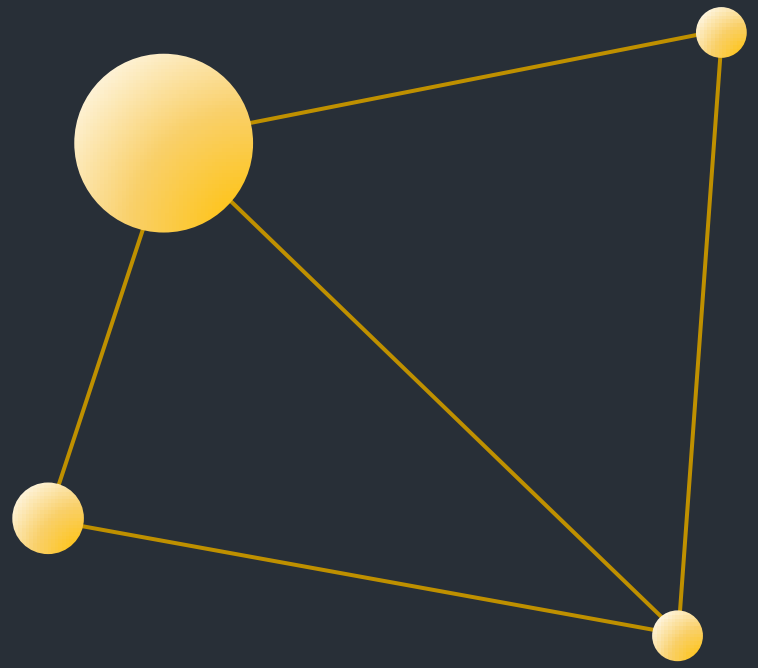
Cyclopharm



22 and 24 October 2019
TechKnow Invest Roadshow
Sydney and Melbourne Australia
James McBrayer, CEO & Managing Director

Safe Harbour Statement

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All references to dollars unless otherwise specified are to Australian dollars.

CYCLOPHARM INVESTMENT CASE

TECANEGAS™

Profitable & Growing MedTech
underlying business is cash positive and issuing dividends

First in class
proprietary product sales to 57 countries with 4.2 million studies to date

Recurring revenue
from consumables similar to an annuity model

USFDA approval
set to quadruple the size of the existing PE business and further leverage penetration into the CTPA market

Optionality
into indications beyond PE into chronic respiratory disease management could deliver exponential growth

Company Overview

Technegas is a substantially de-risked commercial proposition with significant upside in the US market

- Technegas revenues generated in **57 countries**
- Over **195,000 patient procedures** in 2018
- Over **4,200,000 patient procedures** since 1986
- **~1,600 Technegas generators** sold globally
- CYC is growing, underlying business is profitable and a dividend paying company
- Stable gross margins of greater than 80%
- Around 80% of historical revenue is recurring consumable sales

Share Price (18 Oct 2019)	$1.21
Shares on Issue	68.9 million
Market Capitalisation	$83.4 million
Cash (30 June 2019)	$5.8 million

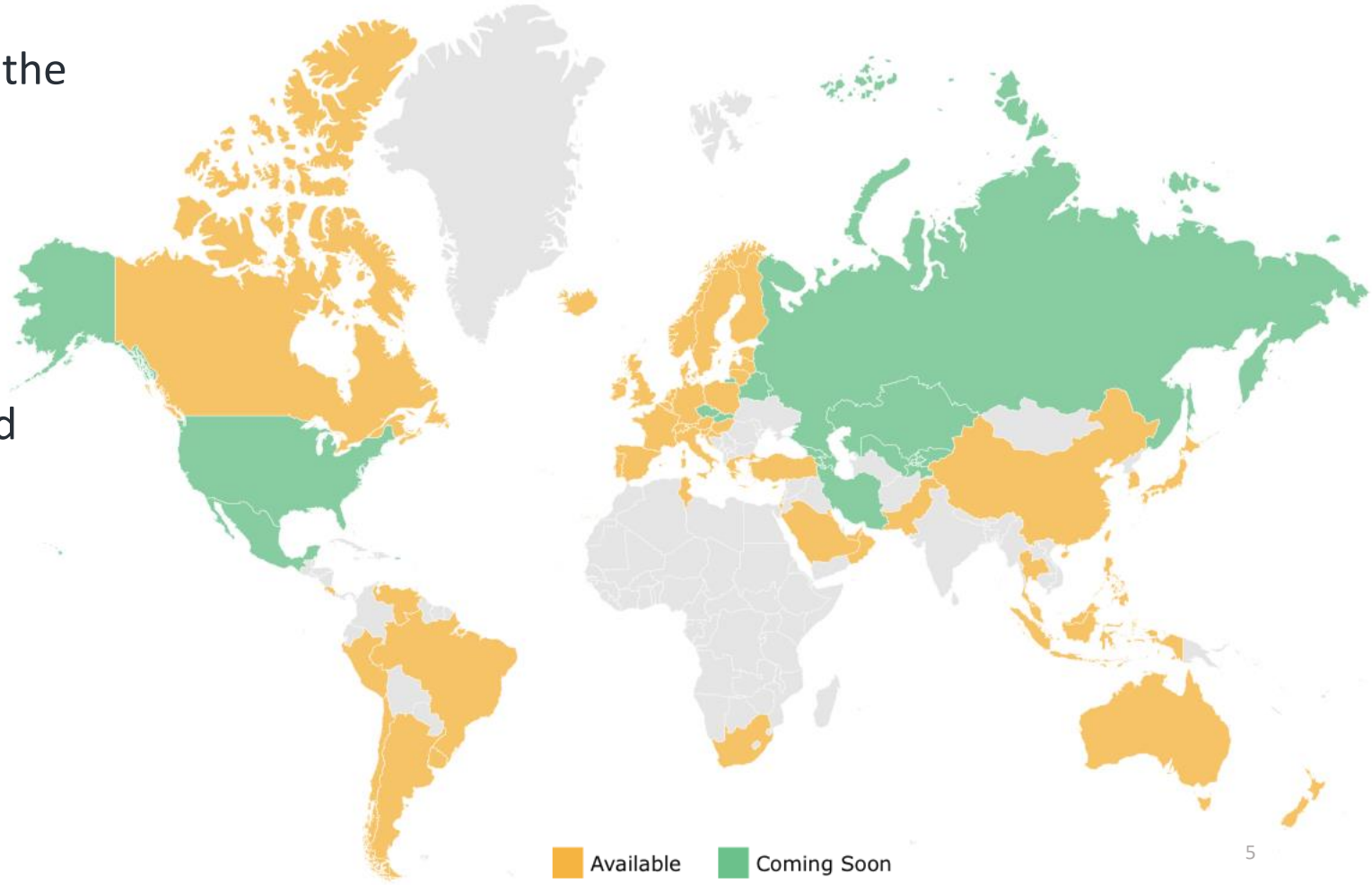
Technegas is not commercially available in the USA.

Technegas around the world

Technegas was introduced to the medical community **in 1986** [1]

Technegas revenues are generated **in 57 countries** via a combination of direct and distributor sales models

Over **4.2 million** patient procedures to date



1. Wiebe LI, et al. Current Radiopharmaceuticals 2010; 3(1): 49-59

Technegas is not commercially available in the USA.

What is Technegas?

