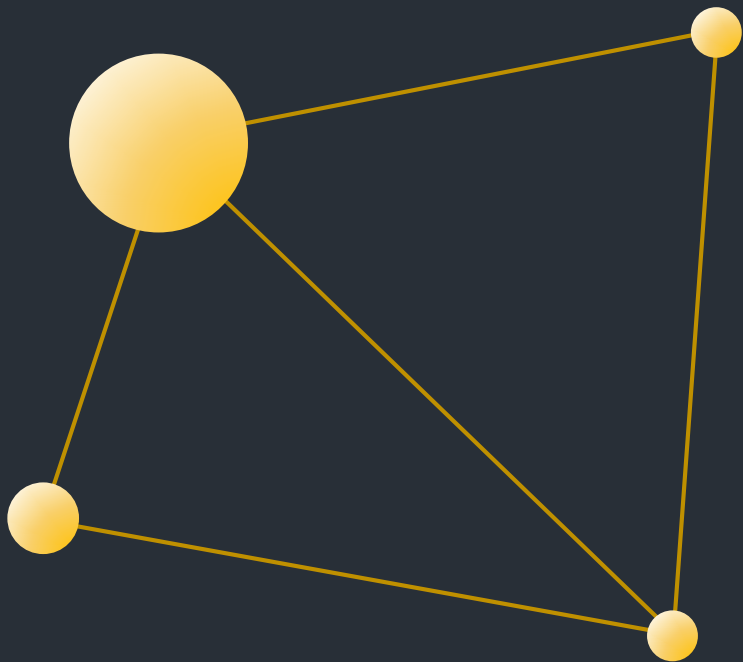




Cyclopharm



27 July 2019
Bioshares Conference
Queenstown New Zealand
James McBrayer, CEO & Managing Director



Safe Harbour Statement

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The presentation includes certain statements, estimates and projections with respect to the anticipated future financial performance of Cyclopharm Limited and as to the markets for the company's products. Such statements, estimates and projections reflect various assumptions made by the directors concerning anticipated results, which assumptions may or may not prove to be correct. Cyclopharm Limited has not sought independent verification of information in this presentation..

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

Bioshares 2019 Session Brief – “On the Cusp”

1. The competitive analysis of lung imaging modalities used to assess Pulmonary Embolism
2. The comparison of each imaging technique to include the existing and future competitive advantage of VQ/SPECT and hybrid approaches including with low dose CT.
3. Publication strategy to include leveraging recent guidelines
4. Update on the USFDA approval process for Technegas



CYCLOPHARM INVESTMENT CASE TECONEGAS™



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 (23 July 2019)	\$1.48
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Shares on Issue	68.9 million
------------------------	---------------------

Market Capitalisation	\$102.0 million
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Cash (30 June 2019)	\$5.8 million
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Technegas around the world



