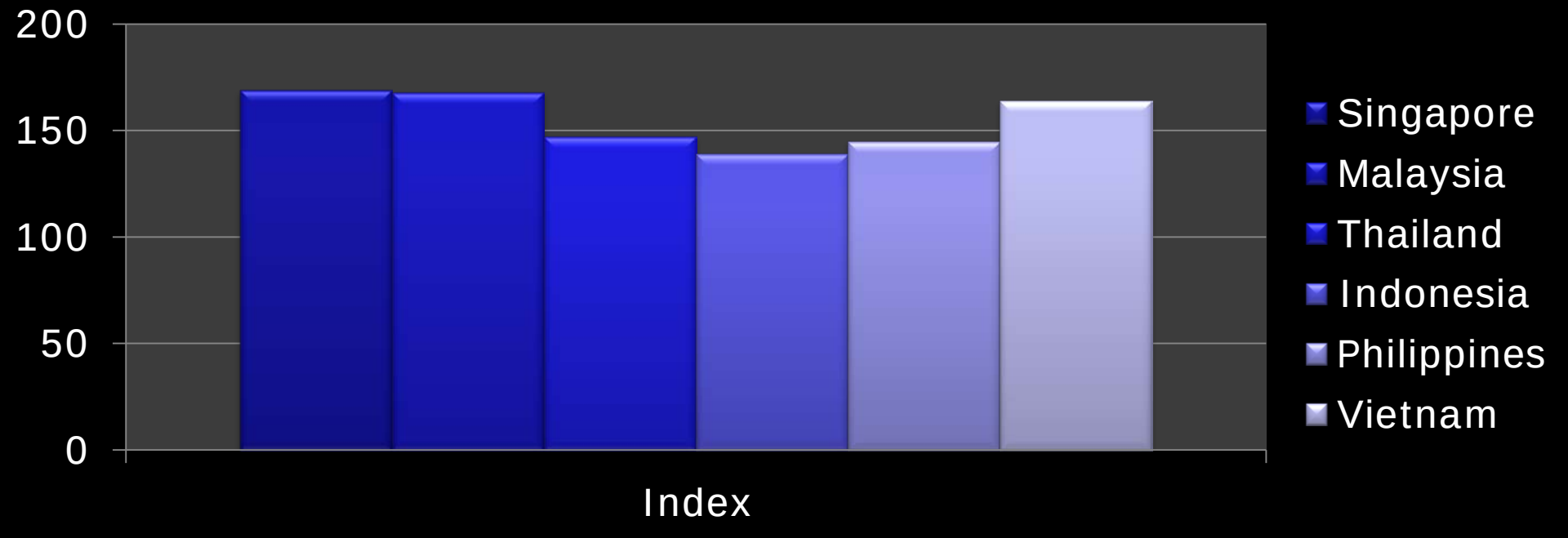
Companies charge different prices in different markets or segments, increasing number of consumers able to afford a product or service

Widely used outside of health care [Think of discounts and rebates in electronics, for instance]

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013

Price Discrimination

IMS data: Little Variation in Average Unit Price (USD)
per Country for all drugs combined [Lopes, 2011]



Price Discrimination [including Access Programs]

Many pilot projects have led to an increase in access and, in some cases, revenue

Some companies now have specific policies to provide medications at a different cost in low and middle income countries [GSK in all emerging markets, ROCHE in India]

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013

Price Discrimination: Challenges

Parallel Imports

Political Backlash in higher income countries, especially in times of economic difficulties

Lower prices might still not be low enough in the absence of Universal Coverage and Economic Development

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013

Public Private Partnerships: The GAVI Alliance and The International Finance Facility for Immunization

The global alliance for vaccines and immunization receives funding from donors such as the Bill and Melinda Gates foundation and the World Bank combined with technical assistance from the WHO and UNICEF

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013

GAVI and IFFI

Additional 325 million children immunized

5.5 million premature deaths averted

In cancer prevention, GAVI has created a market for low cost interventions and has helped decrease the cost of each dose of hepatitis B vaccine to US$0.50 and of HPV vaccine to US$5

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013

Proposal:
A Global Fund and Alliance to Fight Cancer in LMIC

A Global Fund to Fight Cancer would—through engagement, goal setting and multiple-stakeholder involvement—provide recipient countries with incentives to create and develop their health and human capital infrastructures with adequate technical support.

Lopes. Access to Cancer Medications in Low and Middle Income Countries. Nature Rev Clin Oncol 2013

World Health Organization

WHO list of priority medical devices for cancer management

WHO Medical device technical series

https://www.asco.org/international-programs

ASCO International Year in Review for 2016

Jan 06, 2017

By Doug Pyle, Vice President, ASCO International Affairs
Megan Kremzier, Evaluations Coordinator, ASCO International Affairs
Sarah Bachmann, Program Coordinator, ASCO International Affairs

On World Cancer Day 2013, ASCO launched ASCO International and a four-year plan to double ASCO's international programs. Four years later, thanks to the hard work of many, we have accomplished all we said we would (and more), and plans for further expansion are in the works. As we prepare for World Cancer Day 2017 on February 4, I would like to take some time to review what we accomplished in 2016.

Before I do, I would like to thank the many ASCO member volunteers, ASCO staff, and many organizations around the world, without whom none of these accomplishments would be possible.