Particle characteristics

Technegas is composed of Tc-99m cores encapsulated within layers of graphite to form individual hexagonal plate-like particles.[1]

These particles agglomerate to reach a dynamic equilibrium with regard to particle size distribution best described as a bell-shaped curve with an average size of 100nm.[2]

Manufacture and Distribution

Technegas is produced on site at the point of patient administration.

Technegas is manufactured by heating Technetium-99m in a carbon crucible within an argon environment for a few seconds at 2,750 degrees Celsius.[3]

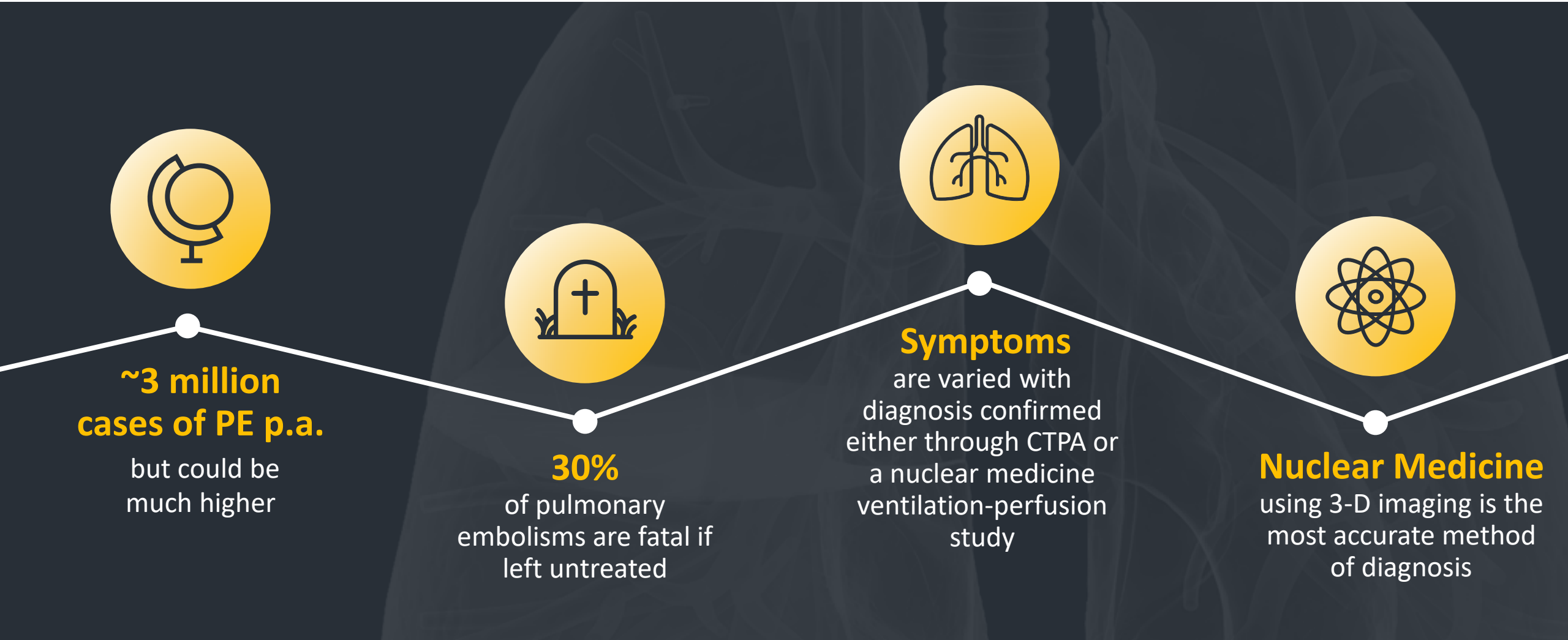
Because of the very small particle size, Technegas is distributed in the lungs almost like a gas and deposited in alveoli by diffusion, providing for SPECT[3] ventilation imaging

Particles remain in the lung until they are cleared by ciliary action or phagocytosis[4].

1. Wiebe LI, et al. Current Radiopharmaceuticals 2010; 3(1): 49-59
2. Lemb M, et al. Eur J Nucl Med 1993; 20(576-579)
3. Leblanc M, et al. CANM guidelines; Nov 2018: www.canm-acmn,ca/guidelines
4. Möller W, et al. Am J Respir Crit Care Med 2008; 177: 426-432

Technegas is not commercially available in the USA.

Pulmonary Embolism



~3 million cases of PE p.a.

but could be much higher

30%

of pulmonary embolisms are fatal if left untreated

Symptoms

are varied with diagnosis confirmed either through CTPA or a nuclear medicine ventilation-perfusion study

Nuclear Medicine

using 3-D imaging is the most accurate method of diagnosis

Benefits of using Technegas

Easy
to prepare and administer

Only need
3 to 4 breaths

3D images
provide functional imaging through to the alveolus

No
contraindications

Cost
effective

Superior to competitive nuclear medicine products

Technegas

- Easy
- 3 to 4 breaths
- 3D images
- No contraindications
- Cost-effective

Xenon - 133

True radioactive gas
inhaled with full face mask

Constant inhale -exhale breathing
for 15 mins

No 3D images
limited to planar imaging resulting in inferior clinical outcomes

Requires special rooms
to contain radioactive gas in the event of a release

DTPA Tc99m

Wet Aerosol
impacts efficacy and clinician interpretations

Creates hotspots
in presence of lung diseases, which is a frequent comorbidity in PE

Technegas is not commercially available in the USA.

TECHNEGAS™

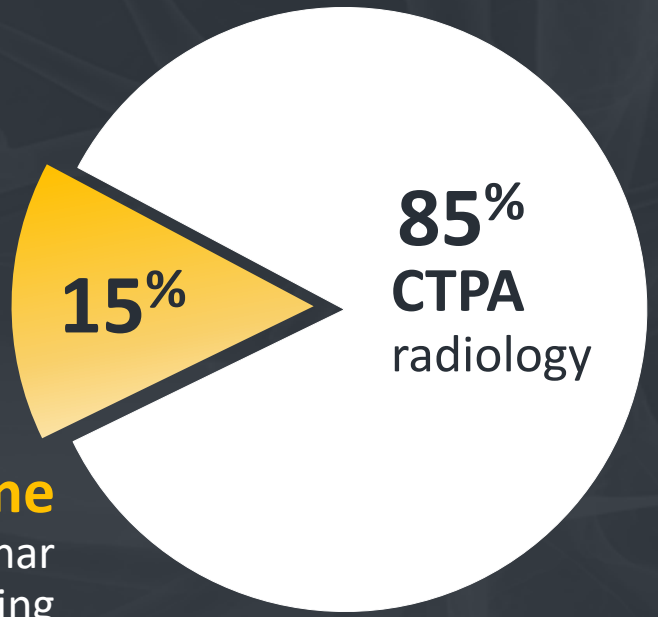
Coming to America

Technegas is not commercially available in the USA.

