THE FACES OF INNOVATION

Meeting the Challenge of Cancer

RDPAC

Ci Yunyou

58-year old with late liver cancer, but benefited from medicine innovation
"I hope that our medical industry will continue to make development and save more cancer patients like me."

Introduction

Cancer, one of the leading causes of death worldwide, led more than 22,000 deaths[1] every day globally.

22,000 Deaths Every Day

It causes more deaths than

AIDS

+

Tuberculosis

+

Malaria

combined

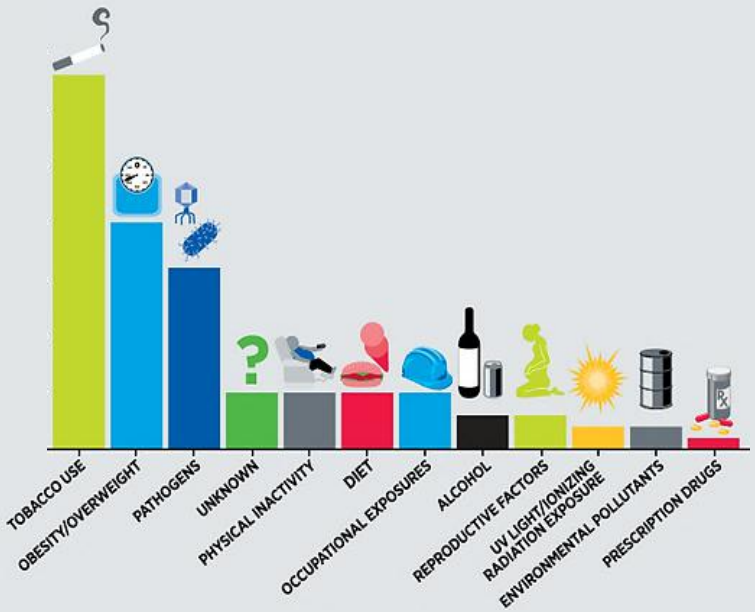
The occurrence of cancer is increasing because of the growth and aging of the population, as well as an increasing prevalence of established risk factors such as smoking, overweight, physical inactivity, and changing reproductive patterns associated with urbanization and economic development.

smoking

overweight

physical Inactivity

changing reproductive patterns

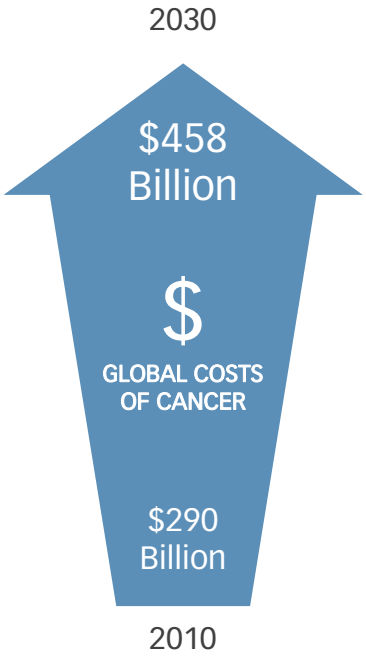


CANCER RISK FACTORS

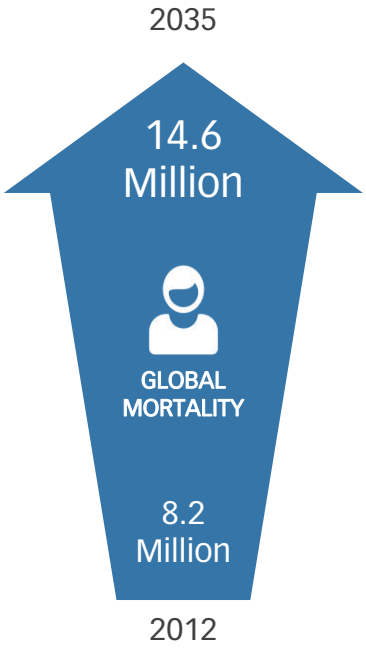
Economic and Epidemiology Burden of Cancer

Enormous Global Burden

The global economic toll of cancer is enormous[4]. The 13.3 million new cases of cancer diagnosed worldwide in 2010 are estimated to have cost $290 billion, and the 21.5 million new cancer cases anticipated to occur in 2030 are projected to cost $458 billion[5].