Our Mission

ASCO International is designed to harness ASCO's core strengths in education and oncology practice to deliver programs with impact in the following areas:

1. **Improving quality of care**—working with organizations and hospitals to extend oncology skills and knowledge
2. **Accelerating innovation and research**—deepening the skills of investigators, particularly in low- to middle-income countries
3. **Supporting professional development**—mentoring future leaders in oncology and providing career development for early-career oncologists in low- to middle-income countries

Members of the International Affairs Committee and ASCO staff pictured at the committee's meeting in September 2016.

Faculty and organizers of the Cancer Control in Primary Care Course in Brazil

RECENT ARTICLES

ASCO International Programs Play Valuable Role in Development of Cancer Care in Nepal

ASCO International Clinical Trial Workshops (ICTWs)—An Experience From Istanbul

ASCO Initiatives Bring Global Oncology Front and Center

New Edition of ESMO/ASCO Global Curriculum in Medical Oncology Sets Standards for Modern Training

JGO Articles Cover First International QOPI-Certified Practice, QOPI Impact on Oncology Training in Brazil

https://connection.asco.org/magazine/asco-international/asco-international-year-review-2016

ASCO Initiatives Bring Global Oncology to Front and Center Stage

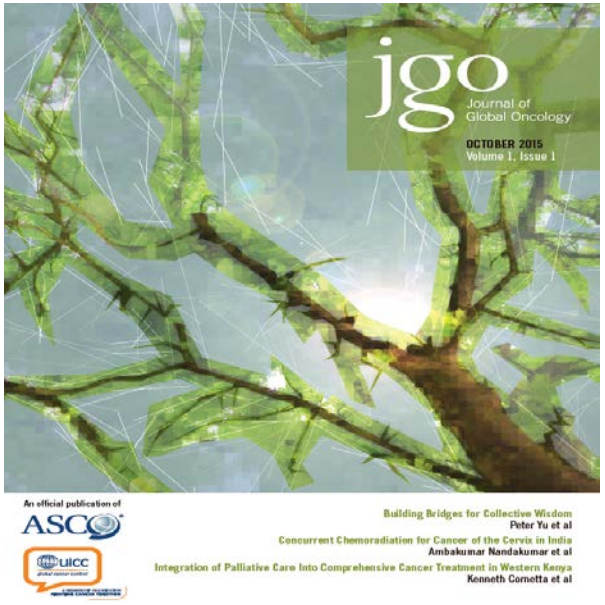
International Perspectives

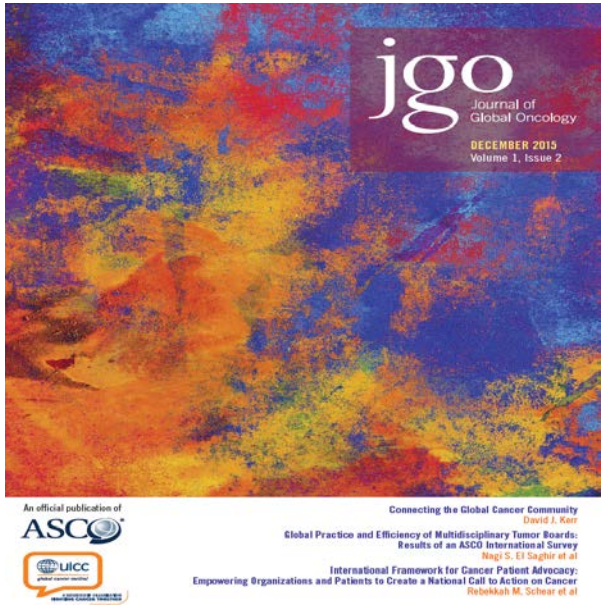
Apr 11, 2016

Simultaneous activities undertaken by the Society at the recommendation of the Task Force include:

1. The development of management guidelines that include resource stratification;
2. A focus on professional development for clinicians, including oncology professionals, general practitioners, and mid-level providers. Emphasis was placed on leadership development and continuation of successful ASCO programs such as the International Development and Education Award (IDEA) and the Leadership Development Program (LDP).
3. Continued emphasis on quality improvement through education and the development of tools to drive such improvement: the Quality Oncology Practice Initiative and the International Cancer Corps Program.
4. Following the example of the successful collaboration between ASCO and the College of American Pathologists for quality improvement in the determination of hormone receptor and HER2 status, a joint effort is ongoing as a demonstration project to improve and harmonize the training of pathologists in four limited-resource countries.

Journal of Global Oncology





JGO Fellows

- Formal training program on good publication practice to build author capacity in LMICs
  - Two fellows selected every year; application process
  - Mentorship and online training (ASCO Univ)
  - Review papers
  - Attend JGO meetings at 2016 AM
  - Demonstrate ongoing dissemination of knowledge

Photo Credit: G Lopes, Kolkata, India, 2013

What we saw today

Cancer is a major global health care issue

Global oncology addresses biological differences and disparities in cancer prevention, care, research, education and the disease's social and human impact around the world.

What we saw today

Practitioners and researchers in the area are called upon to evaluate and develop strategies and actions to diminish the cancer burden through the promotion of awareness, public and professional education, implementation research, primary prevention, early detection with prompt and accurate diagnosis and multidisciplinary treatment, as well as palliative care, all in the most efficient manner, spending as little as possible.

Thank You!

Strive not to be a success,

but rather to be of value.

Albert Einstein

Thank You!

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