Entering the USA Market – Significant Opportunity

USA = 4 million studies p.a.
to rule out PE

$90m USD
Nuclear Medicine ventilation imaging market



Nuclear Medicine
Predominantly Planar Imaging

Our goal in the USA is to double the existing Nuclear Medicine Ventilation Market to $180m USD

CTPA

High radiation burden
CTPA delivers at least 27 times more radiation to the breast as compared to V/Q SPECT[1]

Contraindications
CTPA should not be performed with pregnancy[1-2], renal impairment[3], contrast media allergy[3], diabetes[4]

Acute kidney injury (AKI)
AKI occurs in up to 13% of CTPA cases[5]

Lower clinical sensitivity
V/Q planar[6] = 76%
CTPA[7] = 82%
V/Q SPECT[7] = 93%

Availability
Radiology ED services are generally provided 24/7 vs. nuclear medicine after hours on call service

1. Isidoro J, et al. Phys Med 2017; 41: 93-96
2. Bajc M, et al. Eur J Nucl Mol Imaging 2015; 42: 1325-1330
3. Miles S, et al. Chest 2009; 136: 1546-1553
4. Roach PJ, et al. J Nucl Med 2013; 54: 1588-1596
5. Doganay S, et al. Renal Failure 2015; 37(7): 1138-1144
6. Reinartz P, et al. J Nucl Med 2004; 45: 1501-1508
7. Hess S, et al. Semin Thromb Hemost 2016; 42(8): 833-845

Technegas is not commercially available in the USA.

Technegas FDA Clinical Trial Process and Design

Study Sites

USFDA Clinical trial[1] registered at: https://clinicaltrials.gov/ct2/show/NCT03054870?term=technegas&rank=1

Non-inferiority structural ventilation study comparing Xe133 vs. Technegas[1]

Planned 240 patient study at 9 clinical sites

179 Patients enrolled as at 18 October 2019

Currently compiling a 505(b)2 New Drug Application for submission

The 505(b)2 New Drug Application is expected to be sufficient for USFDA approval

Six-month Priority Review application will be submitted with the 505(b)2 New Drug Application

Clinical Trial enrollment will continue whilst the 505(b)2 submission is being reviewed

Timeline

1H 2018
Finalise Trial Site Recruitment

1H 2018
Submit Preliminary Trial Results for FDA Review

2H 2019
Planned NDA Submission

2H 2019
Commence USA Generator Inventory Build

2020
Anticipated USA Launch provided successful USFDA approval

1. ClinicalTrials.Gov – A comparison of Technegas and Xenon-133 Planar Lung Imaging in Subjects referred for Ventilation Scintigraphy. https://clinicaltrials.gov/ct2/show/NCT03054870?term=technegas&rank=1

What the guidelines say about Technegas:

Endorsed by the guidelines from the European[1-2] and the Canadian[3] Associations of Nuclear Medicine (EANM & CANM)

- “Using 99m-Tc-Technegas is according to clinical experience **better than the best aerosols**”
- “Technegas **facilitates interpretation**, particularly in COPD”
- “For ventilation, **99m-Tc Technegas is the best-aerosol** particularly in patients with COPD”
- “**Liquid aerosols are inferior for SPECT** and should not be used unless Technegas is not available”
- “The **best widely available agent for ventilation** is 99m-Tc-Technegas”
- “Because of the very small particle size, this agent is distributed in the lungs almost like a gas and deposited in alveoli by diffusion, where they remain stable, thus **providing the best possible images for ventilation** SPECT”
- “Another advantage is that only a few breaths are sufficient to achieve an adequate amount of activity in the lungs, **reducing time and personnel exposure to radiation**”
- “Technegas is considered the **agent of choice** in the COPD population as there is less central airway deposition, better peripheral penetration, and it does not wash out as quickly as traditional aerosols”

1. Bajc M, et al. Eur J Nucl Med Mol Imaging 2019; [Epub ahead of print]: https://link.springer.com/content/pdf/10.1007%2Fs00259-019-04450-0.pdf
2. Bajc M, et al. Eur J Nucl Med Mol Imaging 2009; 36(8): 1356-70; https://eanm.org/publications/guidelines/gl_pulm_embolism_part1.pdf
3. Leblanc M, et al. CANM 2018; https://canm-acmn.ca/resources/Documents/Guidelines_Resources/MasterDocument_Final_Nov_21_incl-Exec-Sum_ver3_Dec.%2012_.pdf 2.a

Technegas is not commercially available in the USA.

Building from a strong & well established foundation

Near term opportunities providing significant growth potential beyond PE toward patient management

USA Market

nuclear medicine ventilation imaging market to diagnose PE equal to $90m USD with reimbursement already in place

Targeting USA CTPA PE market

opportunity to convert CTPA to nuclear medicine imaging by shifting market to SPECT imaging

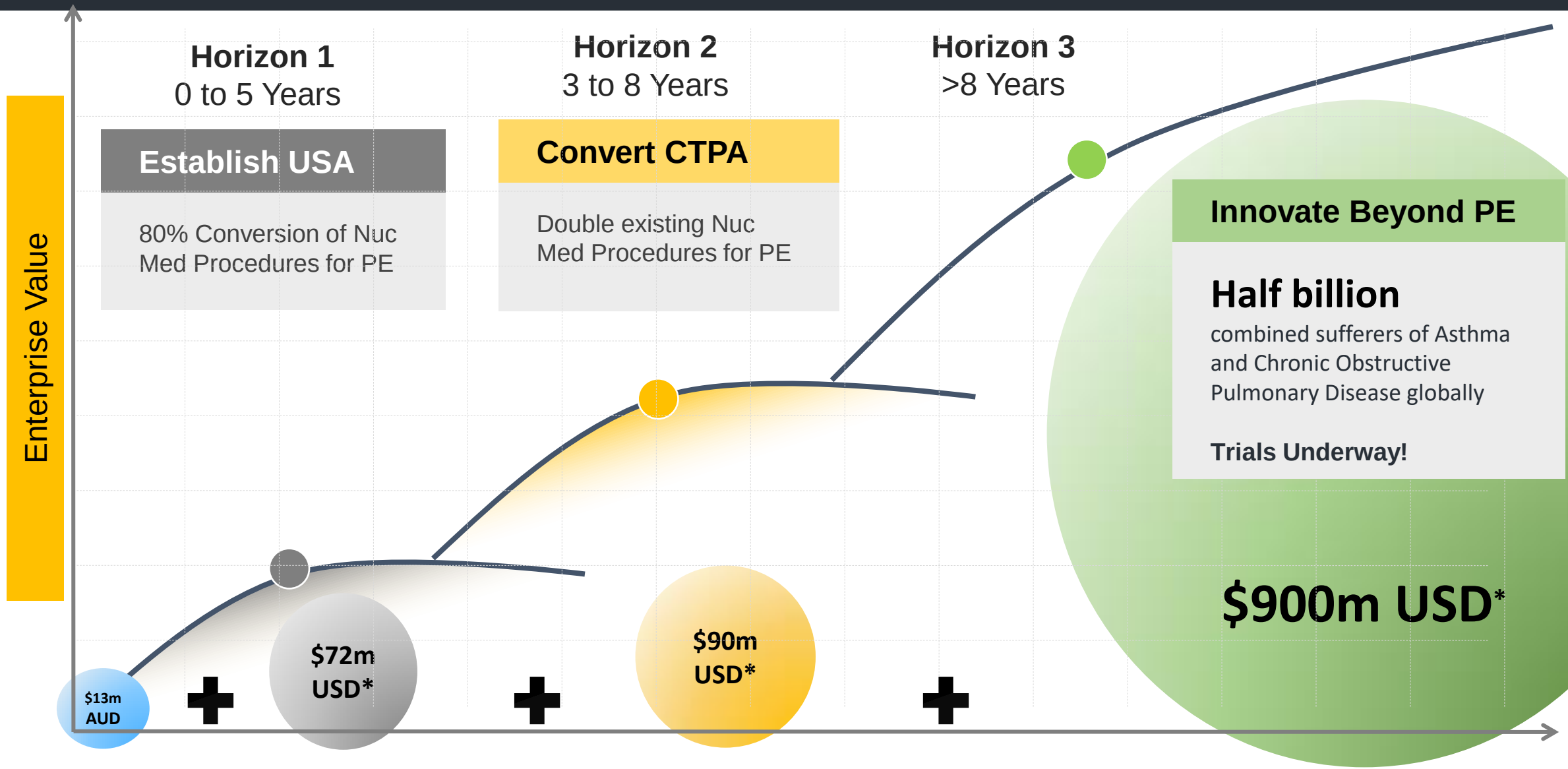
Half billion

combined sufferers of Asthma and Chronic Obstructive Pulmonary Disease globally.