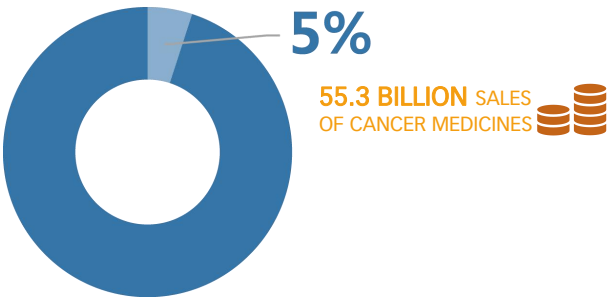
In 2012, it is estimated that 8.2 million[1] died of the disease. Without significant new advances in cancer prevention, detection, and treatment, these numbers are projected to rise to 14.6 million[4] cancer deaths in 2035.



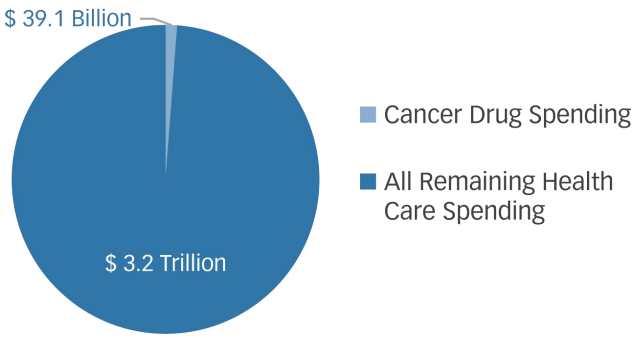
Looking at the overall cost of the disease, the International Agency for Research on Cancer (IARC) [12], Data monitor Healthcare, World Cancer Report 2014 estimates that annual sales of cancer medicines by the top pharmaceutical companies in 2010 constituted 5% of the annual economic cost of cancer in 2010, for a total of USD 1.16 trillion. The most significant portion of costs is linked with hospitalization, premature death and poor rehabilitation and re-integration programs.

IMS Institute of Healthcare Informatics's latest research showed that spending on cancer medicines only represented about 1% of the overall projected health care spending in U.S. 2015.

Total Cost for Cancer 2010 - $1.16 TRILLION



Cancer Medicines as a Portion of NHE Projected Total U.S. Health Care Spending, Billion, 2015



Challenges in China

Cancer incidence and mortality have been increasing in China and it became the major public health problem in the country. With an estimated 4.29 million [2] new cancer cases diagnosed in 2015, China accounted for over one fifth of the world's cancer diagnoses. It estimated that 2.81 million [2] people died from cancer in 2015.

The cancer profile in China is markedly different from those of developed countries. According to GLOBOCAN 2012 figures[6], prostate and breast cancer are the top male and female incidence ones in the developed countries while lung and breast cancer are the top ones in China[2].

Top 5 New Cancer Cases

Developed Countries*

1. Prostate
2. Lung
3. Colorectal
4. Urinary bladder
5. Stomach

1. Breast
2. Colorectal
3. Lung
4. Corpus uteri
5. Ovary

* Figure of 2012

China**

1. Lung
2. Stomach
3. Liver
4. Esophagus
5. Colorectal

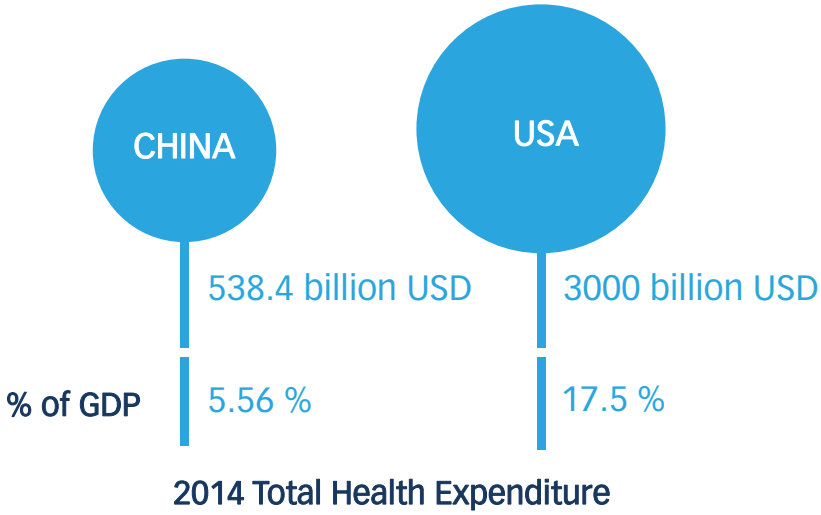
1. Breast
2. Lung
3. Stomach
4. Colorectal
5. Esophagus

