UPDATE STATUS OF NUCLEAR MEDICINE IN THAILAND

HISTORY

- Nuclear Medicine service : Established in1955

  at Siriraj Hospital, 2nd-Chulalongkorn Hosp. in 1959, 3rd Rajavithi Hospital

- Thai Society of Nuclear Medicine (THSNM) : Established in 1977 , 120 members

- Prof. Romsai as the 1st president

First Nuclear Medicine Center

at Siriraj hospital in 1955 Prof. Romsai Suwanik

- International committee on control of iodine deficiency disorder
- Pioneer in research of thyroid disease in Thailand
-
- Using colloidal gold Au198
- Project of adding iodine into drinking water

* Been awarded the medal of Chevalier de l Ordre du Merite (national order of merit , France)

Makumkrong

Watcharee

Sombat

Watcharin

Yuthana

Presidents of THSNM

UP TO DATE THSNM 2017

- Current THSNM members : 290
- 78 NM physicians, the rest are physicist/ technologist/ radiochemist/pharmacist/nurse/etc
- Current activities : 2 regular scientific meetings in March and October - December

THSNM COMMITTEES

สมาคมเวชศาสตร์นิวเคลียร์แห่งประเทศไทย
Nuclear Medicine Society of Thailand

Home
Committee
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Knowledge
Contact Us

Welcome

Welcome to Nuclear Medicine Society of Thailand

Nuclear Medicine Society of Thailand was established in 1977.

The objectives of the society are:

- to exchange the scientific knowledge, experience and research in the field of nuclear medicine among members of the society.
- to promote the advancement of nuclear medicine in Thailand.
- to distribute nuclear medicine science in medical and general community.
- to arrange and conduct scientific meetings, conferences and training courses in

NATIONAL HEALTH CARE SCHEME AND REFERRAL SYSTEM

Base on type of national health care coverage

- Government officers 5 million
- Social security scheme for employees 10 million
- Universal coverage scheme for Thai people 50 million
- Total doctor 22000 with 25% in Bangkok

Base on type of national hospital referral system

from primary to secondary to tertiary and supertertiary hospital

NATIONAL NM EXPENSE

Thailand

GDP 12060 billion baht

NATIONAL EXPENSE ON HEALTH 4.3%/Y

In 2015:

Total expenditure for Nuclear Medicine studies was 497 million TBaht/year and total country's budget for health was 518,580 million Baht/year) with a ratio of 0.1 %

Taiwan

In 2013, NM expenditure was 2,461 million and total expense (national health insurance data) was 507,552 million with a ratio of 0.48% .

STATISTICS PET/CT AND POPULATION

Thai population are 67 millions, 11 PET/CT ,one PET/CT is for **6.27** million population

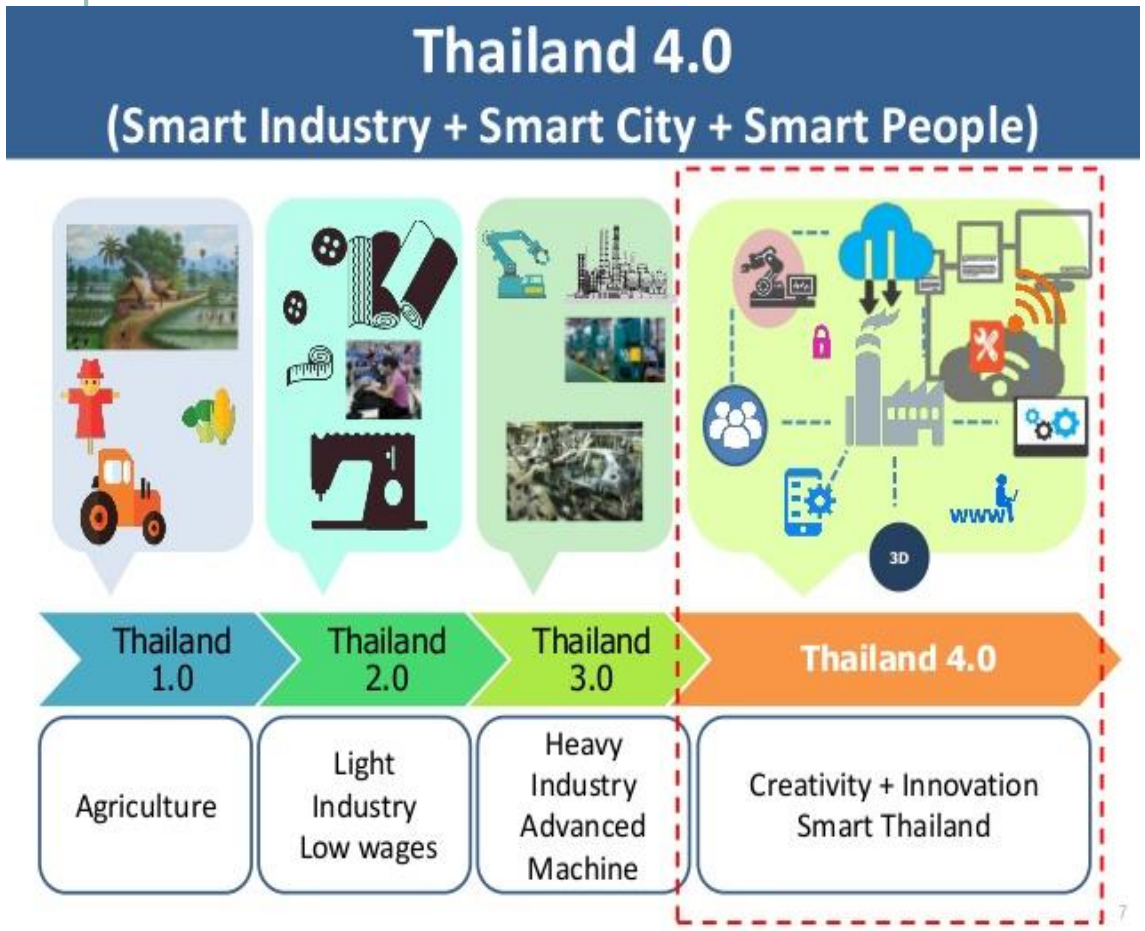
South Korea : 148 machines, one PET/CT is for **0.32** million population and is followed by Singapore and Malaysia

- **Thai reimbursement PET/CT study cost** is only for **government officers**
- Only for 2 indications : A* Non small cell lung cancer with staging for curative surgery
- B *suspected recurrent colon cancer with negative study from CT and MRI

Good news :there will be 3 indications : lung cancer for every cell type , colorectal cancer and lymphoma to be approved in the year 2018.

SIGMA: Security, infrastructure, government, manpower and applications

THAILAND 4.0



In 2012,Thailand is a newly industrialized country, with exports 2/3 of GDP

In 2017, Thailand is moving on from a country with abundant cheap, unskilled labour to an innovation “value-based economy” to climb to the next step of the ladder.

Unique: Strong GDP, continuous growth, strategic location in South East Asia, going to international business , nice people.

Non-communicable disease form the major burdern of morbidity and mortality

NUCLEAR MEDICINE CENTERS IN THAILAND

Government hospitals 22 sites

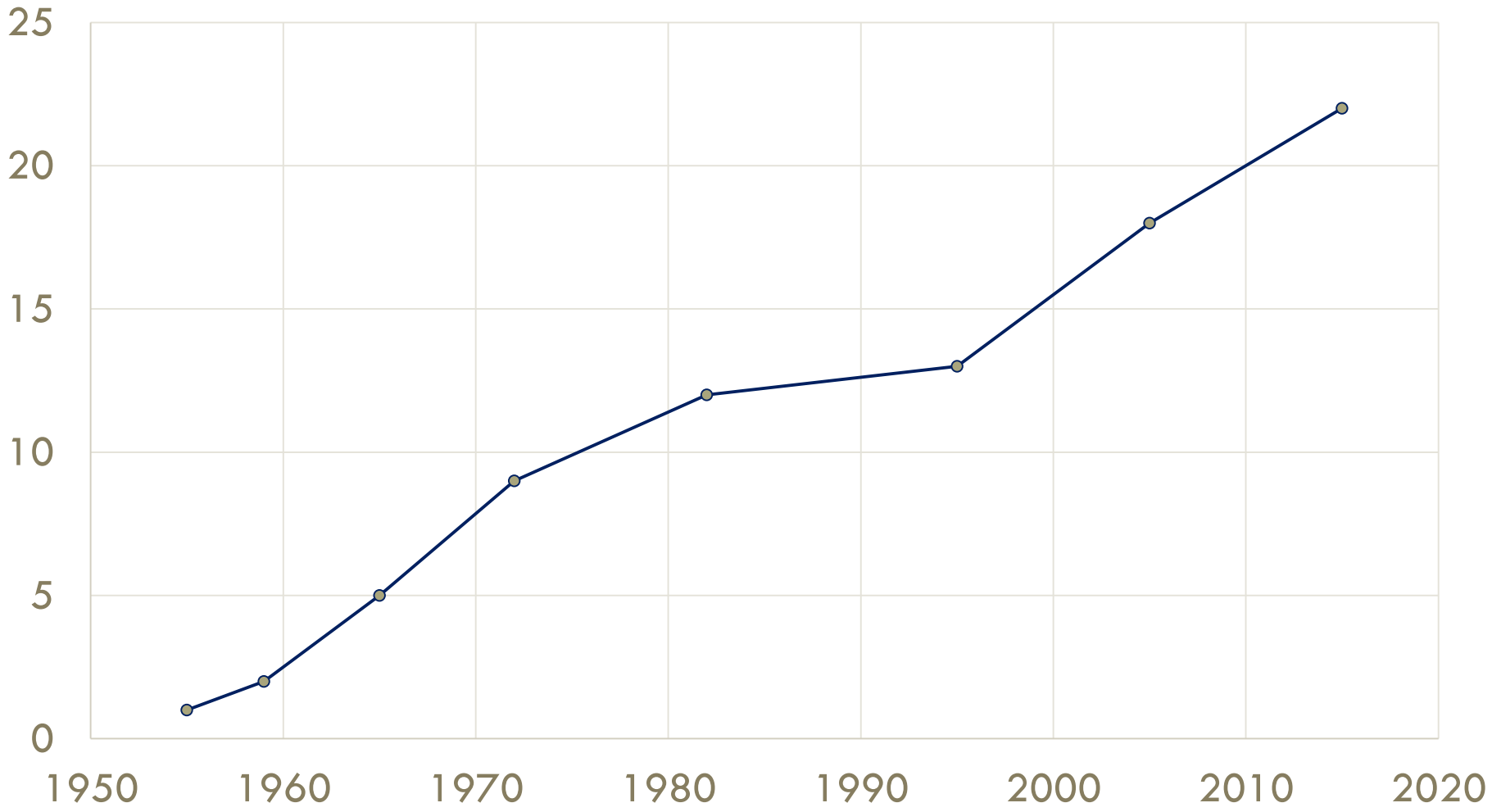
- University hospitals – 9 (5 residency training centers)
- Non-university general hospitals – 8
- Non-university cancer hospitals - 5