Trials underway

Technegas is not commercially available in the USA.

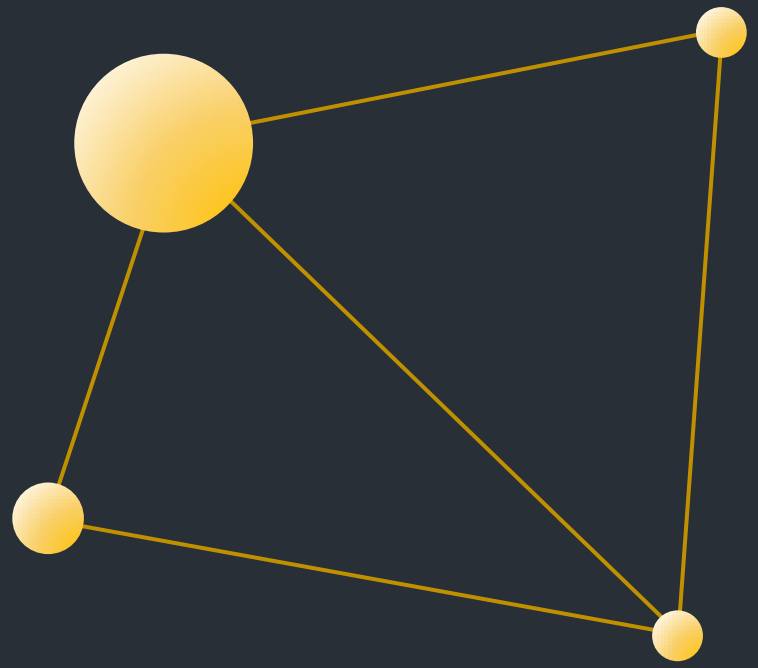
Three Value Horizons



Technegas is not commercially available in the USA.

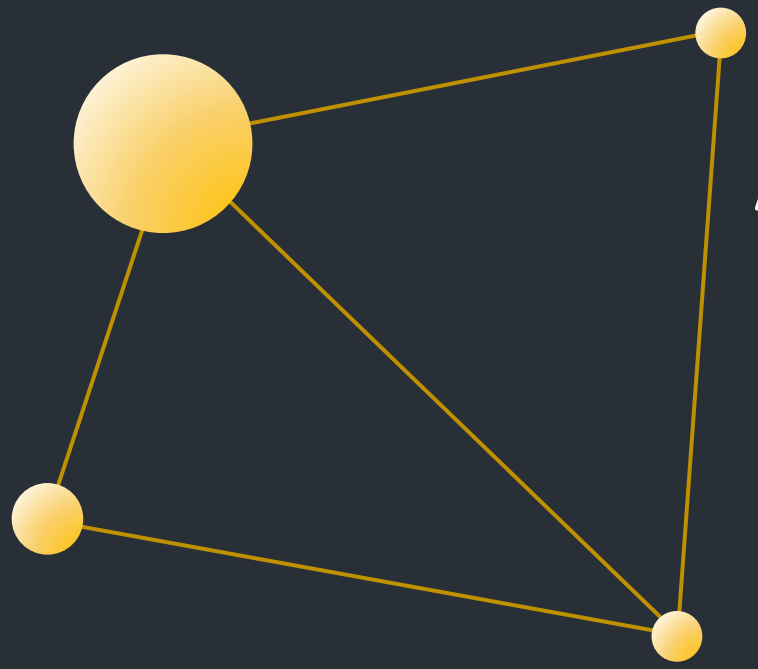
*USA Revenue Estimates

Cyclopharm



Thank You

Appendix Section



FY2018 Results Highlights

Group Sales Revenue	**$13.40 million**
Gross Margin	$10.85 million
Net Loss After Tax	($0.04) million including USFDA investment
Interim Dividend	1.0 cents per share
Underlying Technegas EBITDA[1]	$1.90 million
FDA Trial expenses	($2.96) million
Strong balance sheet[2]	$9.19 million of cash reserves as @ 31 Jan 2019
Guidance Affirmed	The Board expects continuing modest growth in underlying Technegas volumes from existing markets for FY19

Note 1: Underlying Results represent results from the division excluding R&D tax incentive, reversal of contingent consideration, FDA expenses, Pilot Clinical Trial expenses and net expenses for Germany
Note 2: Cash reserves as at 31 December 2018 was $5.85 million

Group Underlying Performance

Solid Underlying Financial Results

Year ended 31 December *($000's)*	2018	2017
Consolidated sales	**13,404**	**13,189**
Gross margin	10,855	10,740
Gross margin % sales	*81.0%*	*81.4%*
Consolidated EBITDA	**655**	**1,043**
Add back:		
CPET / Ultralute™ division EBITDA	335	457
Reversal of contingent consideration	(314)	-
Unrealised gain on forward exchange contract	(275)	-
Expenses net of writebacks for Germany	410	677
FDA expenses and other pilot trial expenses	3,216	2,855
R&D Tax Incentive	(2,122)	(2,391)
Technegas Underlying EBITDA	**1,905**	**2,641**

During the year, CYC continued to implement its strategic priorities, which are to:

1. Accelerate the path to regulatory approval to sell Technegas into the world's largest and new highly prospective US market;
2. Pursue sales of Technegas in new applications: Chronic Obstructive Pulmonary Disease ("COPD") and Asthma which are significantly larger markets than the Pulmonary Embolism market where CYC traditionally operates;
3. Identifying, developing and commercialising complementary innovative technology such as Ultralute™; and
4. Leveraging our core global regulatory strengths, fiscal discipline, strong balance sheet and well-developed expertise in nuclear medicine and pulmonary healthcare to seek out complementary technologies and businesses.

Technegas is not commercially available in the USA.