4.29 million[2] new cancer cases

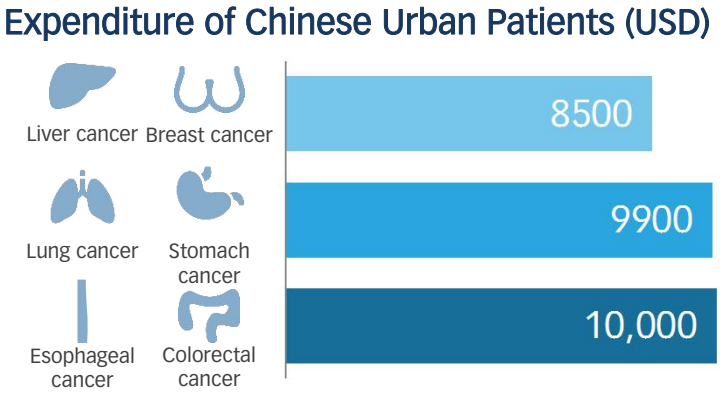
** Figure of 2015 **2.81 million[2] people died from cancer**

Challenges in China

Comparing with developed countries such as United States, China's health expenditure was far behind.



Another research[15] done in China showed, the Chinese urban patients spent over 10,000 USD on esophageal and colorectal cancers treatment which were the highest level of expenditure. Lung and stomach cancers treatment followed at 9900 USD while liver and breast cancers treatment cost were around 8500 USD.



Lung cancer, leading cause of death, is the top cancer profile in China[2]. It was estimated that there were 733.3 thousand new cases in China and the mortality cases were estimated at 610.2 thousand in 2015. According to a survey[16] done in Beijing municipality recently, for those patients diagnosed in 2010, the 5-year survival rate was about 14.04%.

Liver cancer, a typical cancer profile in China, is the second lowest 5-year survival rate cancer in Beijing municipality[16] in 2015 – 12.61%. The mortality rate of liver cancer got a significant decrease2 in 2006 which contributed to the effective control of the infections.

Value of Innovative Cancer Medicine

Rapid technological advances and an emerging understanding of the underlying drivers of disease are changing the face of cancer. We now know that cancer is not a singular condition but, rather, a collection of diseases, each with unique characteristics and features. Cancer is more than 200 diseases all of which have different causes and treatments[17].

Cancer is more than

2 0 0

disease

all of which have different causes and treatments

Researchers have made great strides in recent years in identifying the genetic mutations and related factors that can drive the seemingly random formation and proliferation of abnormal cells in cancer, as well as genetic markers that may identify patients at a greater risk of developing cancer. These learnings not only enable better screening and diagnoses but also drive the development of a new era of cancer treatments.

The latest facts and figures of 5-year survival rates in the United States[18] showed, since 1975, the chances that a cancer patient will live 5 years or more have increased by 41% across cancers. According to a research[22], 83% of survival gains in cancer are attributable to new treatments-including medicines.