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

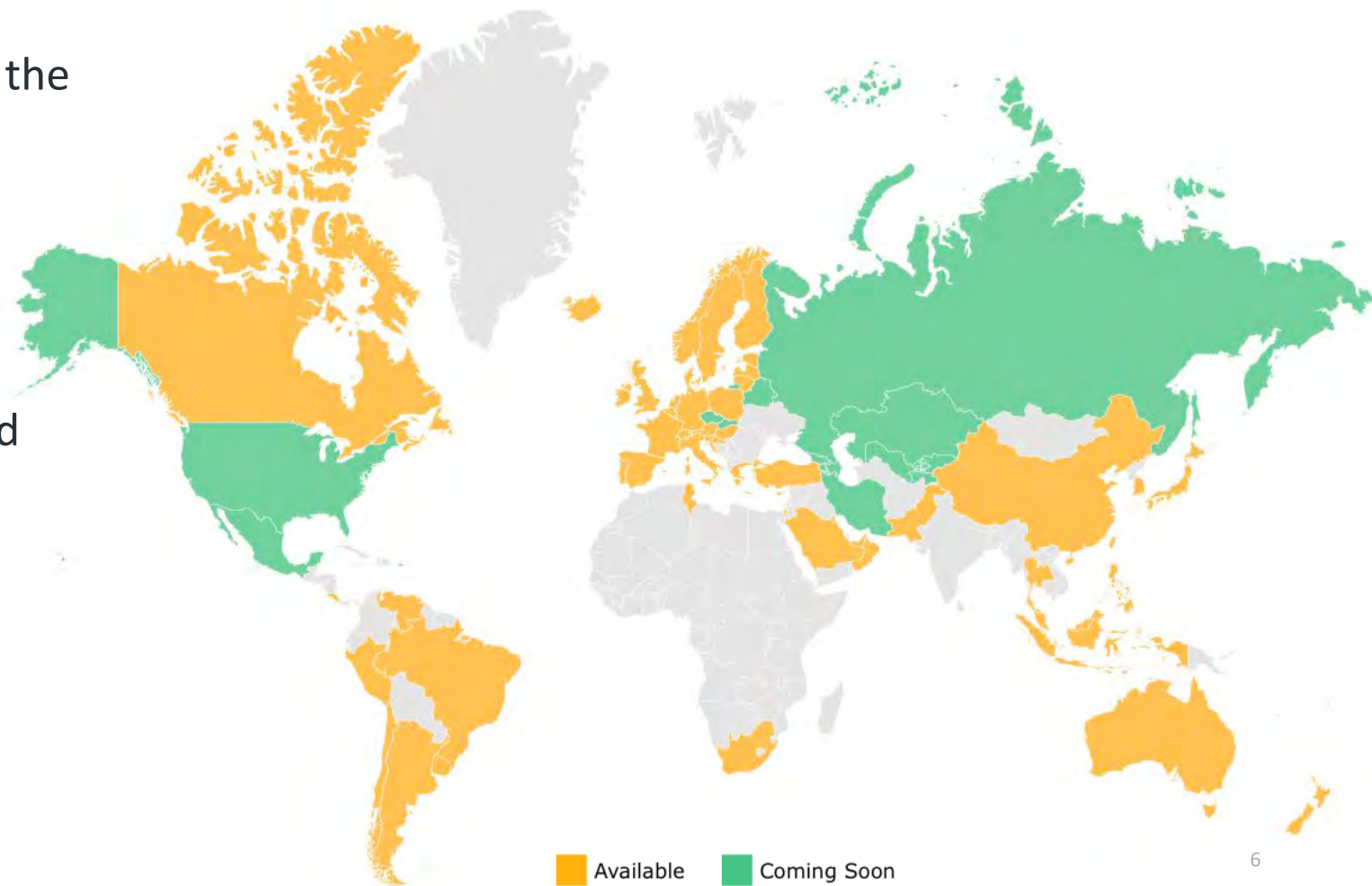


Technegas revenues are generated **in 57 countries** via a combination of direct and distributor sales models



Over **4.2 million** patient procedures to date

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



Available Coming Soon

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 SPECT³ ventilation imaging

Particles remain in the lung until they are cleared by ciliary action or phagocytosis⁴.