Group Balance Sheet

Financial Foundation to Leverage Growth Strategy

Year ended 31 December *($000's)*	2018	2017
Cash	5,855	8,690
Other current assets	9,600	8,139
Non-current Assets	8,082	6,548
Total Assets	**23,537**	**23,377**
Current Liabilities	5,219	5,212
Non-current Liabilities	1,302	916
Total Liabilities	**6,521**	**6,128**
Net Assets	**17,016**	**17,249**

During the year, CYC continued to implement its strategic priorities, which are to:

- Low debt & cash on hand – provides balance sheet and funding flexibility
- Funding used toward USFDA clinical trial enrolment and New Drug Application submission
- Strong financial position supports ongoing investment in R&D and expansion into new markets and indications

Group Cash Position

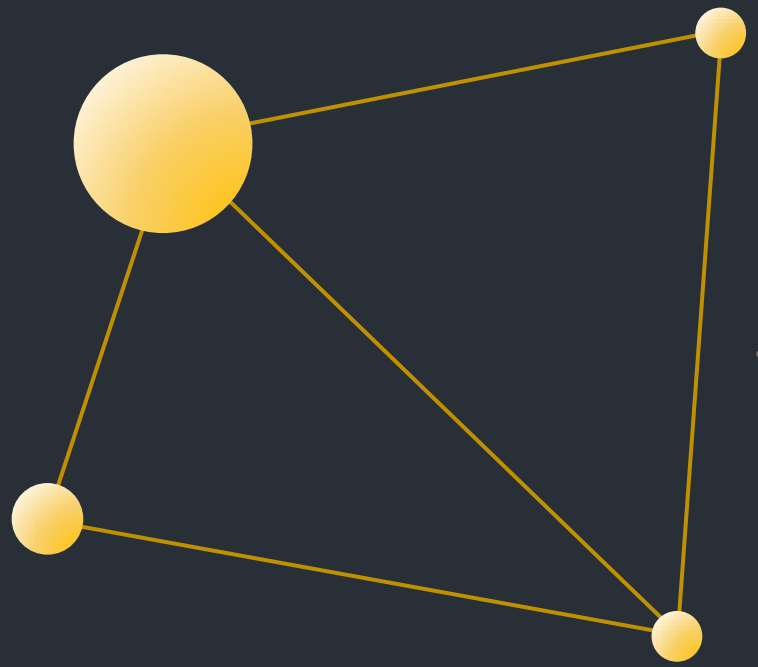
Cash Position Funding Growth

Year ended 31 December *($000's)*	**2018**	**2017**
Operating Activities	(1,107)	(682)
Investing Activities	(1,403)	(1,136)
Financing Activities	(353)	5,828
Net (Decrease) / Increase in Cash	(2,863)	4,010
Opening Cash	8,690	4,591
Foreign Exchange	28	89
Closing Cash @ 31 December ($000's)	**5,855**	**8,690**
Closing Cash @ 30 April 2019 ($000's)	**7,137**	

- Capital Raising $6.59 m June 2017 with 90% Shareholder Participation
- Benefited from expanded R&D tax Incentive Program resulting in Other Income of $2.12 million

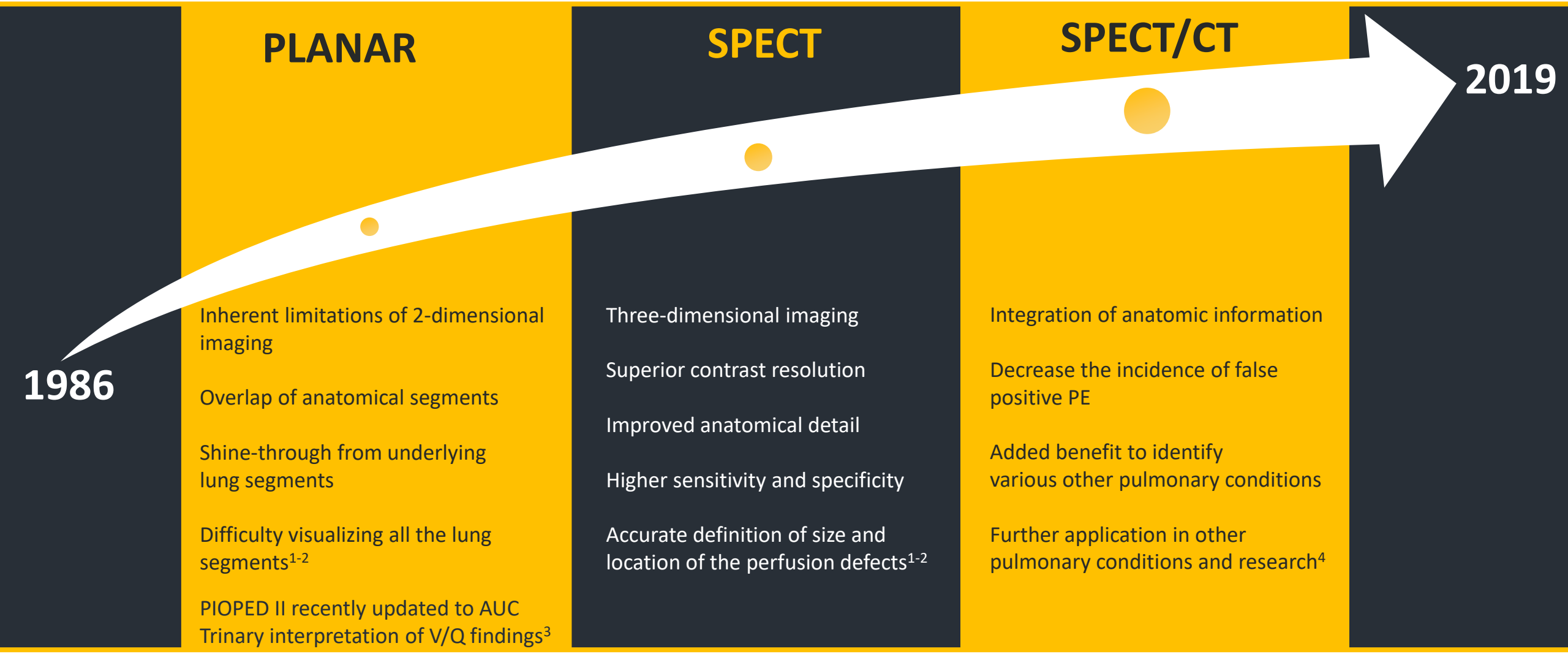
Pulmonary Imaging With

TECHNEGAS™



Technegas is not commercially available in the USA.

Nuclear Medicine Imaging Technology Has Evolved Beyond CTPA in Diagnosing PE



1. Gutte H, et al. Nucl Med Commun 2010; 31: 82-86
2. Roach PJ et al. Semin Nucl Med 2010; 40:397-407
3. Waxman AD, et al. J Nucl Med 2017; 58: 13N-15N
4. Roach PJ, et al. J Nucl Med 2013; 54:1588–1596

Technegas is not commercially available in the USA.

Radiation Dosimetry

A nuclear medicine V/Q scan is Exponentially Lower in dose than CTPA

Technique	Effective dose (mSv/MBq)	Effective dose (mSv)	Breast absorbed dose (mGy)	Lung absorbed dose (mGy)
Ventilation Technegas (20MBq) [1-3]	0.015	0.30	0.13	2.2
Ventilation ^{99m}Tc-DTPA (20MBq) [1-2]	0.007	0.14	0.04	0.30
Ventilation ^{133}Xe (800MBq) [1]	0.0014	1.12	0.09	0.89
Perfusion MAA (120MBq) [1-3]	0.012	1.44	0.60	7.92
Low dose CT non-contrast [4]	NA	~ 1.00	-	-
CTPA 16 slice [1]	NA	14.4	10-20	10
CTPA 64 slice [1,3]	NA	19.9	22	20

Table: Radiation dosimetry data were sourced from Bajc M et al 2009 [1]; Schembri GP et al 2010 [2], Isidoro J et al 2017 [3] and Ling IT et al 2012 [4].