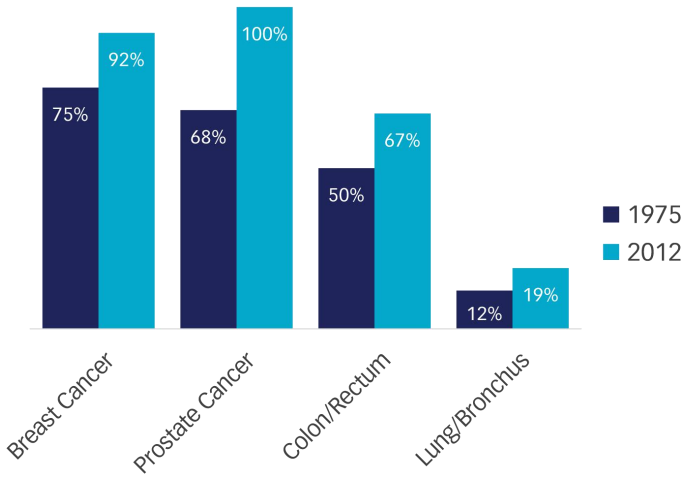
41%

Increase of 5-year survival rate since 1975

83%

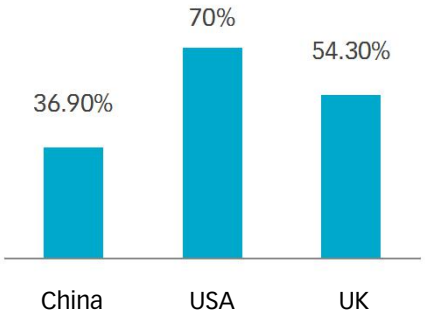
Of survival gains in cancer are attributable to new treatments, including medicines

5-Year Survival Rates Among the Most Common Cancers, 1975-2012

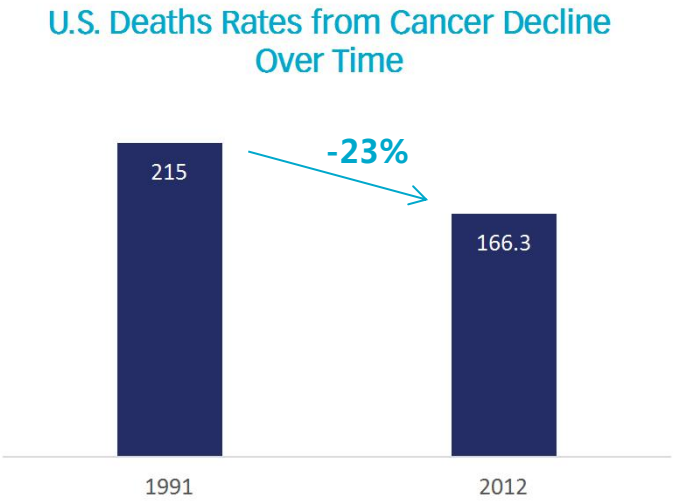


China's overall 5-year relative survival rate for all cancers combined was 36.9%[2] in 2015 compared to 70%[4] in the United States (2012) due to the lack of efficient treatment, difference of cancer profile etc. With this rate and 4 million new cancer cases annually in China, a 5-year (or more) delay for new oncology products translates to over 2 million patients who may not survive long enough to receive the appropriate treatment with innovative therapies which may have a life-saving or life extending impact.

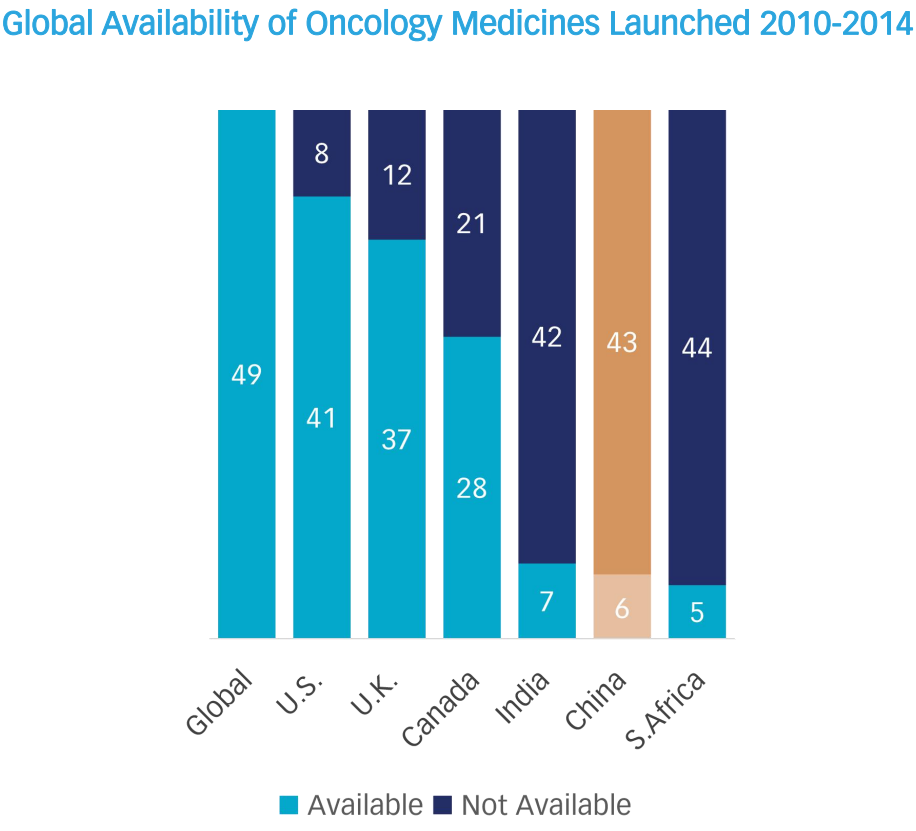
5-Year Survival Rates in China, USA and UK