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



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

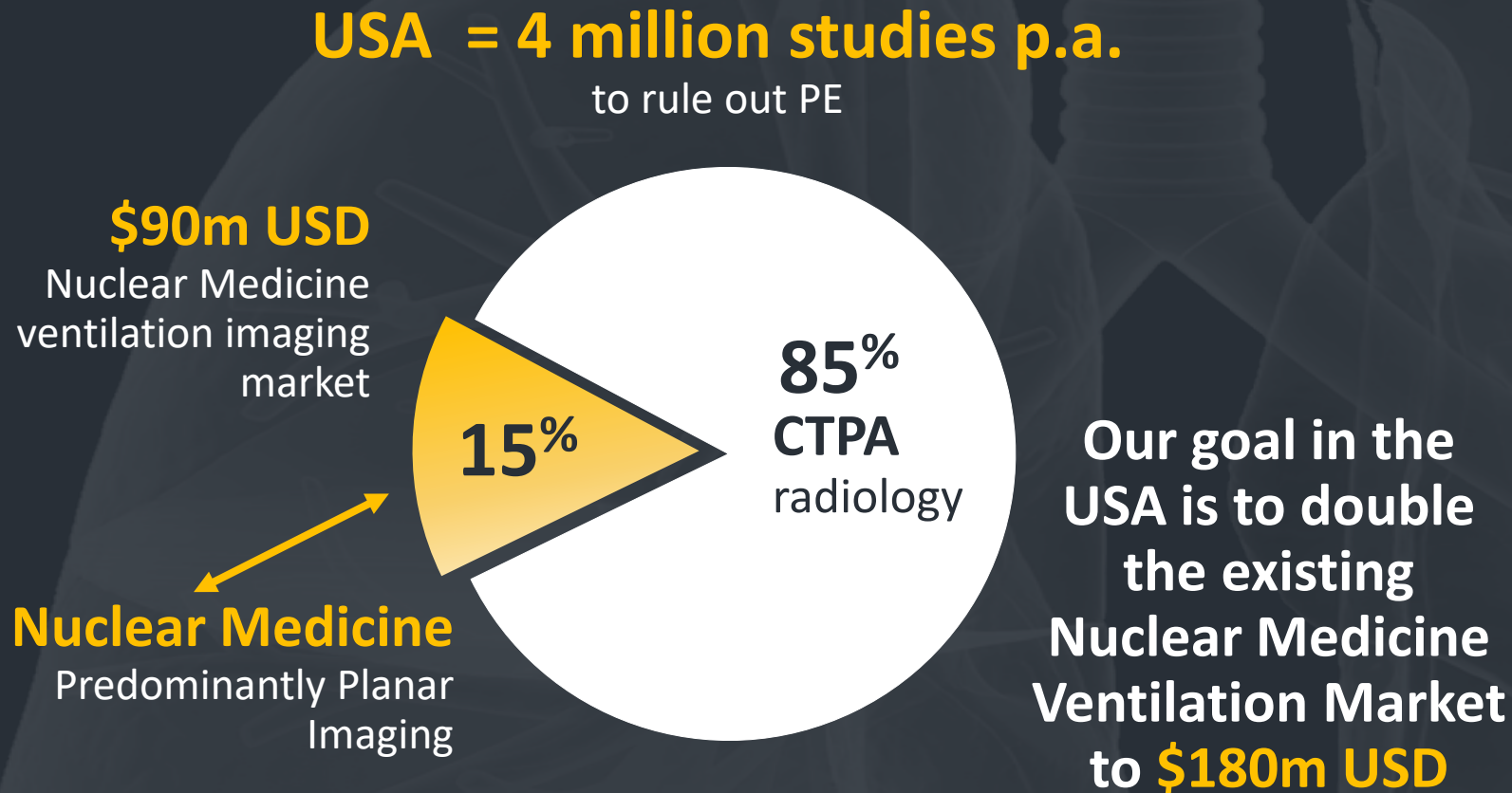


Wet Aerosol
impacts efficacy and
clinician interpretations



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

Diagnosing Pulmonary Embolism in the USA



CTPA



High radiation burden

CTPA delivers at least 27 times more radiation to the breast as compared to V/Q SPECT¹



Contraindications

CTPA should not be performed with pregnancy¹⁻², renal impairment³, contrast media allergy³, diabetes⁴



Acute kidney injury (AKI)

AKI occurs in up to 13% of CTPA cases⁵



Lower clinical sensitivity

V/Q planar⁶ = 76%
CTPA⁷ = 82%
V/Q SPECT⁷ = 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

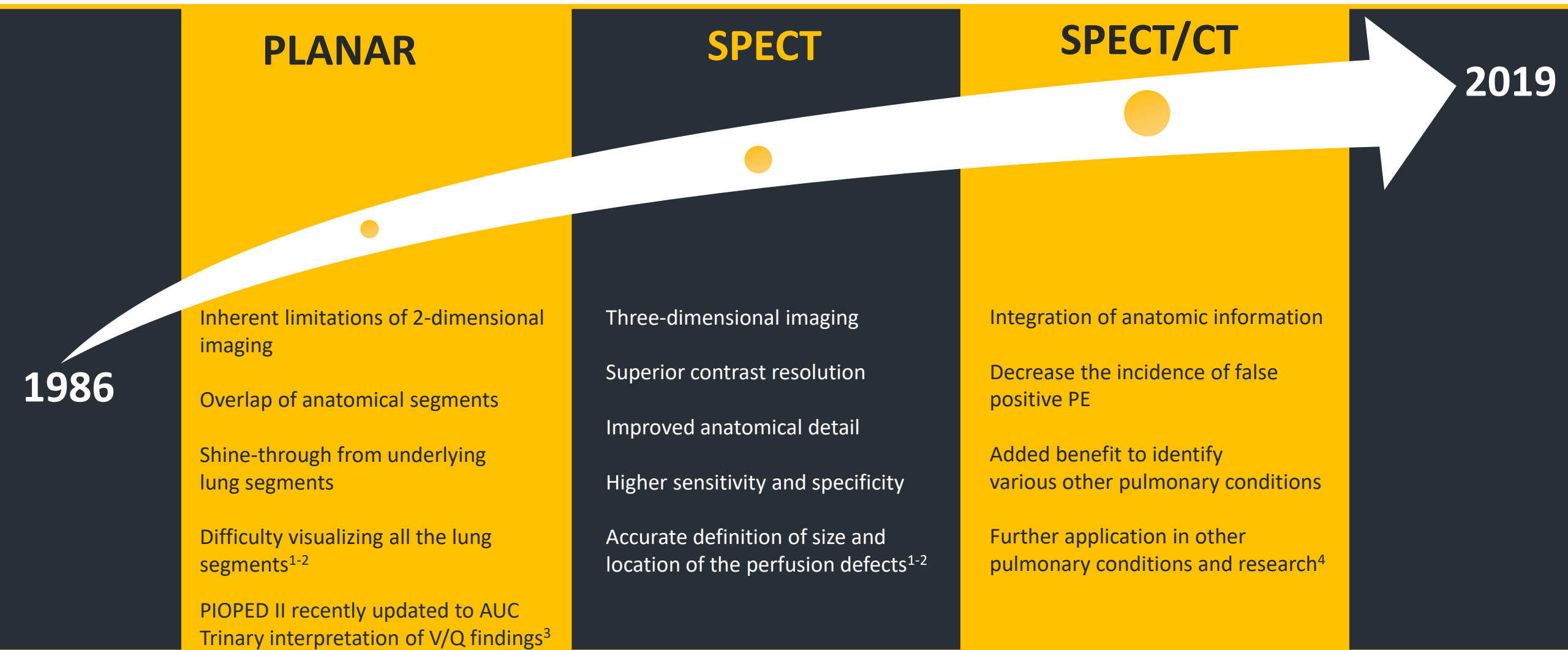
4. Roach PJ, et al. J Nucl Med 2013; 54: 1588-1596