1. Bajc M, et al. Eur J Nucl Med Mol Imaging 2009; 36(8): 1356-1370
2. Schembri GP, et al. Semin Nucl Med 2010; 40: 442-454
3. Isidoro J, et al. Phys Med 2017; 41: 93-96
4. Ling IT, et al. Intern Med J 2012; 42(11): 1257-1261

Technegas is not commercially available in the USA.

Nuclear Medicine provides better diagnostic outcomes in Diagnosing PE

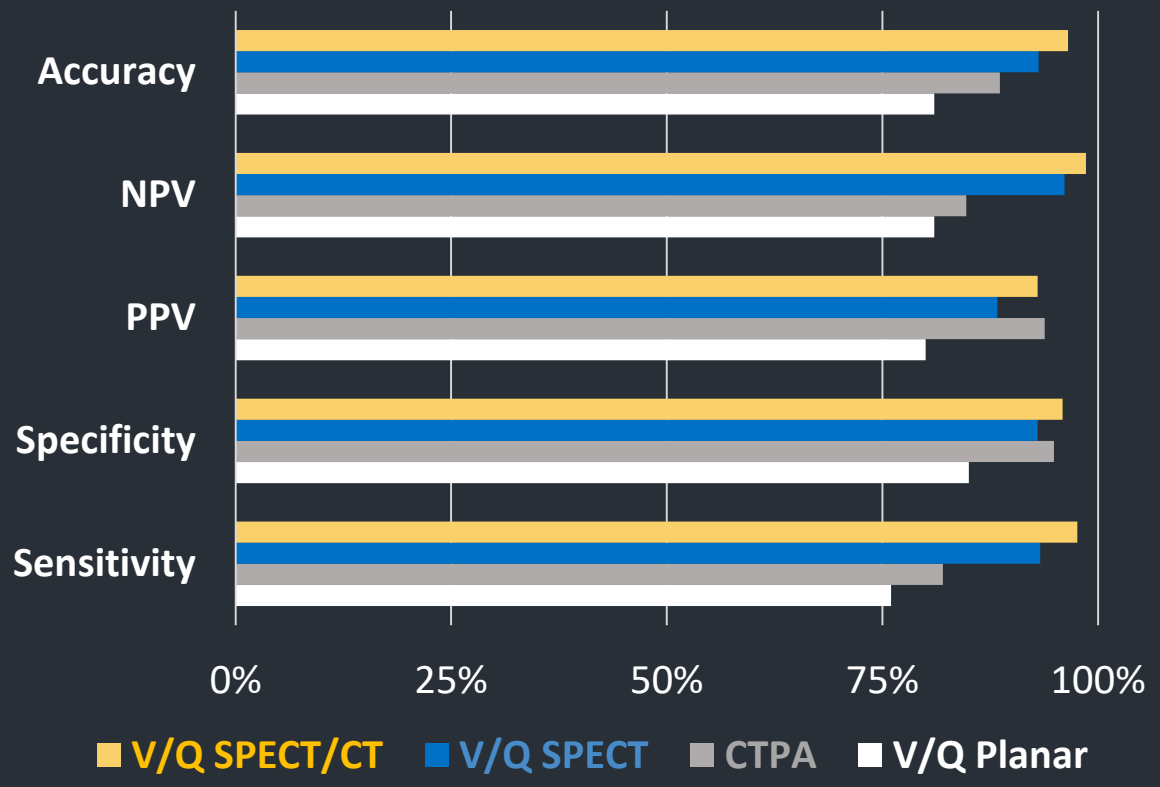


Table: Diagnostic ability of V/Q SPECT/CT[1], V/Q SPECT[1], CTPA[1] and V/Q Planar[2] to detect PE (adapted from Hess and al, 2016[1] and from Reinartz et al, 2004[2])

V/Q SPECT and V/Q SPECT/CT have shown that V/Q SPECT/CT is **superior** in most clinical settings with better overall diagnostic performance[1].

In situation of acute PE, chronic PE pregnancy, paediatrics and the COPD population, V/Q SPECT, with or without low-dose CT, can be considered as a first-line investigation to detect PE[3] due to:

- Its higher accuracy, sensitivity and negative predictive value when compared to CTPA[3]
- Its low radiation and no adverse reactions[3]

1. Hess S, et al. Semin Thromb Hemost 2016; 42(8): 833-845
2. Reinartz P, et al. J Nucl Med 2004; 45: 1501-1508
3. Leblanc M, et al. CANM guidelines; Nov 2018: www.canm-acmn.ca/guidelines

Technegas in the recent literature

66% of references citing Technegas in the past 24 months are for indications Beyond PE