Private hospitals 7 sites

- General hospitals – 4
- Cancer hospitals – 3

Total 29 centers

Government Nuclear Medicine Centers



DISTRIBUTION MAP

77 PROVINCES

POPULATION 67,122,943

BKK 8,597,808

TOTAL 29 NM CENTERS

16 BKK (55%)

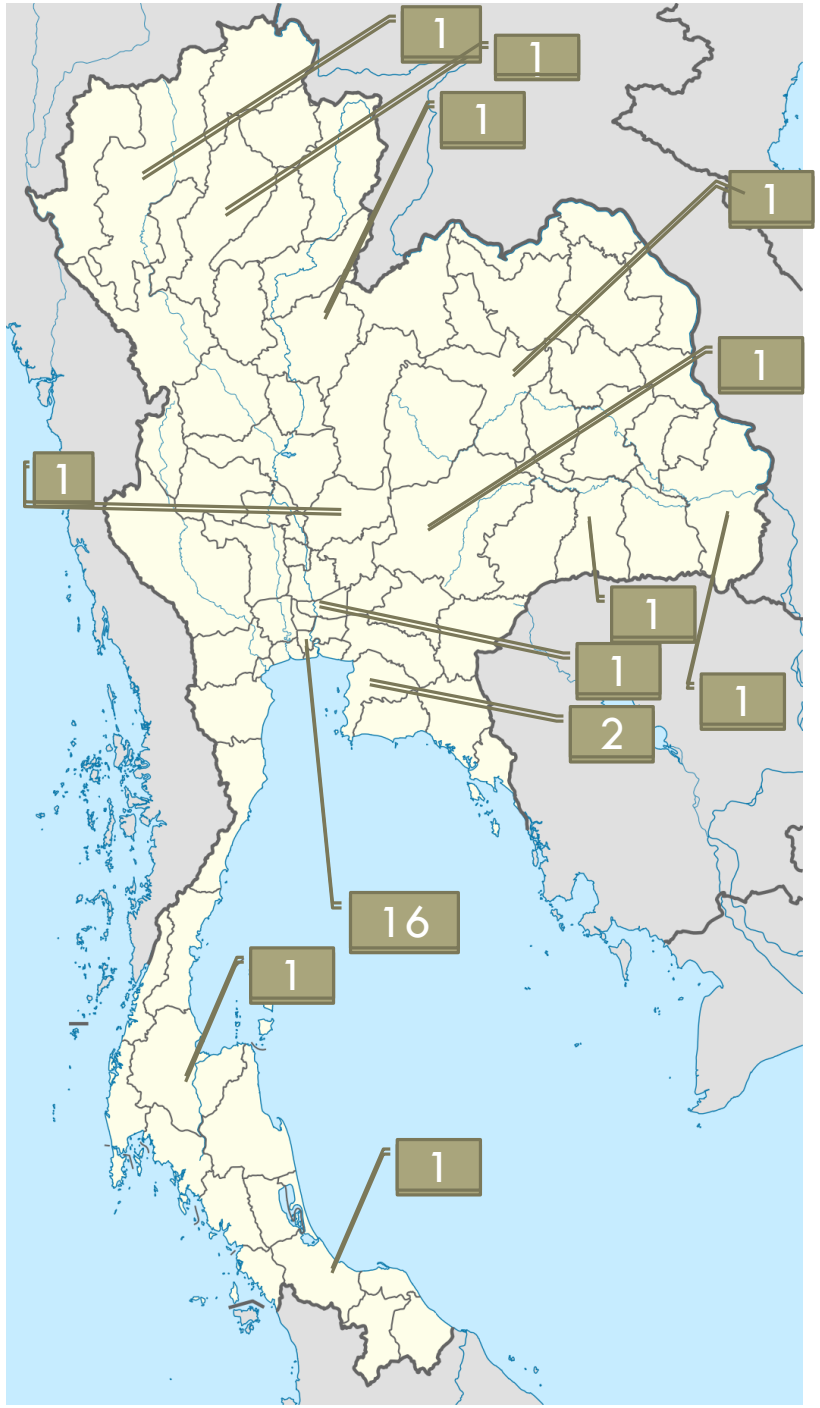
2 CENTRAL

3 NORTH

2 SOUTHERN

4 NORTHEAST

2 EAST



PERSONNEL IN 25 CENTERS IN 2016

Job	Number
Physician	78
Physicist	29
Technologist	106
Nurse	59
Pharmacist	15
Chemist	17
Scientist	3
Others	47
Engineer	3
Neurologist	1

EQUIPMENTS IN 29 CENTERS

Cyclotron 4 sites

Chulabhorn hospital
Wattanosot hospital
Siriraj hospital
Chiangmai hospital

Equipment	Number
Gamma Counter	12
Gamma Probe	12
Rectilinear scanner	0
Static gamma detector	8
Planar gamma camera	1
SPECT gamma camera	27
SPECT/CT gamma camera	16
Cardiac SPECT	2
PET-CT scanner	11
PEM	1
Cyclotron	4
Dose calibrator	10
Survey meter	7
Bone densitometer	10
Wipe test	2
Contamination Survey meter	2
Chemiluminescent	2
TLC counter	1

NUCLEAR MEDICINE 59455 STUDIES IN THE YEAR 2016

The top five studies :

Bone scan 47.5%

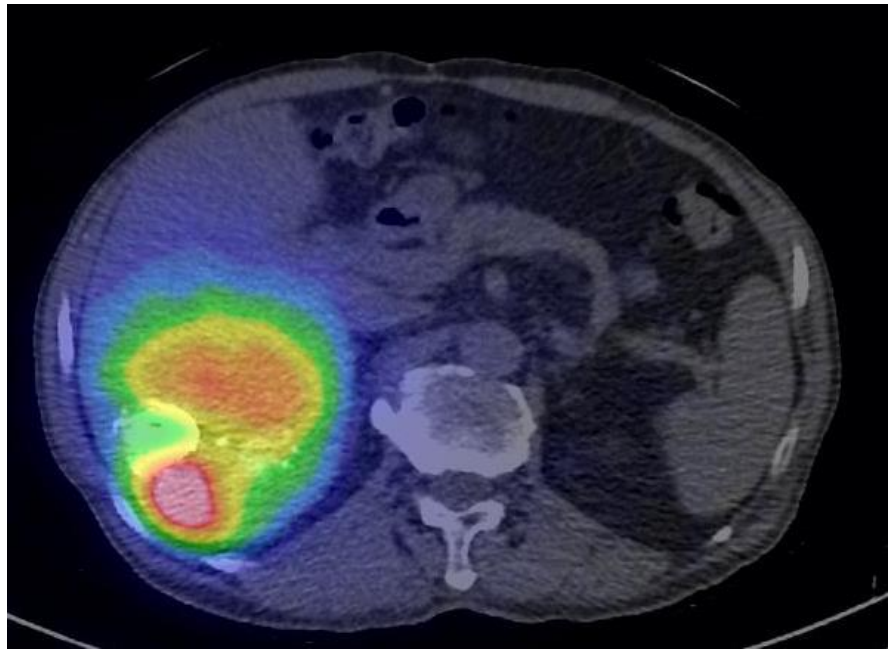
Total body scan (I131) 12.3%

Cardiac scan 11.3%

PET oncology 9.3%

Thyroid scan 7.5%

Five studies composed of 87.9% .



12338 NM TREATMENT IN 29 CENTERS

Treatment	Number	
Thyroid malignancy	3566	28.8%
Hyperthyroidism	8658	70.2%
Polycythaemia vera	2	
Bone metastases (Sm153-EDTMP, Ra-223)	41	
Synovitis	10	
Other: e.g. Y-90 microspheres, I-131 MIBG,	61	

PET STUDIES IN 8 CENTERS IN 2015

PET	Number	
Oncology	5529	94%
Brain	161	2.7%
Cardiology	2	
Infection	9	
Bone	181	3.1%

RADIOPHARMACEUTICALS

TECHNETIUM

Radiopharmaceuticals	Supplier	
	TINT	GMS
^{99m}Tc-DISIDA	√	√
^{99m}Tc-DTPA	√	√
^{99m}Tc-ECD	√	√
^{99m}Tc-Hynic-TOC	√	
^{99m}Tc-MAA	√	√
^{99m}Tc-MAG_3	√	√
^{99m}Tc-MDP	√	√
^{99m}Tc-MIBI	√	√
^{99m}Tc-Sulfur Colloid		√
$^{99m}TcO_4$	√	√
^{99m}Tc-Phytate	√	√

TECHNETIUM GENERATOR

Producer	Supplier
CIS/France	Biogenetech
Sam Young Unitech/Korea	Biogenetech
Gentech/Australia	GMS
Mallinckrodt/Netherland	GMS

NON-TECHNETIUM

Radiopharmaceuticals	Supplier				
	TINT	GMS	Biogenetech	Wattanosoth	Chulabhorn
F-18 FDG				√	√
C-11 PIB (Amyloid)				√	√
F-18 THK 5351 (Tau)					√
F-18 FDOPA				√	√
F-18 NaF				√	
Ga-67 citrate		√			
Ga-68 DOTATATE	√				
Ga-68 PSMA					√
I-131 Diag Capsule	√	√			
I-131 MIBG for Diagnostic	√				
I-131 Hippuran	√				
In-111 Octreo Scan		√			
TI-201 chloride		√			

THERAPEUTIC RADIOPHARMACEUTICALS

Radiopharmaceuticals	Supplier				
	TINT	GMS	Biogenetech	Wattanosoth	Chulabhorn
I-131 Therapatic Capsule	√	√			
I-131 MIBG for Treatment	√				
Sm-153 EDTMP	√	√			
Sr-89 chloride		√	√		
Y-90 Microsphere		√			
Y-90 citrate colloid			√		
Ra-223 chloride		√			

COLD KITS

Pharmaceuticals	Supplier			
	TINT	GMS	Biogenetech	In-House
DISIDA	√			
DMSA	√			
DMSA (V)	√			√
DTPA	√			√
EC	√			
ECD	√			
HSA		√		√
Hynic-Toc	√			
Leukocyte		√		
MAA	√			
MAG_3	√			
MDP	√	√	√	√
MIBI	√		√	
Rhenium Sulfide			√	
Phytate	√			
PYP		√		√
Stannous	√	√		√

INTERNATIONAL STANDARDS

Service

Quality Management Audits in Nuclear Medicine (QUANUM)

Education

World Federation of Medical Education (WFME)

QUALITY MANAGEMENT AUDITS IN NUCLEAR MEDICINE (QUANUM)

International Atomic Energy Agency

THA6042

- **New Improving Quality Management in Nuclear Medicine and Diagnostic Radiology**

Workshop on Quality Management Audits in Nuclear Medicine Practices (QUANUM 2.0)

The institute has be accredited : Siriraj , Chula, Chiangmai

EDUCATION :WORLD FEDERATION OF MEDICAL EDUCATION

WFME : A non-governmental organization related to the WHO aiming to achieve higher quality of medical education through accreditation and promoting standards.

Quality improvement in post graduate medical education in Thailand is ongoing in nearly all specialty including **NM** of residency training (Medical council)

Accreditation contents:

the training process and assessment of trainees

NUCLEAR MEDICINE RESIDENCY TRAINING

Started in 1989

5 University medical institutes for 3 years training course .

Thai Board of Nuclear Medicine

Exams: Thesis, MCQ and short assay for basic and clinical aspect, oral and case interpretation

Consequently, **52** residents were trained up to date.