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

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

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

Nuclear Medicine provides better diagnostic outcomes in Diagnosing PE

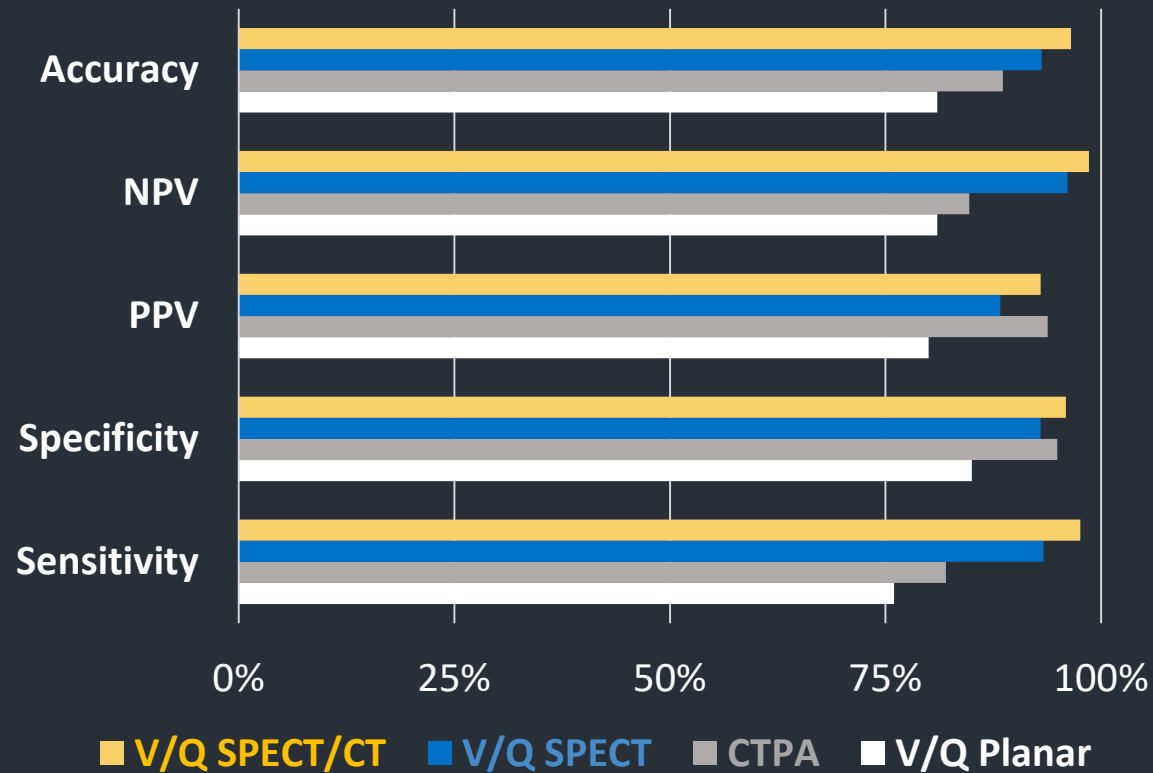


Table: Diagnostic ability of V/Q SPECT/CT¹, V/Q SPECT¹, CTPA¹ and V/Q Planar² to detect PE (adapted from Hess and al, 2016¹ and from Reinartz et al, 2004²)

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 performance¹.