1. King GG, et al. Dismantling the pathophysiology of **asthma** using imaging. Eur Respir Rev 2019; 28(152): pii: 1801111
2. Yang L, et al. Changes in ventilation and perfusion following lower lobe endoscopic lung volume reduction **(ELVR)** with endobronchial valves in severe COPD. Clin Respir J 2019; [Epub ahead of print].
3. Kjellberg M, et al. Ten-year-old children with a history of **bronchopulmonary dysplasia** have regional abnormalities in ventilation perfusion matching. Pediatr Pulmonol 2019; 54(5): 602-609
4. Paludan JPD, et al. Improvement in image quality of Tc-99m-based ventilation/perfusion single-photon emission computed tomography in patients with **chronic obstructive pulmonary disease** through pretest continuous positive airway pressure treatment. World J Nucl Med 2019; 18(2): 185–186
5. Myc LA, et al. Role of medical and molecular imaging in **COPD.** Clin Transl Med 2019; 8(1): 12
6. Ling T, et al. Ventilation/perfusion SPECT/CT in patients with severe and rigid **scoliosis**: An evaluation by relationship to spinal deformity and lung function. Clin Neurol Neurosurg 2019; 176: 97-102
7. Farrow CE, et al. SPECT Ventilation imaging in **asthma**. Semin Nucl Med 2019; 49(1): 11-15
8. Mortensen J, et al. Lung scintigraphy in **COPD**. Semin Nucl Med 2019; 49(1): 16-21
9. Sanchez-Crespo A, et al. Lung VQ SPECT in **infants and children** with nonembolic chronic pulmonary disorders. Semin Nucl Med 2019; 49(1): 37-46
10. Bajc M, et al. Ventilation/Perfusion SPECT Imaging - Diagnosing other **cardiopulmonary diseases** beyond PE. Semin Nucl Med 2019; 49(1): 4-10
11. Sanchez-Crespo A, et al. Lung scintigraphy in the assessment of **aerosol deposition and clearance**. Semin Nucl Med 2019; 49(1): 47-57
12. Bailey DL, et al. V/Q SPECT - Normal Values for **Lobar Function** and Comparison With CT Volumes. Semin Nucl Med 2019; 49(1): 58-61
13. Lawrence NC, et al. Ventilation perfusion single photon emission computed tomography: Referral practices and diagnosis of acute pulmonary embolism in the quaternary clinical setting. J Med Imaging Radiat Oncol 2018; 62(6): 777-780.
14. Leblanc M, et al. CANM Guidelines for Ventilation/Perfusion (V/P SPECT) in pulmonary embolism.www.canm-acnm.ca/guidelines
15. Hsu K, et al. Endoscopic Lung Volume Reduction in **COPD**: Improvements in Gas Transfer Capacity Are Associated With Improvements in Ventilation and Perfusion Matching. J Bronchology Interv Pulmonol. 2018; 25(1): 48-53
16. Dimastromatteo J, et al. Molecular imaging of pulmonary diseases. Respir Res 2018; 19(1): 17
17. Jögi J, et al. Diagnosing and **grading heart failure** with tomographic perfusion lung scintigraphy: validation with right heart catheterization. ESC Heart Fail 2018; 5(5): 902-910
18. Waxman AD, et al. Appropriate use Criteria for Ventilation-Perfusion imaging in Pulmonary embolism : Summary and Excerpts. J Nucl Med 2017; 58(5): 13N-15N
19. Isidoro J, et al. Radiation dose comparison between V/P SPECT and CT-angiography in the diagnosis of pulmonary embolism. Phys Med 2017; 41: 93-96
20. Righini M, et al. Diagnosis of acute pulmonary embolism. J Thromb Haemost. 2017; 15: 1251-1261
21. Le Roux PY, et al. New developments and future challenges of nuclear medicine and molecular imaging for pulmonary embolism. Thromb Res 2018; 163: 236-241
22. Farrow CE, et al. Peripheral ventilation heterogeneity determines the extent of bronchoconstriction in **asthma**. J Appl Physiol (1985). 2017; 123(5): 1188-1194
23. Tulchinsky M, et al. Applications of Ventilation-Perfusion Scintigraphy in Surgical Management of **Chronic Obstructive Lung Disease and Cancer**. Semin Nucl Med. 2017; 47(6): 671-679
24. Cheimariotis GA, et al. Automatic lung segmentation in functional SPECT images using active shape models trained on reference lung shapes from CT. Ann Nucl Med. 2017; 10: 25-30
25. Bajc M et al. Identifying the heterogeneity of **COPD** by V/P SPECT: a new tool for improving the diagnosis of parenchymal defects and grading the severity of small airways disease. Int J Chron Obstruct Pulmon Dis 2017; 12: 1579-1587
26. Nasr A, et al. Ventilation defect typical for **COPD** is frequent among patients suspected for pulmonary embolism but does not prevent the diagnosis of PE by V/P SPECT. EC Pulmonology and Respiratory Medicine. 2017; 4(3): 85-91
27. Provost K, et al. Reproducibility of **lobar perfusion and ventilation quantification** using SPECT/CT segmentation software in lung cancer patients. J Nucl Med Technol 2017; 45(3): 185-192
28. Metter DF, et al. Current status of ventilation-perfusion scintigraphy for suspected pulmonary embolism. AJR Am J Roentgenol 2017; 208(3): 489-494
29. Stubbs M, et al. Incidence of a single subsegmental mismatched perfusion defect in SPECT and planar ventilation/perfusion scans. Nucl Med Commun 2017; 38(2): 135-140
30. El-Barhoun EN, et al. Reproducibility of a **semi-quantitative lobar pulmonary ventilation** and perfusion technique using SPET and CT. Hell J Nucl Med 2017; 20(1): 71-75

Reclaiming and Expanding Pulmonary Imaging

Education

Educating referring physicians to the facts, benefits and capabilities of nuclear medicine will bring back lung imaging to nuclear medicine

Utilizing Available Technology

Leveraging the state of the art techniques to include SPECT, SPECT-CT & Quantification Software

CYC Research Strategy Beyond PE

Exploring new methods and techniques to engage specialists and develop new clinical applications

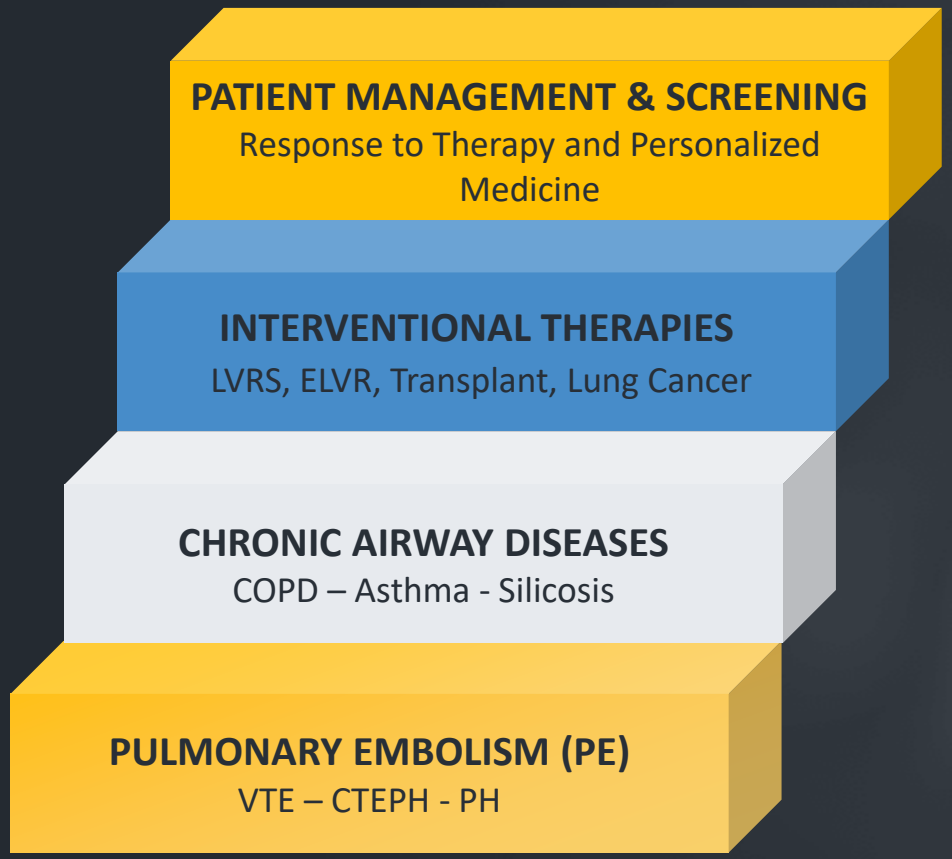
CYC Publication Strategy Beyond PE

Extending the reach of journal articles beyond the nuclear medicine community…. i.e. Respiratory Medicine, Emergency Medicine & Cardiology

CANM ACMN
The Canadian Association of Nuclear Medicine
Association canadienne de médecine nucléaire

Technegas is not commercially available in the USA.