SIRIRAJ Hospital

SIRIRAJ HOSPITAL

2223 hospital beds

80 buildings

3 millions OPD visits

90,000 IPD admissions

908 full time physicians

14327 employees

Undergraduate, postgraduate , resident and fellows training

SIRIRAJ Hospital

NM SIRIRAJ HOSPITAL

10 DOCTORS

1 Cyclotron

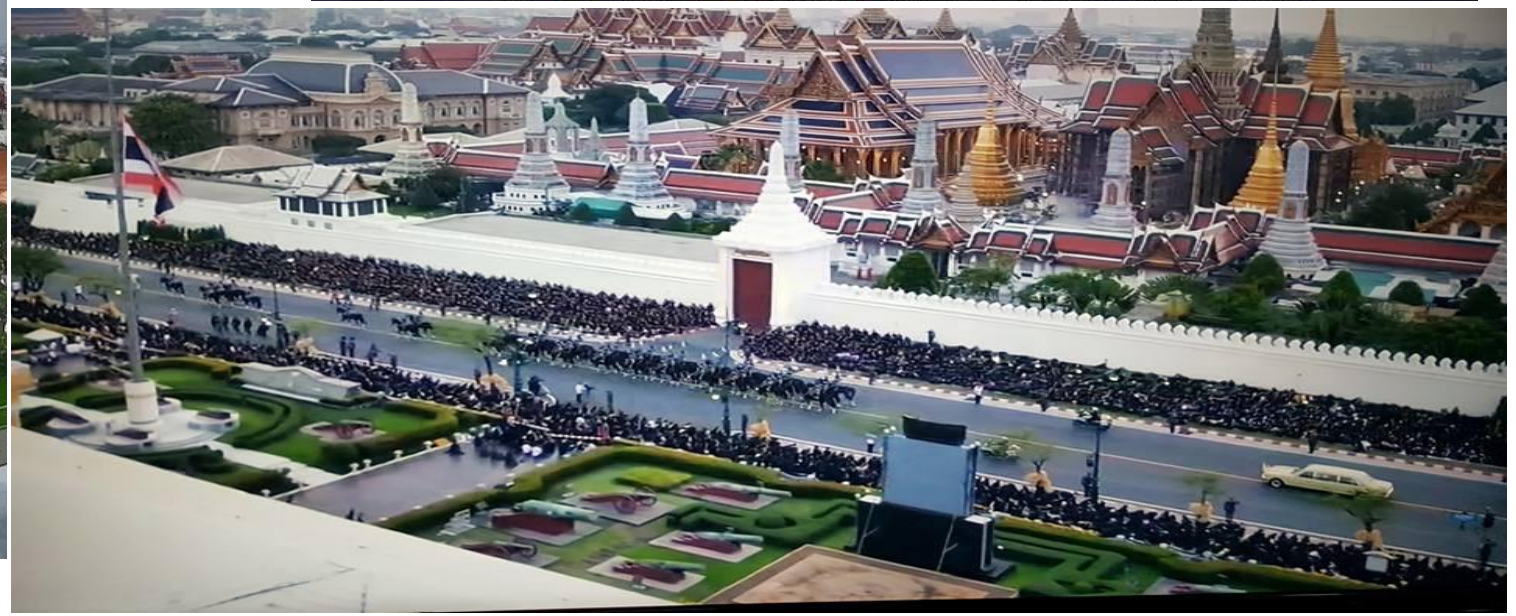
2 PET/ CT 4SPECT/CT 1SPECT

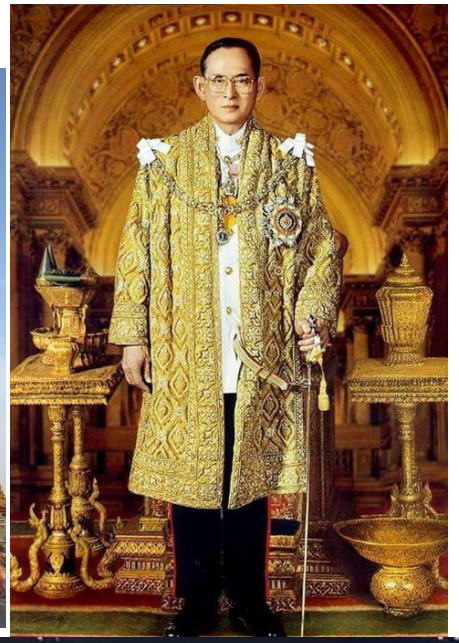
In process 1 SPECT CT

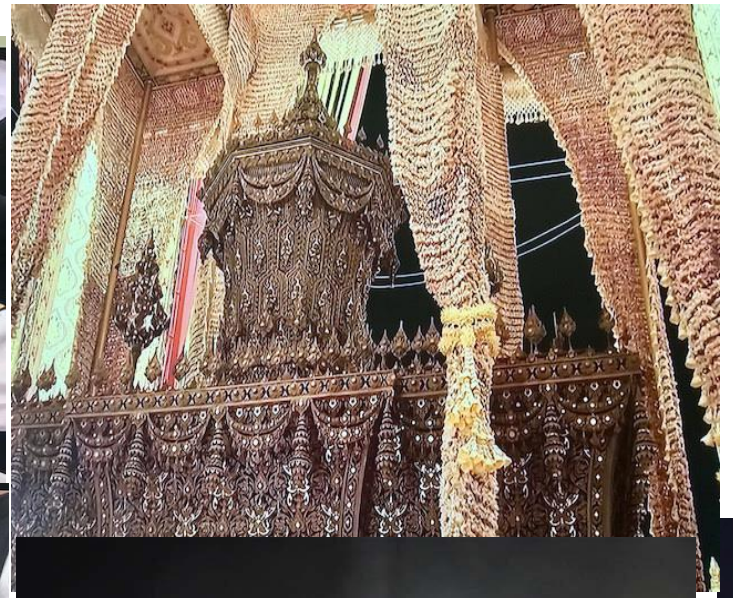
whole body CZT

7000 NM imaging/Y

500 PET CT cases/Y





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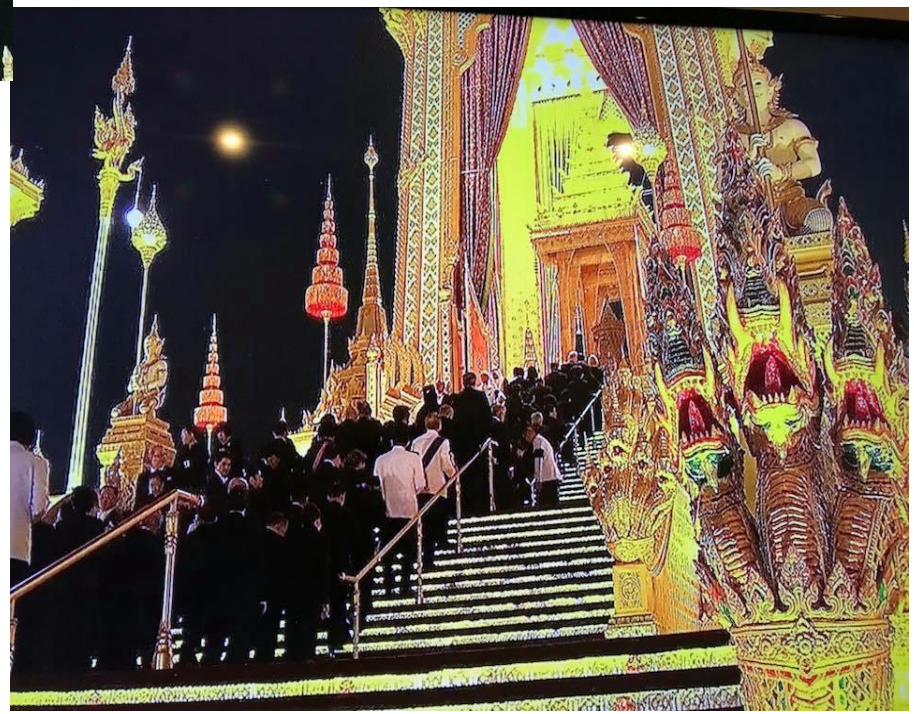



NATION
PHOTO

CHULA HOSPITAL

CHULA HOSPITAL

University hospital

Undergraduate, postgraduate resident and fellows training

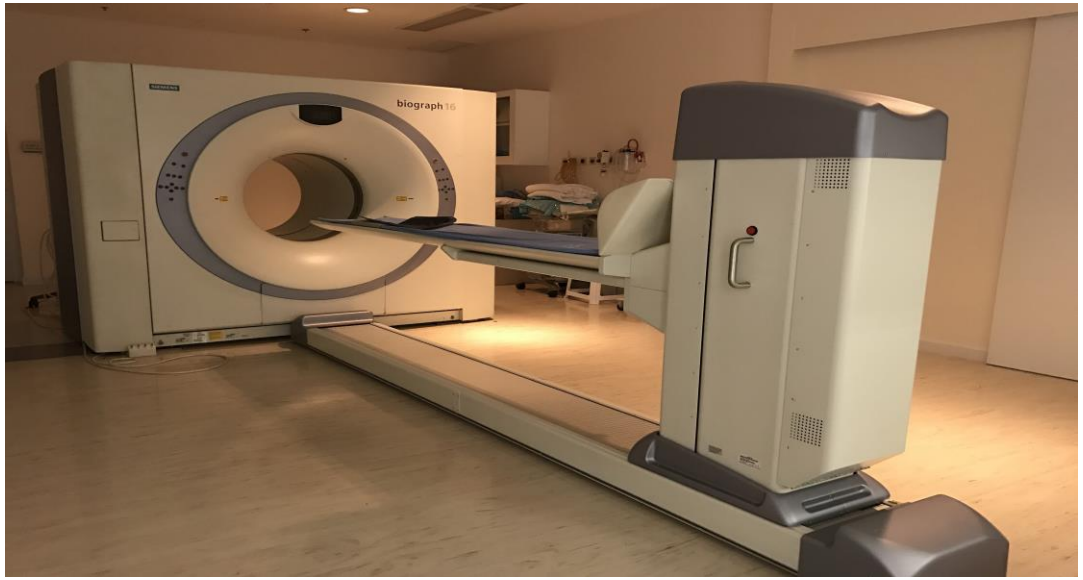
6 doctors

No cyclotron

1PET CT 2 SPECT 2 SPECT CT

4000 NM imaging/Y

270 PET CT cases



CHULA Hospital

AC-225-PSMA617 - PSMA-TARGETED ALPHA THERAPY (JNM MAY 1,2016)

The nuclear medicine group at the University of Heidelberg are breaking new ground.

Ac-225-PSMA-617 is an alpha emitter like Xofigo, but unlike Xofigo, it has the ability to kill metastatic cells systemically and not just bone metastases. So far, 80 patients have been treated and they have lived longer than expected with 3/4 of them achieving reduction in size of metastases and PSA.