Increases in cancer survival are estimated to translate to the decrease of cancer deaths by 23%[19] since 1991 till 2012, according to the latest research in the United States.

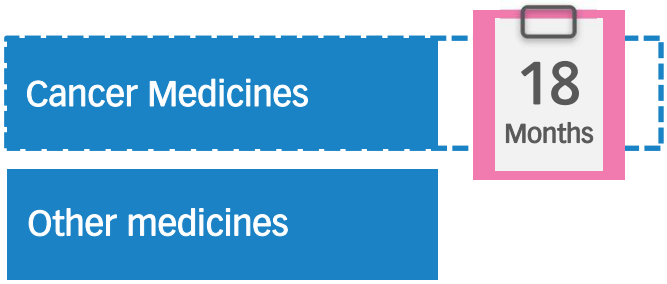


IMS recent report[7] showed that, China was one of the last three countries have few access to the new medication 2010-2014.

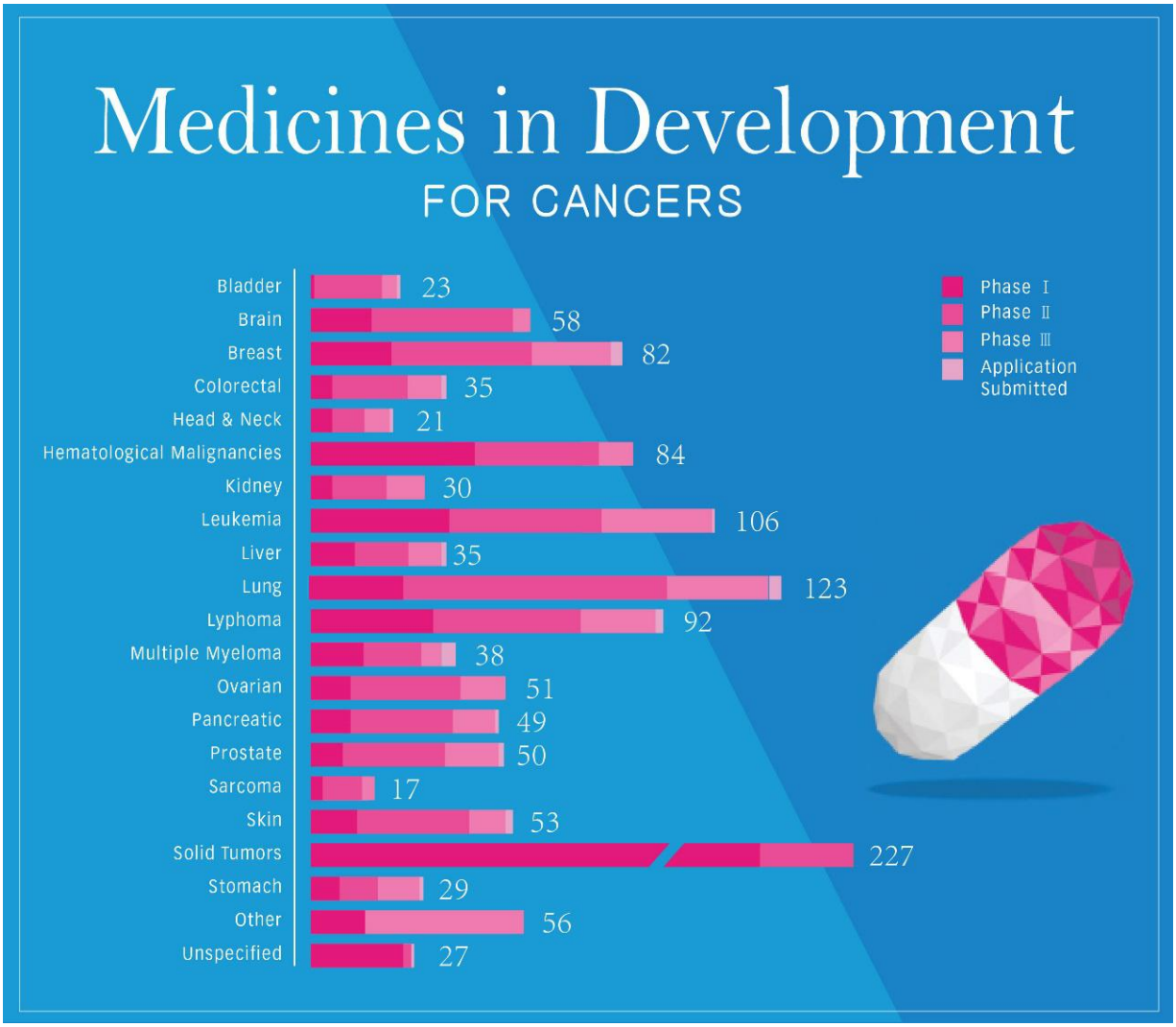


Advances of Cancer Medicine

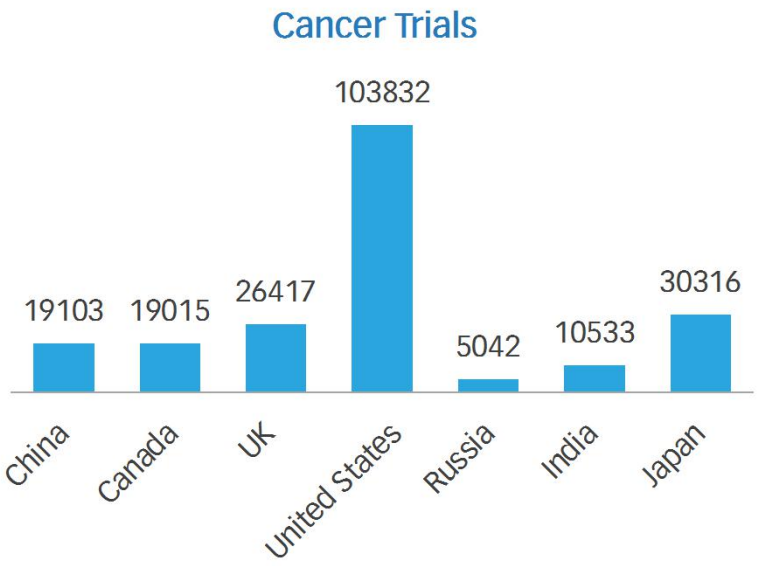
The complexity of cancer is reflected in the drug development process. Cancer medicines can take an average of 1.5 years longer[9] to develop than medicines for other diseases.



PhRMA recent report[20] showed, there are more than 800 cancer medicines in development while 73% of cancer medicines have the potential to be the "Personalized Medicines". Personalized medicine, sometimes referred to as precision or individualized medicine, is an emerging field of medicine that uses diagnostic tools to identify specific biological markers, often genetic, to help assess which medical treatments and procedures will be best for each patient.



WHO clinical trial database showed till December 2016, there are 19103 cancer clinical trials undertaking in China which has the similar number as Canada (19015). United States has more than 103832 cancer trials which was 5 times than China's.

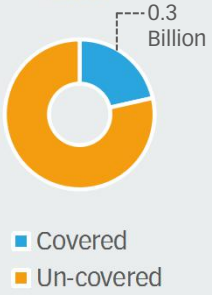
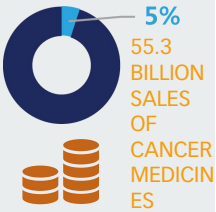
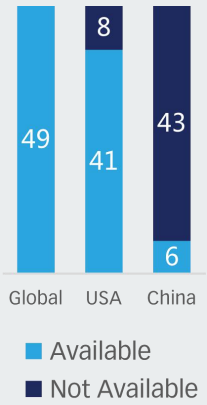


