**The basic situation of radiotherapy in mainland China：   
 A national survey in 2019**

**Junlin Yia,d， Ye Zhanga， Ming Chenb,d, Lvhua Wang c,d**

a. National Cancer Center/Cancer Hospital, Chinese Academy of Medical Sciences (NCC/CH, CAMS)

b. Cancer Hospital, University of Chinese Academy of Sciences, Zhejiang Cancer Hospital

c. Shenzhen Cancer hospital, Cancer Hospital, Chinese Academy of Medical Sciences

d. Chinese Society of Therapeutic Radiation Oncology (CSTRO), Chinese Medical Association (CMA)

Email address of Corresponding Author(s): yijunlin1969@163.com

**BACKGROUND AND OBJECTIVE**

The radiation oncology developed rapidly in recently years in China, and our government also want to established and adjust the national development program.

To provide data for making national radiation oncology development program based on the current situation and requirement.

CSTRO established in 1986. Provide proposal for government on how to develop and regulate the health policy is one of the tasks of CSTRO, In the past decades, 8 times national survey have done by CSTRO

In 2019, the 9th national survey was done.

**METHODS**

The investigation method was adopted with the electronic questionnaire through internet platform.

Required information include: Staffs, devices, techniques, annual person-times of radiotherapy. The most common primary tumor treated by RT. RT units/million people and the proposal of WHO were calculated and compared, proposal for how to improve RT was submitted to the health authority.

**RESULTS AND DISCUSSION**

The mainland China have RT centers: 1463, RT treated pts in 2019: 1,259,602 (<30% of newly diagnosed pts) ，the most common primary sites was: lung, followed by esophagus, breast, cervix, rectal, NPC. The RT human resource include RO 14,575, MP 4,172, RTT 8,940 and Engineers1,409. The RT equipment include: LA: 2021 uints, Cobalt-60 66 unit, brachytherapy 339 sets, photon or heavy ion 5 units, X-ray simulator 1453 units, CT simulators 355 units and MR simulator: 34 units. The RT development rapidly in the past decades.

Talbe 1 The developmemt of RT center in mainland China from 1986-2019

There were only 1.5 accelerate units /million people (LA+Cobolt) in mainland China, which is much lower than WHO recommendation. Only Beijing, Shanghai, Shandong provinces fulfill the recommendation of WHO which own 3.73/M, 2.54/M and 2.35/M respectively, the southern-western provinces such as Yunnan, Guizhou, Ningxia own lower than 1LA unit/M. Even the relative economically developed provinces such as Guangdong and Zhejiang only own 1.04/M and 1.07/M.respectively.

New RT technology was widely use in national level, 86.9% RT centers can provide 3DCRT, IMRT，SBRT，Tomotherapy etc. new RT technique.

High technology RT equipment was rare in mainland China, only 2 proton and 1 heavy ion centers are running. But 16 proton centers will be built and put into operation in future 5 years.

**CONCLUSIONS**

Although huge progression have made in the past decades in RT in mainland China, there are still huge gap exist between the requirement and provided.

The most common primary tumor treated by RT was lung, followed by esophagus, breast, cervix, rectal, NPC etc.

Less than half of patients who need RT received RT national wide.

High technology RT equipment is rare in China, but there is a plan that 16 proton centers will be built in the future 5 years

**REFERENCES**

**[1]**. Gu XZ，Feng NY, Yu Y． Investigation report on the composition, equipment and technical level of radiation therapy team in China [J]. Radiat Oncol China，**3** (1989) 41．

[2].Yin WB，Chen B，Gu XZ．General survey of radiation oncology in China ．Chin J Radiat Oncol **4** (1995) 271.

**[3].** Yin WB， Tian FH, Gu XZ. Current status of radiation therapy personnel and equipment in China. Chin J Radial Oncol, **7** (1998) 131.

[4]. Yin WB, Tian FH. Survey report on national radiation therapy personnel and equipment in 2001．Chin J Radial Oncol **11** (2002) 145.

[5].Chinese Society of Radiation Oncology (Yin WB, Yu Y, Chen B, et al). Fifth nationwide survey on radiation oncology of China in 2006．Chin J Radial Oncol, **16** (2007) 1**.**

[6] Chinese Society of Radiation Oncology (Yin WB, Chen B, Zhang CL, et al)．The sixth nationwide survey on radiation oncology of continent prefecture of China in 2011. Chin J Radiat Oncol, **20** (2011): 453.

[7]. Lang JY, Wang P, Wu DK, et al. An investigation of the basic situation of radiotherapy in mainland China in 2015. Chin J Radiat Oncol **25** (2016) 541.

[8].IAEA．Setting up a radiotherapy programme：clinical，medical physics，radiation protection and safety aspects．Wien：IAEA．2008．