RAMA HOSPITAL

University hospital

Undergraduate, postgraduate , resident and fellows training

6 doctors

No cyclotron

1PET CT 3 SPECT 1 SPECT CT

6000 NM imaging/Y

300 PET CT cases/Y

RAMA HOSPITAL

RAMA HOSPITAL

Neuroblastoma

I-131 MIBG is used for neuroblastoma treatment supplied by TINT

Lymphoma : I-131 rituximab

CHIANGMAI HOSPITAL

University hospital

Undergraduate, postgraduate , resident and fellows training

5doctors

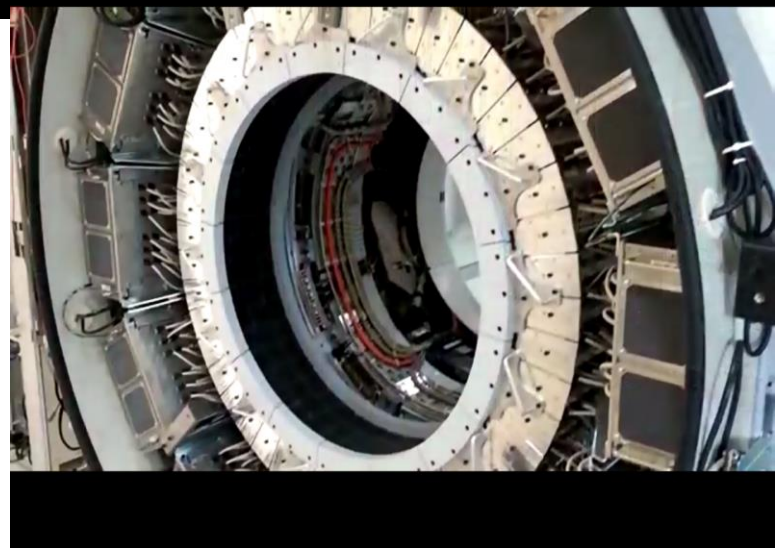
1 cyclotron

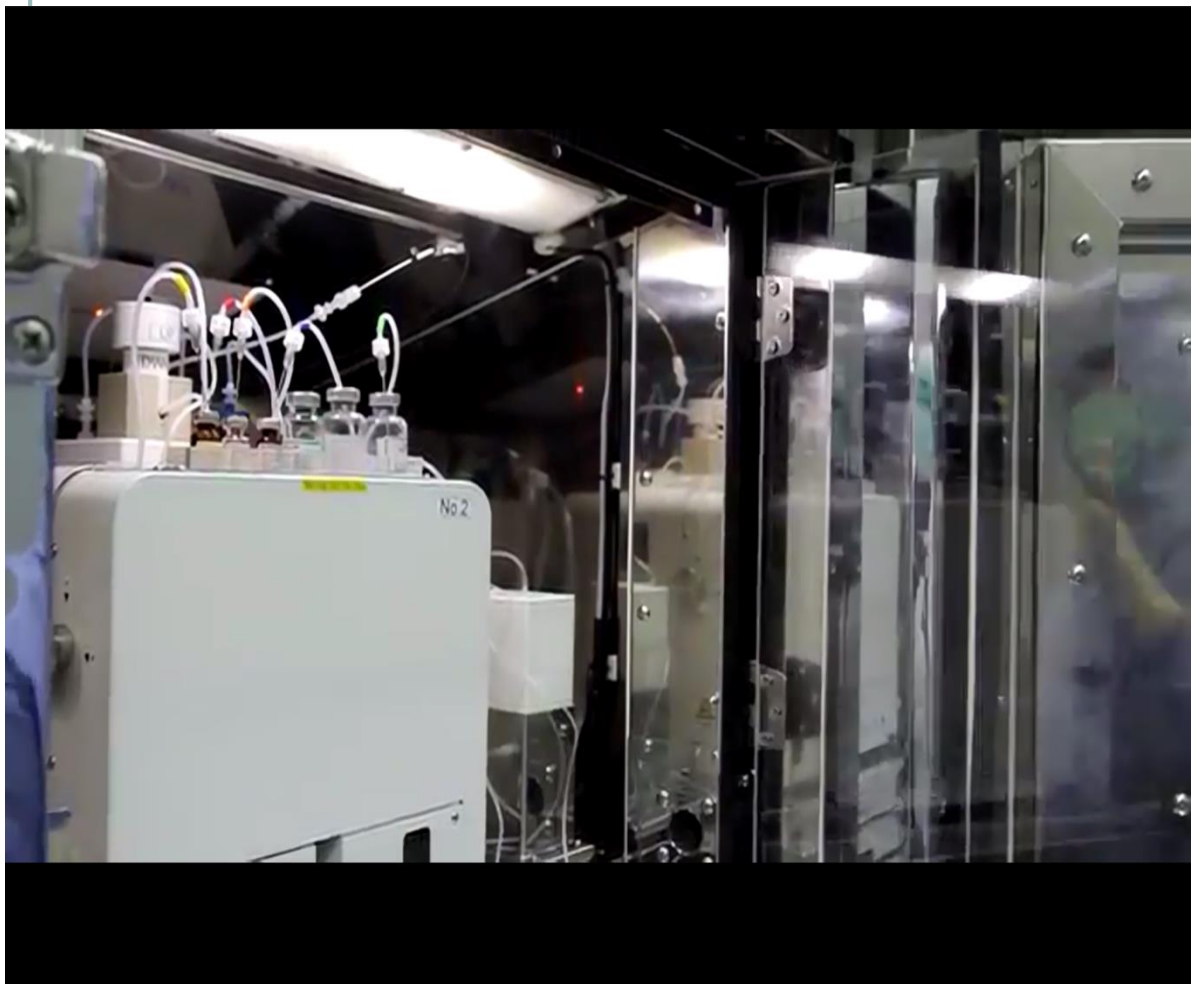
1PET CT 1 SPECT 1SPECT CT

2500 NM imaging/Y

130 PET CT cases

MedCMU
The Center for Medical Excellence





Cyclotron facility20 Mev

- 18F FDG
- 18F FDOPA
- 11C choline
- 11C MET
- 13N ammonia
- 15O water
- 15O gas
- Solid target products: Cu-64, I-123

Prof. Dr. HRH Princess Chulabhorn

NATIONAL CYCLOTRON and PET CT Center

Y 2006

Chulabhorn hospital

NATIONAL CYCLOTRON AND PET CENTRE (NCPC)

Data courtesy of National cyclotron and PET Center, Chulabhorn Hospital

CHULABHORN HOSPITAL AND NCPC

With the dedication of Professor Dr. HRH Princess Chulabhorn Mahidol in visiting leading cancer institutes all over the world.

CBH is able to establish cooperation networks with many outstanding international cancer institutes in various countries such as Japan, Germany, Canada, Israel, and USA.

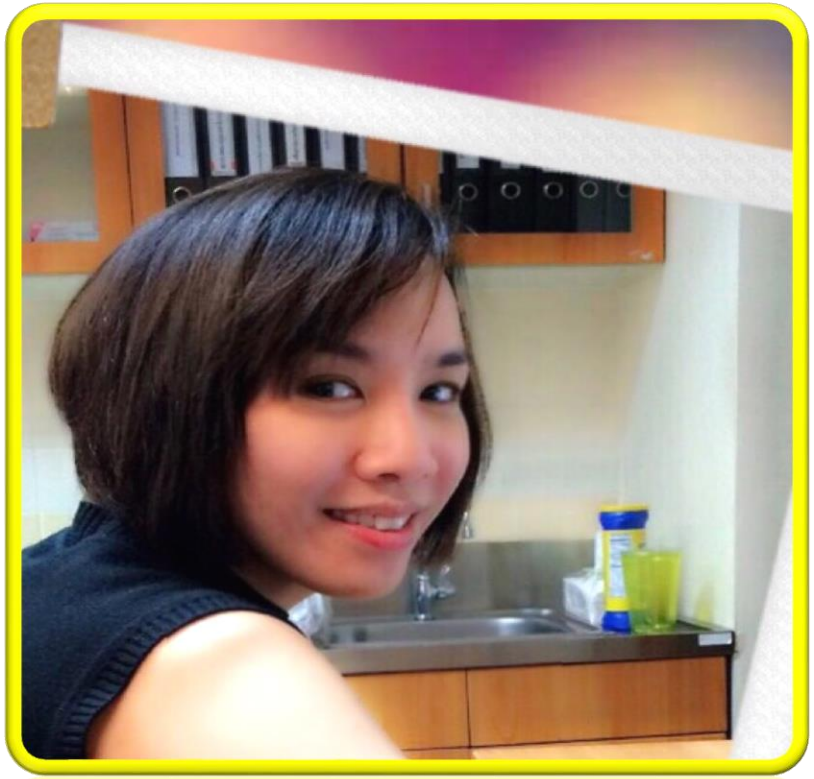
NM CHULABHORN HOSPITAL

1 CYCLOTRON **1 PET CT** **1 SPECT CT**
3 DOCTORS

RP PRODUCTION

^{18}F-FDG
^{18}F-FDOPA
^{11}C-Choline
^{11}C-Erlotinib
^{11}C-PiB
^{18}F-THK-5351
18F-FLT

2015 Tracer dose sell 1874 doses
2016 Tracer dose sell 2448 doses
increase 30.6%



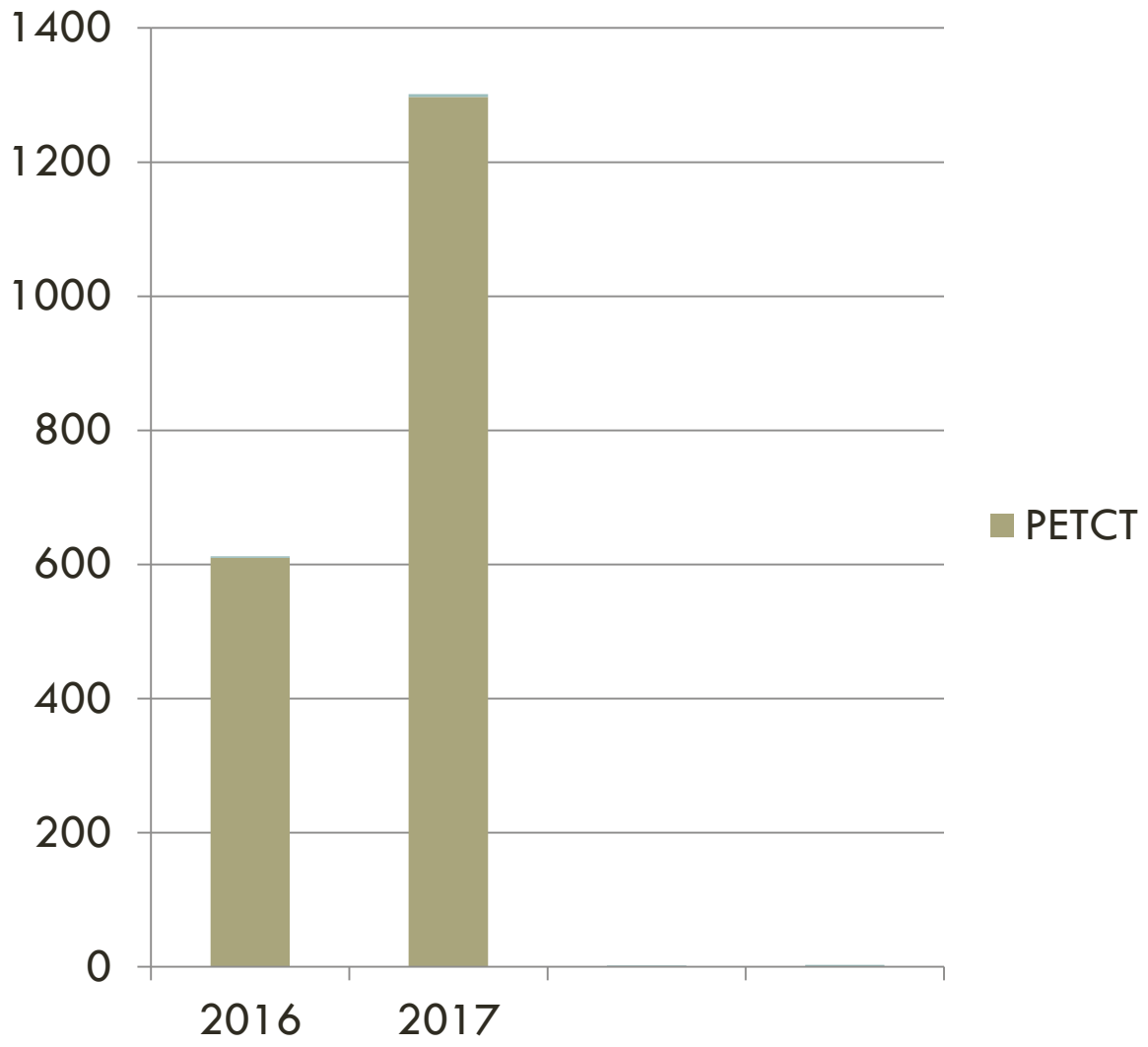
PET CT CASES INCREASE 100%

PET/CT

610 cases PET CT in 2016

1297 cases PET CT in 2017

On sale 50% 1yr from 40,000 to 20,000 baht



NM CHULABHORN HOSPITAL

TOP 5

1 LYMPHOMA

2 CA COLON

3 CA LUNG

4 AD

5 CA BREAST

MEDICAL TOURISM IN THAILAND

Thailand is rapidly becoming the premier destination for patients seeking treatment abroad.