New approaches[10] that are adding to the cancer treatment toolbox include:

Angiogenesis Inhibitors	Epigenetics	Immunotherapies
Tumors need blood vessels to grow and spread. Angiogenesis is the process by which new blood vessels are formed. Angiogenesis inhibitors work by preventing the formation of new blood vessels to stop or slow the growth or spread of tumors.	Researchers have discovered that cancer can be influenced by changes in gene expression caused not only by genetic mutations (changes in the DNA sequence) but also by chemical modifications of DNA (epigenetic changes). By targeting these "epigenetic" marks, genes associated with a cancer may be able to be turned "on" and "off".	The body's immune system may provide a platform for fighting cancer. Researchers are studying therapies, such as cancer vaccines and non-specific immunotherapies that enhance the immune system to help it prevent cancer or attack cancer cells.

Future and Actions

Strategic leadership is needed to address several challenges and sustain current and new initiatives.

	Scientific	Data	Capacity	Economic	Regulatory	Cultural
Challenges	Challenges associated with unanswered questions that stem from the scientific complexity of the disease	The lack of population-based cancer registries in China	Limited number of specialized professionals, inadequate cancer treatment in rural area	Diverging perceptions on that actual treatment value	• Regulatory requirements for clinical trial designs not always adapted to new therapies • Patient's access to the innovative medicines impacted by the current payment and procurement policies	Culture differences influence cancer approach on: • Patient's role in the continuum of care • The prioritization of certain cancer • The importance given to prevention, screening and palliative care
Facts	Cancer is more than 200 disease all of which have different causes and treatments	Population Base 	15 doctors* 10,000 people * WHO Figure in 2011	Total Cost for Cancer 2010 - $1.16 TRILLION 		Myths and perception of cancer which can present challenges to cancer control Death/Helplessness - "cancer is always fatal" Fear - "cancer is a punishment" Pain and suffering Loss of control and independence Isolation - Silence surrounding the disease, especially gynecological and breast cancers
Actions[21]	• Support research to define the value for patients of treatment • Foster consortiums and others ways to work together in order to share scientific knowledge	• Develop capacity in China to improve the quality and completeness of cancer registries • Enhance the importance of robust database to monitor and evaluate the impact of specific interventions in targeted populations	• Improve and Increase the professionals skill and number • Enhance the healthcare in rural area	Increase international collaboration among stakeholders to define value of novel interventions	• Develop more adapted pathways that can keep pace with advances in cancer innovation • Optimize the payment and procurement system to support the access to innovative medicines	• Increase the public knowledge of cancer prevention and treatment • Development of more prevention programs and national action plans from the government

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About RDPAC

Under the China Association of Enterprises with Foreign Investment (CAEFI), the R&D-based Pharmaceutical Association Committee (RDPAC) is a non-profit organization made up of 38 member companies with pharmaceutical R&D capability.

Till now, the member companies have 49 plants and 31 R&D centers. They invest over RMB 8 billion per year in R&D in China.

The Chinese government, local companies and RDPAC members share a similar vision to see China become a leading global innovation partner. RDPAC welcomes the opportunity to continue to partner with the government to reach our joint aspiration for the benefit of Chinese patients.

Our Vision

HEALTHIER CHINA THROUGH INNOVATION

To be a valued partner in delivering the “Healthy China 2030” goal to improve the health and quality of life of people in China:

- Provide our high-quality/ innovative healthcare products and services in a socially responsible and commercially viable manner;
- Commit to securing patients timely access to innovative & high quality drugs;
- Achieve the highest standard of integrity for ethical research and business practice;
- Contribute to the growth of the biopharmaceutical sector in China;
- Support the development of a sustainable healthcare system in China.

RDPAC Member List

(Updated: January 2017)

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AbbVie	艾伯维	Kyowa Kirin	协和发酵麒麟
Allergan	艾尔建	LEO Pharma China	利奥制药
Amgen	安进	Lundbeck	灵北
Astellas	安斯泰来	Menarini	美纳里尼
AstraZeneca	阿斯利康	Merck Serono	默克雪兰诺
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Celgene	新基医药	Pfizer	辉瑞
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Chugai	中外制药	Sanofi	赛诺菲
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Eli Lilly	礼来	Sumitomo	住友
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