TECHNEGAS™ : Beyond PE



Clinical Trials Sponsored by Cyclomedica

- **Hunter Medical Research Institute (Newcastle, AU):** Diagnosis and response to therapy in severe asthma and COPD[1]
- **Woolcock Institute (Sydney, AU):** Diagnosis and response therapy in mild to moderate COPD[2]
- **CHUM (Montreal, CA):** Early detection of COPD in asymptomatic smokers[3]
- **Dalhousie (Halifax, CA):** Post-lung transplant patients

Clinical Trials Under Discussion with Cyclomedica

- **Australia:** Clinical utility of Technegas in occupational lung diseases such (e.g. silicosis and coal worker's pneumoconiosis)
- **Canada:** Lung cancer patients pre and post lung resection

Other Non-Sponsored Clinical Initiatives

- **Macquarie University (Sydney, AU):** ELVR with endobronchial valves in severe COPD patients
- **Macquarie University (Sydney, AU):** Bronchial Thermoplasty procedure in asthma patients

1. ACTRN12617001275358 - Can functional lung ventilation imaging identify treatable traits in obstructive airway disease?
2. http://investor.cyclopharm.com/site/PDF/1561_0/BetterDefiningAirwaysDiseasewithTechnegas
3. https://ichgcp.net/clinical-trials-registry/NCT03728712

Hybrid V/Q SPECT/CT

V/Q SPECT provides **functional** information on ventilation and perfusion of the lungs[14-15]

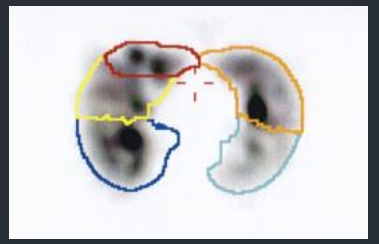
Low-dose CT provides **anatomical** information such as fissures delineation[16]

Combination of functional and anatomical information allow for objective results through **quantitative software**[15-16]

Ventilation SPECT

Low-dose CT

Fused SPECT/CT



Lobar distribution of ventilation

		RIGHT				LEFT		
		RUL	RML	RLL	Total	LUL	LLL	Total
Counts	kcts	27% 254	11% 103	28% 261	66% 617	24% 227	10% 95	34% 321
Volume	ml	24% 1256	9% 456	25% 1321	57% 3033	26% 1364	17% 914	43% 2278

Percentages, volumes and counts of individual lobes
(Images and 3D quantification provided by MMI)

IMPROVES DIAGNOSTIC CAPABILITIES AND OFFERS ANATOMICALLY-BASED QUANTIFICATION OF LOBAR CONTRIBUTION FOR INTERVENTIONAL THERAPIES

14. Reinartz P, et al. J Nucl Med 2004; 45: 1501-1508
15. King GG, et al. Semin Nucl Med 2010; 40(6): 467-473
16. Provost K, et al J Nucl Med Technol 2017; 45(3): 185-192

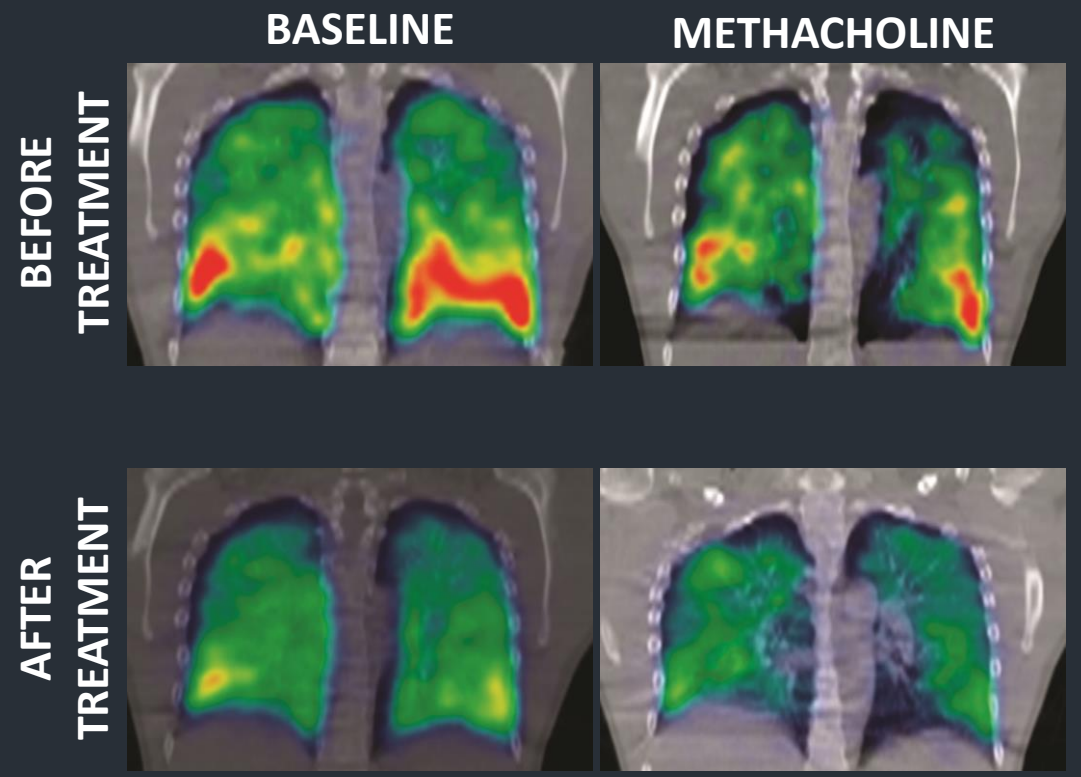
Treatment response in asthma patient

Case 1

CLINICAL HISTORY
Male patient of 25 years old with life-long asthma

REFERRAL
Evaluation of asthma treatment efficacy

PROTOCOL
Ventilation SPECT/CT imaging at baseline and after methacholine challenge before and after asthma treatment



Bronchoconstriction after methacholine challenge worsened ventilation function and increased ventilation heterogeneity. This was predicted by baseline peripheral ventilation heterogeneity

After treatment, ventilation improved and is more homogeneous on ventilation SPECT imaging, at baseline and also after methacholine-induced bronchoconstriction

Images and data were kindly provided by the Woolcock Institute of Medical Research

VENTILATION SPECT/CT TO MONITORE TREATMENT RESPONSE IN PATIENTS WITH LIFELONG ASTHMA

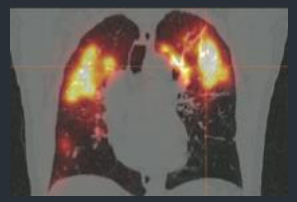
Planning lung volume reduction surgery

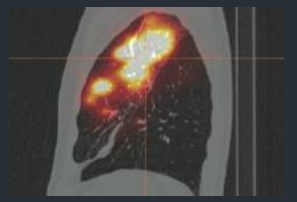
Case 2

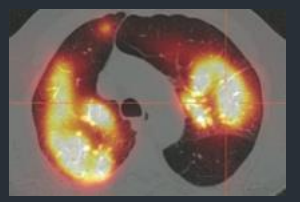
CLINICAL HISTORY
Male patient of 64 years old with emphysema

REFERRAL
Assessment of lung ventilation function before planning endoscopic lung volume reduction

PROTOCOL
VQ SPECT/CT imaging with Technegas as ventilation agent


CORONAL FUSION


SAGITTAL FUSION


UPPER LOBES TRANSVERSE FUSION


LOWER LOBES TRANSVERSE FUSION

The ventilation SPECT/CT scan reveals the function of the lower lobes is severely affected. The left oblique fissure is intact so the left lower lobe should be a good target lobe for endobronchial valves insertion.

Assessment for collateral ventilation was confirmed using CHARTIS assessment tool during the procedure.

Decision: 3 valves were inserted into the left lower lobe.

VENTILATION RELATIVE UPTAKE [%]	*Right*	*Left*
UPPER	45 %	36 %
MIDDLE	12 %	N/A
LOWER	**3 %**	**4 %**
TOTAL	60 %	40 %

Lobar 3D quantification provided by Hermes

Images and data were kindly provided by Macquarie Medical Imaging

VENTILATION SPECT/CT AS A TOOL TO ASSIST IN PREDICTING FUNCTIONAL LUNG VENTILATION PRIOR TO LUNG VOLUME REDUCTION