Thailand is a leader in medical tourism.

Thailand's high standards and healthcare expertise make it a world leader in medical tourism, while the options for a post-medical treatment holiday are the best in the world. [Source: TAT]

Global Medical Procedures Cost Comparison

U.S., Thailand, Singapore, and Malaysia (US$)

Procedure	U.S.	Thailand	Singapore	Malaysia
Heart Bypass	$130,000	$11,000	$18,000	$9,000
Valve Replacement	$160,000	$10,000	$12,500	$9,000
Angioplasty	$57,000	$13,000	$13,000	$11,000
Hip Replacement	$43,000	$12,000	$12,000	$10,000
Hysterectomy	$20,000	$4,500	$6,000	$3,000
Knee Replacement	$40,000	$10,000	$13,000	$8,000
Spinal Fusion	$62,000	$7,000	$9,000	$6,000

** Estimated costs of common medical procedures*

Source: Global Health and Travel, Jul–Aug 2013, Page 56.

BDMS GROUP, BANGKOK HOSPITAL

WATTANOSOTH HOSPITAL
BANGKOK CANCER HOSPITAL

NM BDMS HOSPITAL

1 Cyclotron

2 PET/CT machine

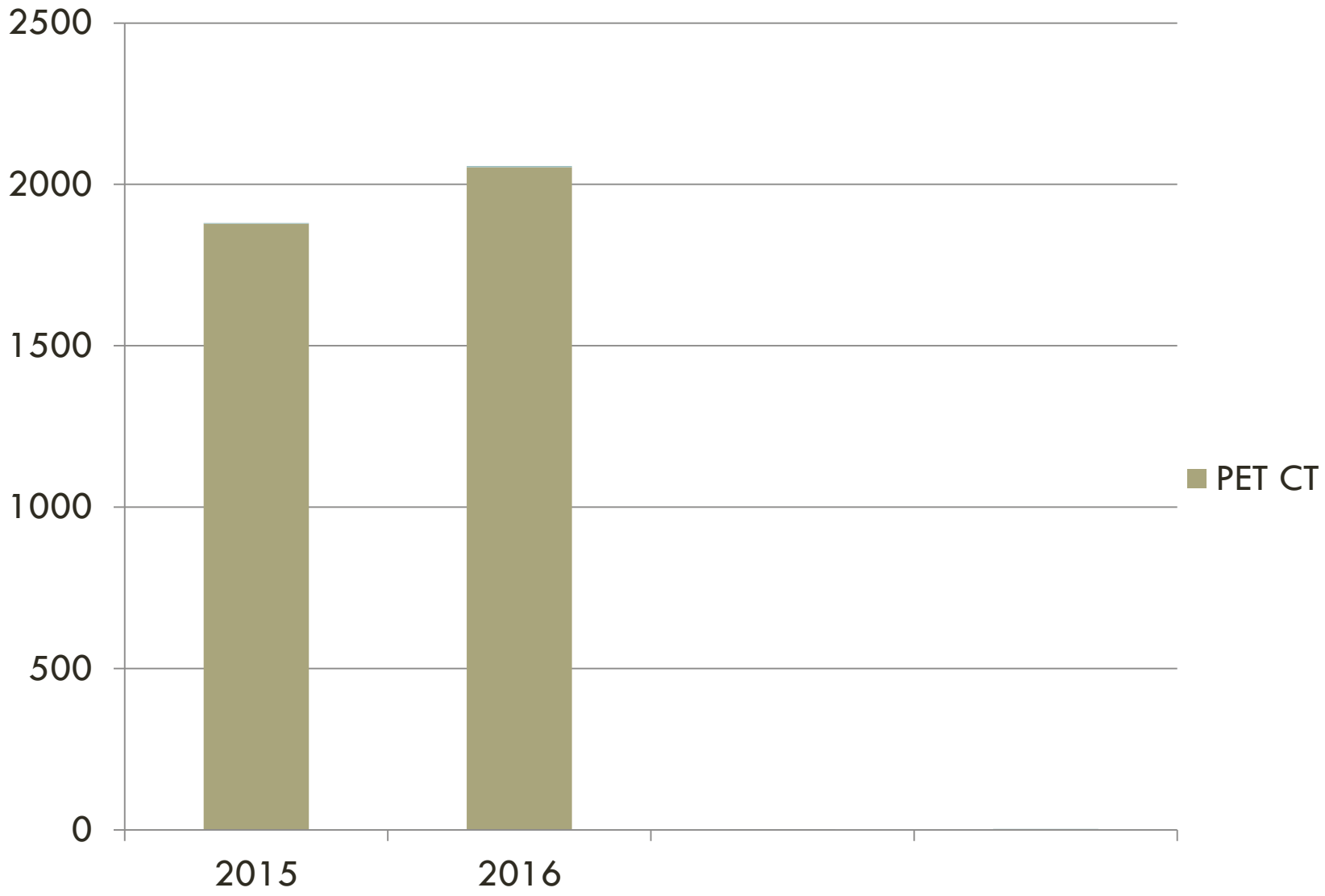
1 SPECT CT

RP production: FDG, FDOPA and PIB

1878 cases PET CT in 2015

2053 cases PET CT in 2016

Increased 9.3%


2500
2000
1500
1000
500
0
2015
2016
PET CT

BDMS STATISTICS (MILLION BAHT)

Years	2013	2014	2015	2016	2017 HY
revenue	76,399.01	93,227.86	102,334.99	106,939.41	118,088.34
net profits	6,261.46	7,393.52	7,917.47	8,386.48	5,764.24
Earn/share	0.40	0.48	0.51	0.54	0.37
margin %	11.95	12.74	12.15	11.90	15.11
Share price	11.75	17.20	22.30	23.10	21.5

Bumrungrad International

BI HOSPITAL

Milestones

Established as a 200-bed facility: **September 17, 1980**

Listed on the Stock Exchange of Thailand: **1989**

Joint Commission International Accreditation: **Since February 2002**

Opening of the Bumrungrad International Clinic (BI Clinic) Building: **May 2008**

One of largest private hospitals in Southeast Asia

One of the world's largest private sector outpatient clinics

Area 70,262 square meters

5500 OPD patients /day 580 IPD beds

NM BI HOSPITAL

1 SPECT

1 PET CT MACHINE

PET/CT

2309 cases PET CT in 2015

2248 cases PET CT in 2016

2026 cases PET CT 10 months 2017

NM IMAGING

1743 studies in 2015

1720 studies in 2016

1208 studies 10 months in 2017

BH STATISTICS (MILLION BAHT)

Years	2013	2014	2015	2016	2017 HY
revenue	14,657.27	15,910.54	17,941.96	18,128.01	8,967.86
net profits	2,520.78	2,730.30	3,435.83	3,626.17	1,965.30
Earn/share	3.46	3.75	4.72	4.98	2.70
margin %	17.20	17.60	19.15	20	21.91
Share price	87.75	141	211	181	222
P/E					

SWOT ANALYSIS THAI NM

TAI TZU YING VS RATCHANOK 8:8

SWOT ANALYSIS

STRENGTH

- Small society – close collaboration
- Nuclear Medicine Board training

Active young generation – further training abroad

WEAKNESS

- Limited budget from the government
- Lack of personnel (Physician, Radiopharmacist, Physicist)
- Only few PET indications for reimburstment
- Uneven distribution of NM center

SWOT ANALYSIS

OPPORTUNITY

- ASEAN economic community (AEC)
  - more patients
  - alerts personnel for knowledge improvement
  - more collaborations
- 30 MeV cyclotron – more radiopharm choices
- QUANUM , WFME

THREAT

Nuclear Med practice by other profession

- AEC

- support of foreigners by Thai government budget

- free flow of health care personnel

HOW TO PROMOTE NUCLEAR MEDICINE IN THAILAND

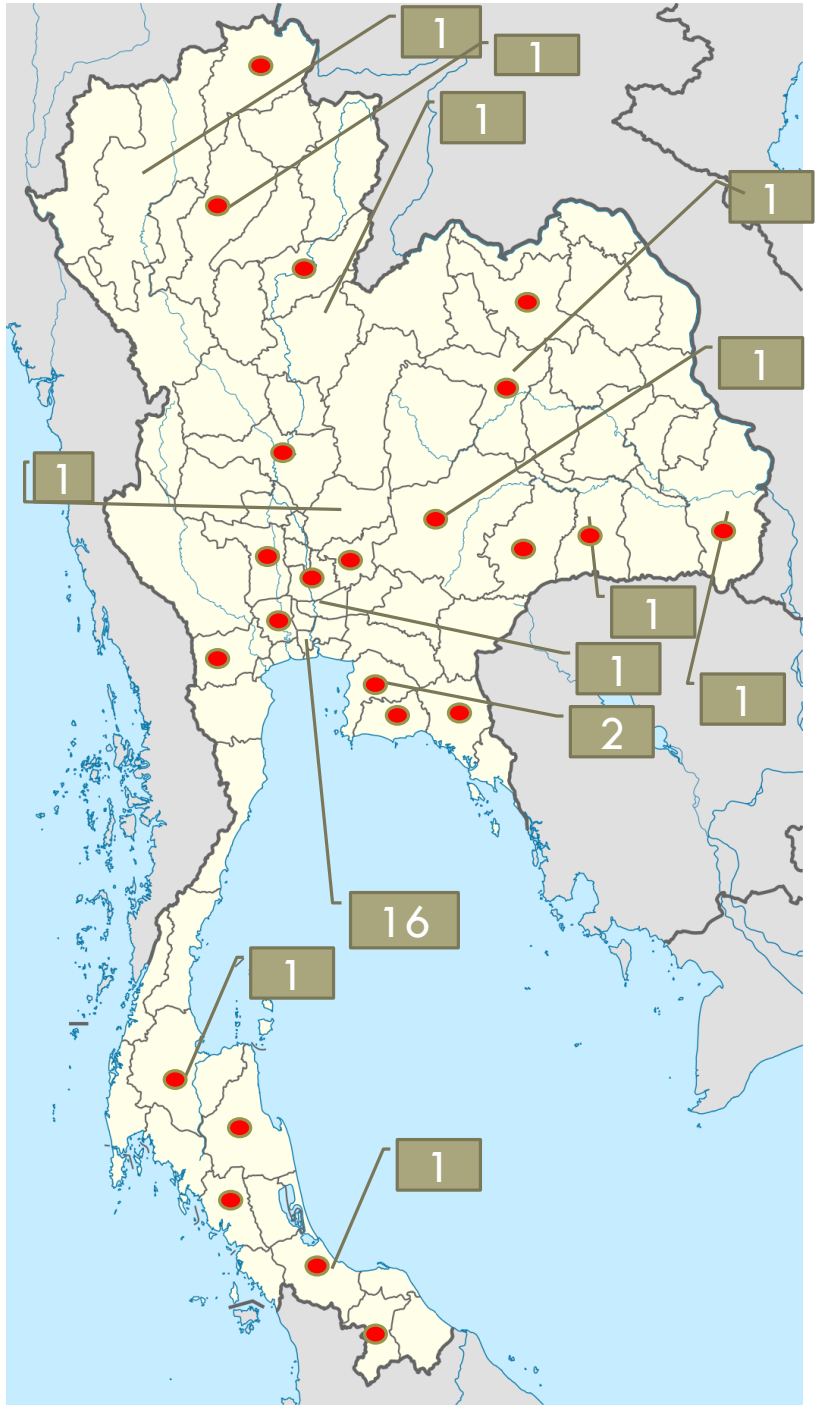
National level

1. Infrastructure : Increase number of nuclear medicine centers

- Increase number of position & salary (government)
- Budget & technology support (government&IAEA)

MORE NM CENTERS IN PROVINCIAL HOSPITALS

3 year government plan
for increased number of radiotherapy and NM centers
throughout the country
: MOPH and Royal college of Radiologist



Provincial Hospitals

HOW TO PROMOTE NUCLEAR MEDICINE

National level

2. Advancing knowledge

- Knowledge support→ Regional/National training course, expert mission
- Sustainability-research activity

HOW TO PROMOTE NUCLEAR MEDICINE

National level

3. Establish a regional school/training course for some professions eg southeast asia

: Radiopharmacist etc

HOW TO PROMOTE NUCLEAR MEDICINE

Regional level

- Create a network – within RCA region & external
  - Establish a Society of Nuclear Medicine in South East Asia region.
  - This society can link out to the bigger societies-ARCCNM, WFNMB,etc

-MOU collaboration and research activity between countries

-Exchange of experts in the region

COLLABORATION DURING THE GLOBALIZATION PERIOD

- International Atomic Energy Agency (IAEA)
- Asian Regional Cooperative Council for Nuclear Medicine (ARCCNM)
- Asia Oceania Federation of NM and Biology (AOFNMB)
- World Federation of Nuclear Medicine and Biology (WFNMB)
- Asian School of Nuclear Medicine
- MOU with Japanese Society of Nuclear Medicine 2016

New release 2017

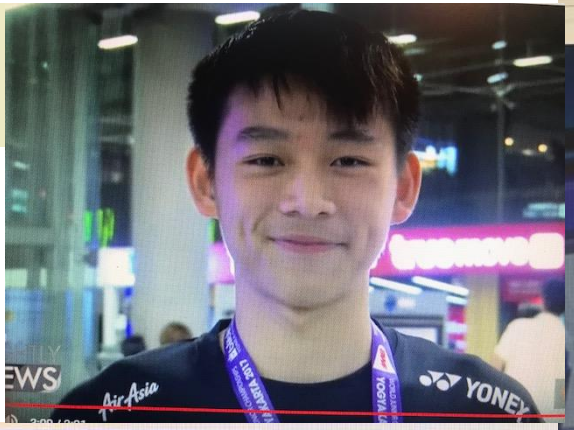
- MOU with Taiwan Society of Nuclear Medicine
- MOU with Institute of Nuclear Energy Research (INER), Taiwan

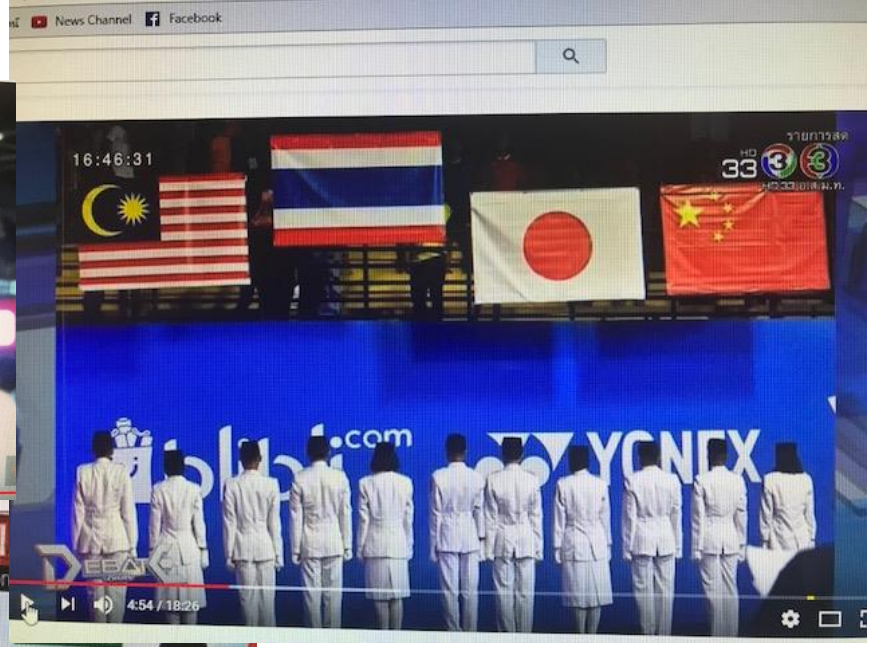

Dr. Kai greeting Dr. Saengsuda (Regional Principal of Thailand)

TAIWAN

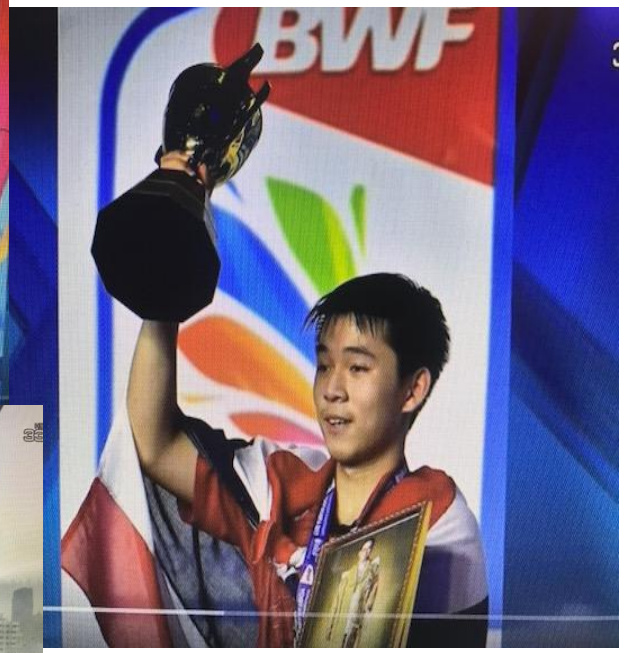
Chou Tien Chuen

THAI YOUNG BLOOD





VIEW



THSNM YOUNG BLOODED PERSONNEL

8 FellowS of ANMB 2015-2017

100% PASS

TAIWAN

FANTASTIC !

TAIWAN

THAILAND

TAIWAN

THAILAND


Shanghai Manifesto 2016
1) NUCLEAR MEDICINE SHOULD NOT BE LIMITED TO ONLY MEDICAL IMAGING BUT ALSO INCLUDE RADIONUCLIDE THERAPY.
2) NUCLEAR MEDICINE SHOULD NOT BE LIMITED TO ONLY SPECT & PET BUT MARCH TOWARDS HYBRID MOLECULAR IMAGING.
3) NUCLEAR MEDICINE IS A SAFE MEDICAL APPROACH WITH LOW RADIATION EXPOSURE. IT IS PATIENT, MEDICAL STAFF AND ENVIRONMENT

CONCLUSION :

All of you now know the overview of update status of NM in Thailand within 30 minutes

Welcome to

Data courtesy of National cyclotron and PET Center, Chulabhorn Hospital

Neuroendocrine Tumors

- eg ^{177}Lu DOTATATE, ^{177}Lu DOTATOC - indicate which therapeutic radiopharmaceuticals are used, and source

No available tracers now. As far as I know, these tracers are being under synthesis by TINT.

Currently not available. Being under synthesis but even with successful production, the cost may be another issue for consideration.

Bone pain

- eg ^{89}Sr chloride, ^{153}Sm EDTMP, 223Ra chloride - indicate which therapeutic radiopharmaceuticals are used, and source

Sr-89 chloride, Sm-153 EDTMP and Ra-223 chloride are available tracers used for palliative bone pain therapy supplied by GMS and GMS/Bayer for Ra-223 chloride.

Sm-153 EDTMP 37 MBq/kgBW

Ra-223 chloride 50 MBq/kgBW

- Are there any issues that impact on access and availability of these therapeutic tracers

At present, Sm-153 EDTMP production at TINT is off due to regulatory problem with OAEP. The most important issue is cost esp. for Ra-223 chloride which has not been approved for reimbursement.

Liver Tumors

- eg ^{90}Y SIRspheres, ^{90}Y glass spheres, ^{188}Re spheres - indicate which therapeutic radiopharmaceuticals are used, and source

Y-90 microsphere is the only available tracer for liver tumor therapy supplied by GMS.

- Typical administered dose (MBq) for each therapy

Y-90 SIRsphere with dose depends on individual patient according to calculated activity from MAA study and volume using partition model.

RAMA

Neuroblastoma

- eg ^{131}I MIBG - indicate which therapeutic radiopharmaceuticals are used, and source

I-131 MIBG is used for neuroblastoma treatment supplied by TINT.

- Typical administered dose (MBq) for each therapy (adult)

I-131 MIBG 3700-11,100 MBq.

Lymphomas

- eg ^{131}I Tositumumab, ^{90}Y Ibritumomab tiuxetan - indicate which therapeutic radiopharmaceuticals are used, and source

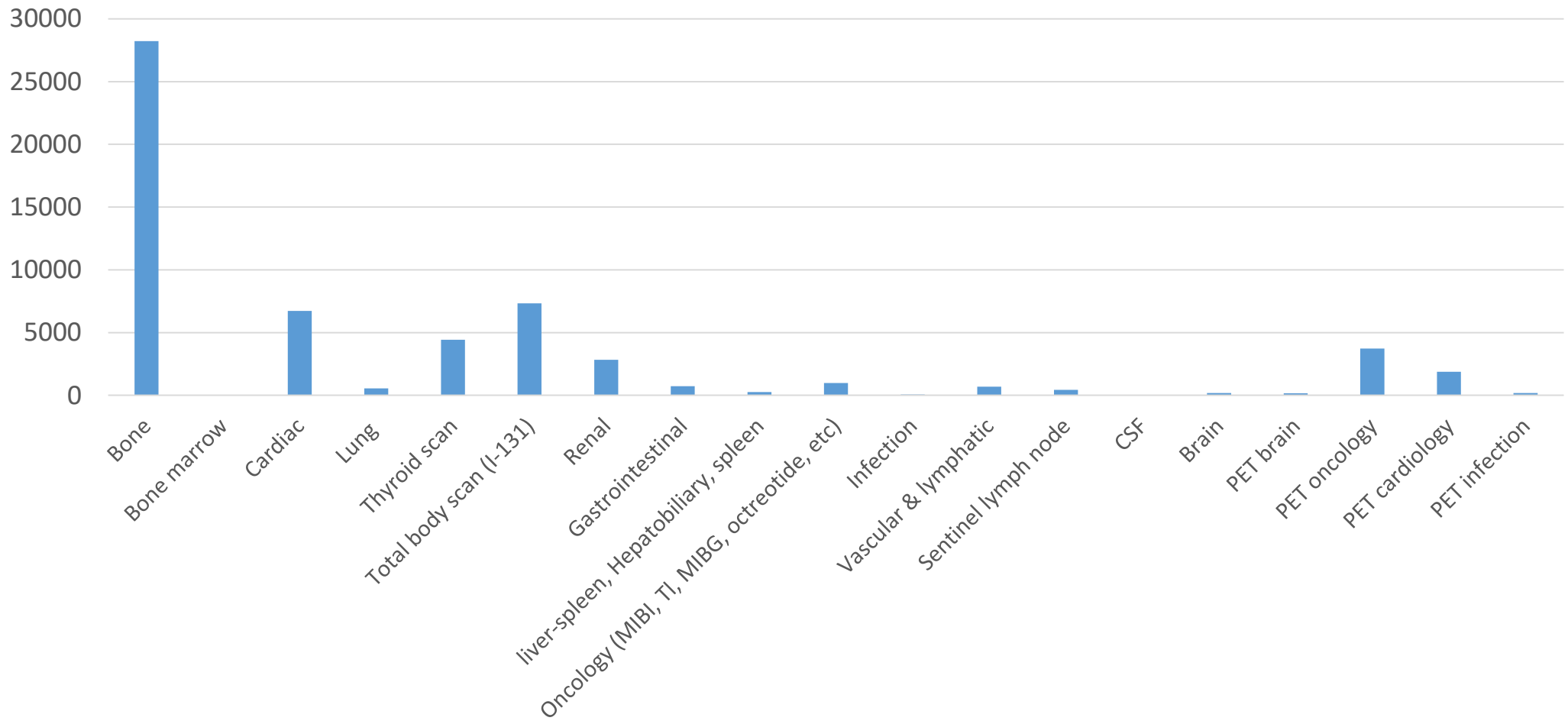
Y-90 Ibritumomab and I-131 rituximab

- Typical administered dose (MBq) for each therapy

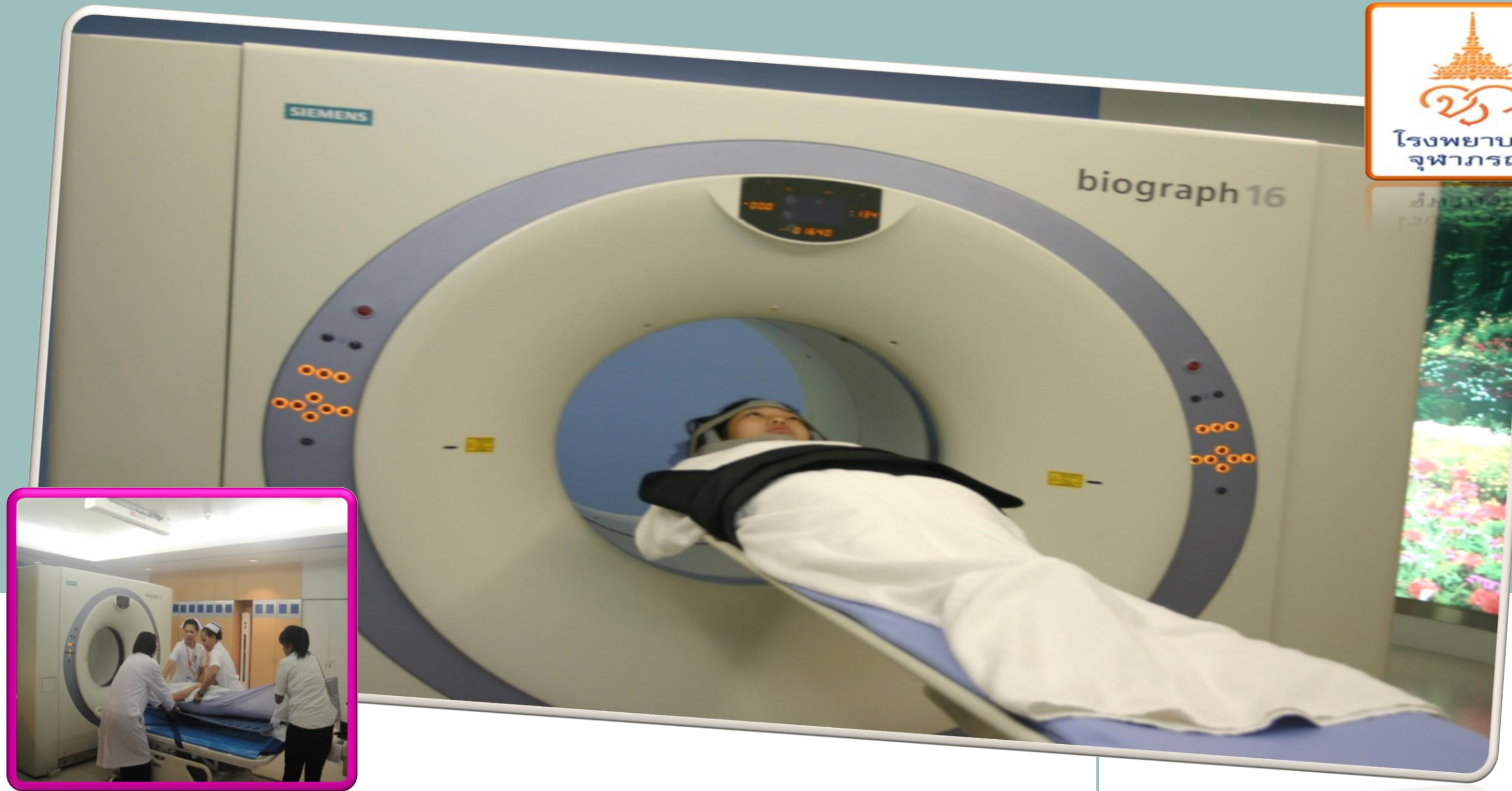
Y-90 Ibritumomab tiuxetan 11.4-14.8 MBq/kgBW, maximum dose 1,184 MBq

I-131 rituximab based on dosimatry (0.75 Gy to whole body)

STUDIES PERFORMED IN 25 CENTERS IN 2015



Scan type	Number
Bone	28217
Bone marrow	8
Cardiac	6736
Lung	549
Thyroid scan	4435
Total body scan (I-131)	7327
Renal	2841
Gastrointestinal	736
Liver-spleen, Hepatobiliary, Spleen	262
Oncology (MIBI, Tl, MIBG, octreotide, etc)	1065
Infection	69
Vascular & lymphatic	674
Sentinel lymph node	447
CSF	25
Brain perfusion	182



โรงพยาบาล
จุฬาภรณ์

Data courtesy of National cyclotron and PET Center, Chulabhorn Hospital

BI HOSPITAL

Patient Volume & Revenue Human Resources

Over 1.1 million patients treated per year (outpatient and inpatient)

Over 520,000 are international patients from over 190 different countries

USD 546 million turnover in 2016

Over 4,800 employees

Over 1,200 physicians and dentists, most with international training and certification

Over 900 nurses

12338 RADIONUCLIDE THERAPY AMONG ALL CENTERS

The two most procedures :

I131 treatment in hyperthyroidism 70%

Treatment in thyroid malignancy 29%

The rest 1% procedures are

I131 MIBG treatment

Sm-153 EDTMP

Ra-223

Y90 microsphere

etc

HOW TO PROMOTE NUCLEAR MEDICINE

National level

4. Increase number of studies

- Road show
- Holding an annual meeting together with other professional societies – oncology, cardiology, neurology, nephrology, pediatrics, ….

MISS INK 16 YEARS OLD

ACKNOWLEDGEMENTS

Institute of Nuclear Energy Research (INER)

International Atomic Energy Agency (IAEA)

Thailand Institute of Nuclear Technology (TINT)

Office of Atoms for Peace (OAP)

Thai Society of Nuclear Medicine

Royal College of Radiologist of Thailand

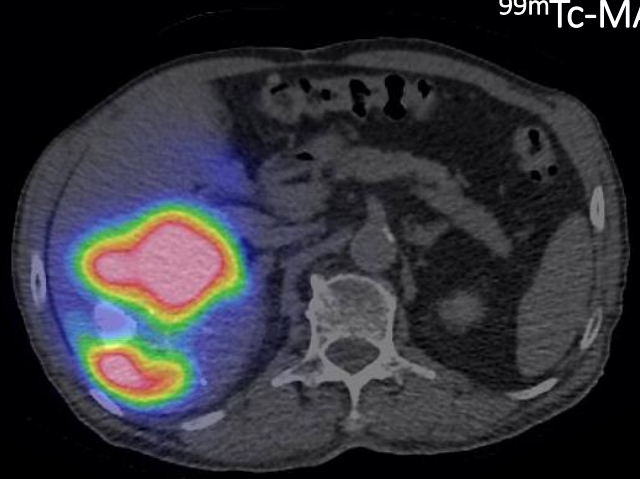
All Nuclear Medicine Centers in Thailand

^{90}Y RESIN MICROSPHERES IN HEPATOCELLULAR CARCINOMA

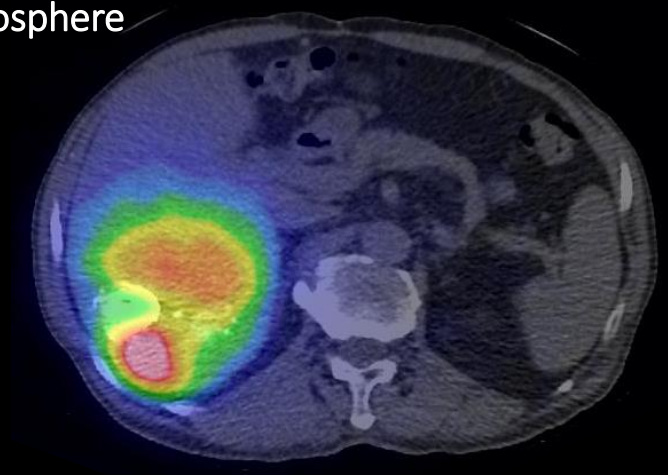
- *Experiences*
  - ^{99m}Tc-MAA hepatopulmonary scan 20 cases
  - ^{90}Y resin microspheres 15 cases
- *Dose calculation*
  - Method - Partition model
  - Software - Dosimetry Toolkits (GE healthcare)
- *Research*
  - Comparison of LSF (planar VS SPECT/CT)
  - Treatment outcome

Pre-treatment CT scan

^{99m}Tc-MAA



^{90}Y-microsphere



^{90}Y microsphere treatment

THE SUCCESSFUL PROGRESS OF NUCLEAR MEDICINE PRACTICE IN THAILAND DURING THE GLOBALIZATION PERIOD

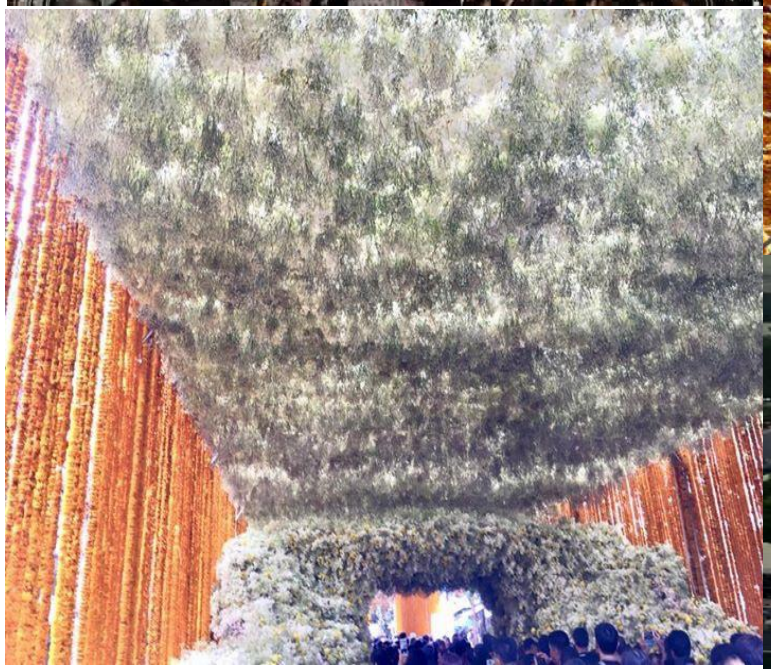
Collaborations with IAEA projects particularly the upcoming of quality management audits in nuclear medicine practice (QUANUM) for Thailand

Academic links and collaborations with the Asian Regional Cooperative Council for Nuclear Medicine (ARCCNM) .

Mutual exchanges of education and research activities due to MOU between THSNM and JSNM since October 2016

A great step to have an MOU with TSNM and INER

The well preparedness of manpower, equipment and new technology in both imaging and radionuclide therapy.



RAJAVITHI HOSPITAL

The largest hospital of public health ministry with affiliated to Rungsit University (private) for first private medical students , about 3 million baht for 6 yrs , since 1992

1200 hospital beds

1 million OPD visits

40,000 IPD admissions

250 full time physicians

4500 employees

Undergraduate, postgraduate , resident and fellows training

NM RAJ HOSPITAL

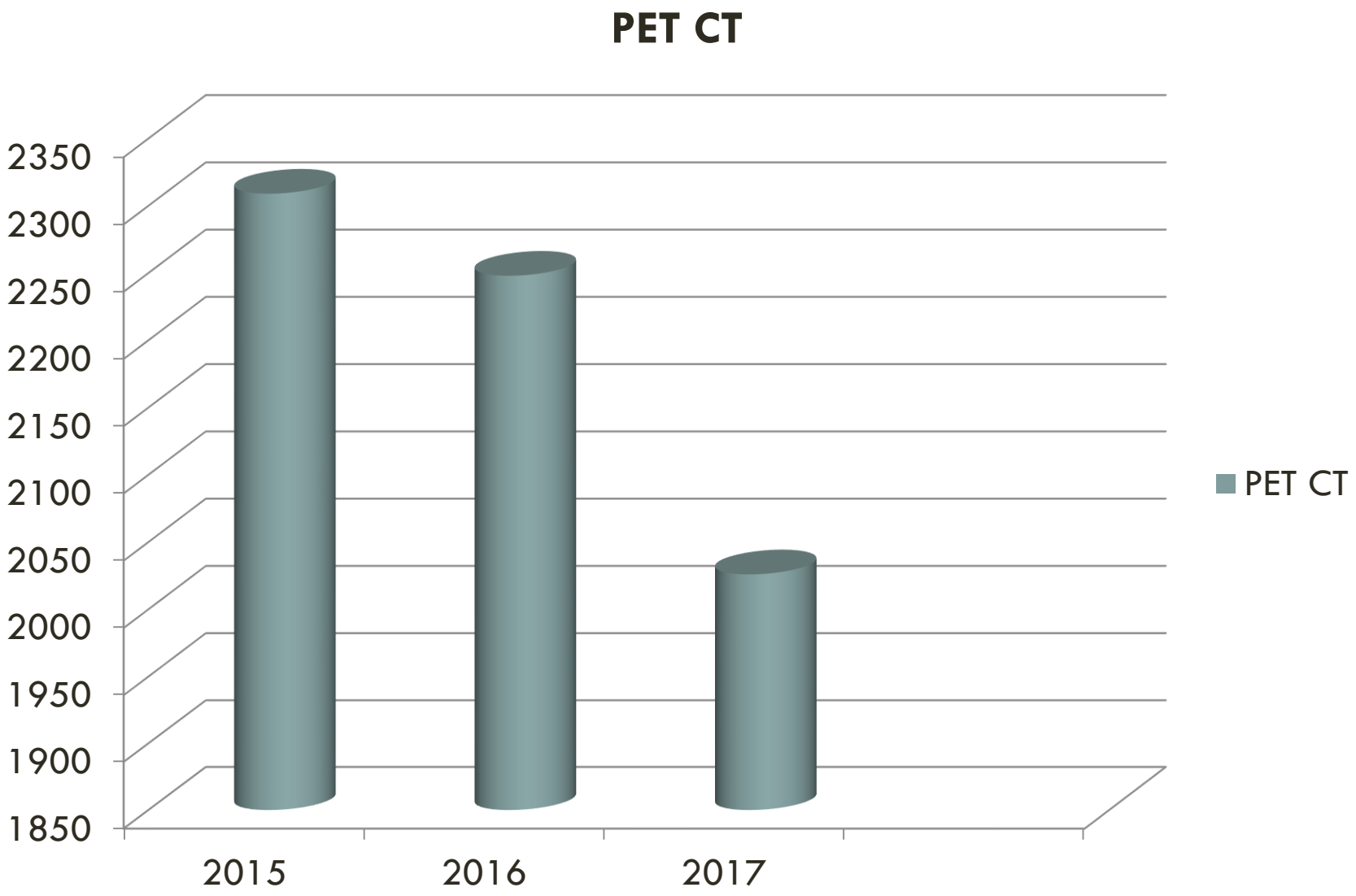
4 DOCTORS

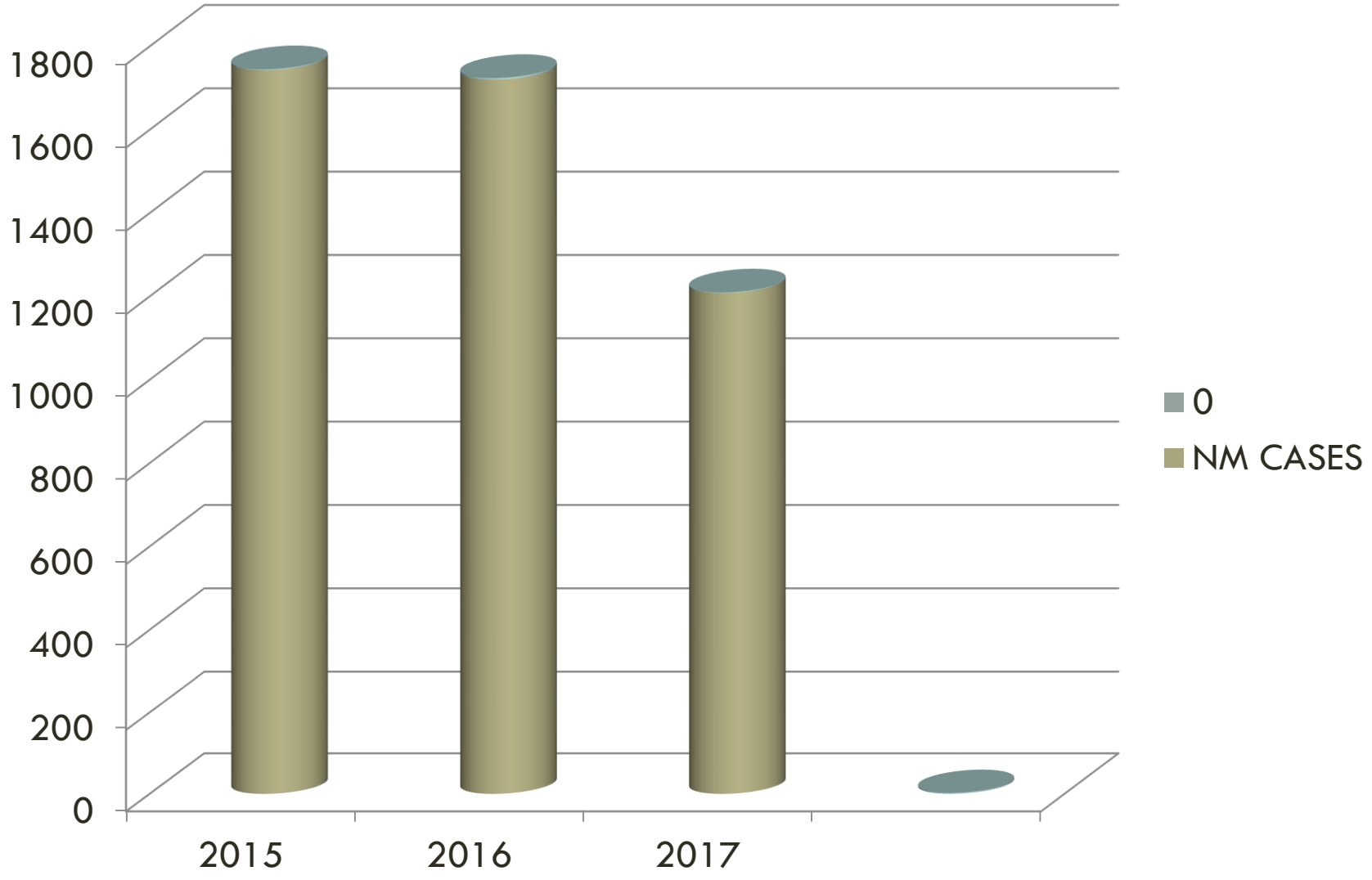
no Cyclotron

No PET/ CT 2 SPECT

1 PEM

2700 NM imaging/Y


PET CT
2350
2300
2250
2200
2150
2100
2050
2000
1950
1900
1850
2015
2016
2017
PET CT


1800
1600
1400
1200
1000
800
600
400
200
0
2015
2016
2017
0
NM CASES

INTERNATIONAL ACADEMIC MEETINGS

SNMMI (Society of Nuclear Medicine and Molecular Imaging)23-26 June 2018 Philadelphia

EANM (31th European Association of Nuclear Medicine 2018) 13-17 October Dusseldorf

AOCNMB (12th Asia Oceania Congress of Nuclear Medicine and Biology) 2017 Yokohama

Congress of WFNMB 12th Melbourne 20-24 April 2018

ANMF (4TH Asian Nuclear Medicine Academic Forum) 2018 MB

ANMB examination2018 Melbourne