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 PE³ due to:



Its higher accuracy, sensitivity and negative predictive value when compared to CTPA³



Its low radiation and no adverse reactions³

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



TECANE GAS™



Technegas is not commercially available in the USA.

Technegas FDA Clinical Trial Process and Design

Study Sites

USFDA Clinical trial¹ registered at:

<https://clinicaltrials.gov/ct2/show/NCT03054870?term=technegas&rank=1>

Non-inferiority structural ventilation study comparing Xe133 vs. Technegas¹

Planned 240 patient study at 9 clinical sites

154 Patients enrolled as at 25 July 2019

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

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 European⁶ and the Canadian⁴ Associations of Nuclear Medicine (EANM & CANM)

- “ Using 99m-Tc-Technegas is according to clinical experience better than the best aerosols ”
- “ Technegas is preferred to DTPA in patients with 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 ”

4. Leblanc M, et al. CANM 2018; https://canm-acmn.ca/resources/Documents/Guidelines_Resources/MasterDocument_Final_Nov_21_incl-Exec-Sum

6. 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

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

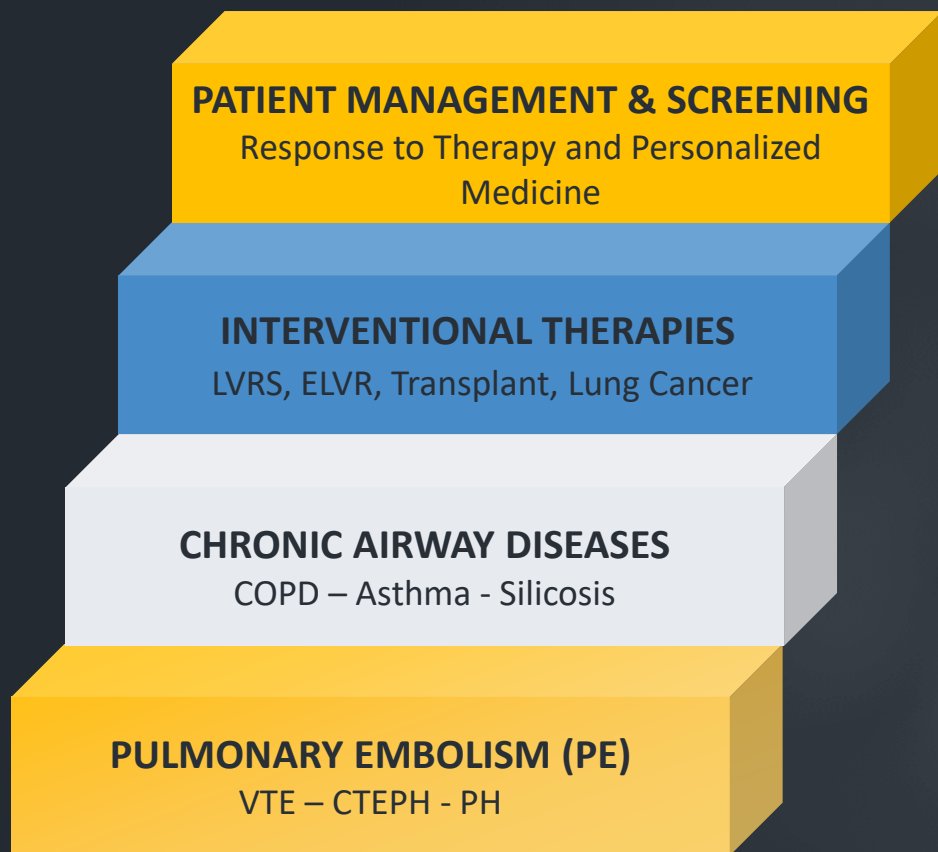


**CANM
ACMN**

The Canadian Association of Nuclear Medicine
Association canadienne de médecine nucléaire



TECNEGAS™ : Beyond PE



• Clinical Trials Sponsored by Cyclomedica

- **Hunter Medical Research Institute (Newcastle, AU):** Diagnosis and response to therapy in severe asthma and COPD¹
- **Woolcock Institute (Sydney, AU):** Diagnosis and response therapy in mild to moderate COPD²
- **CHUM (Montreal, CA):** Early detection of COPD in asymptomatic smokers³
- **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>

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

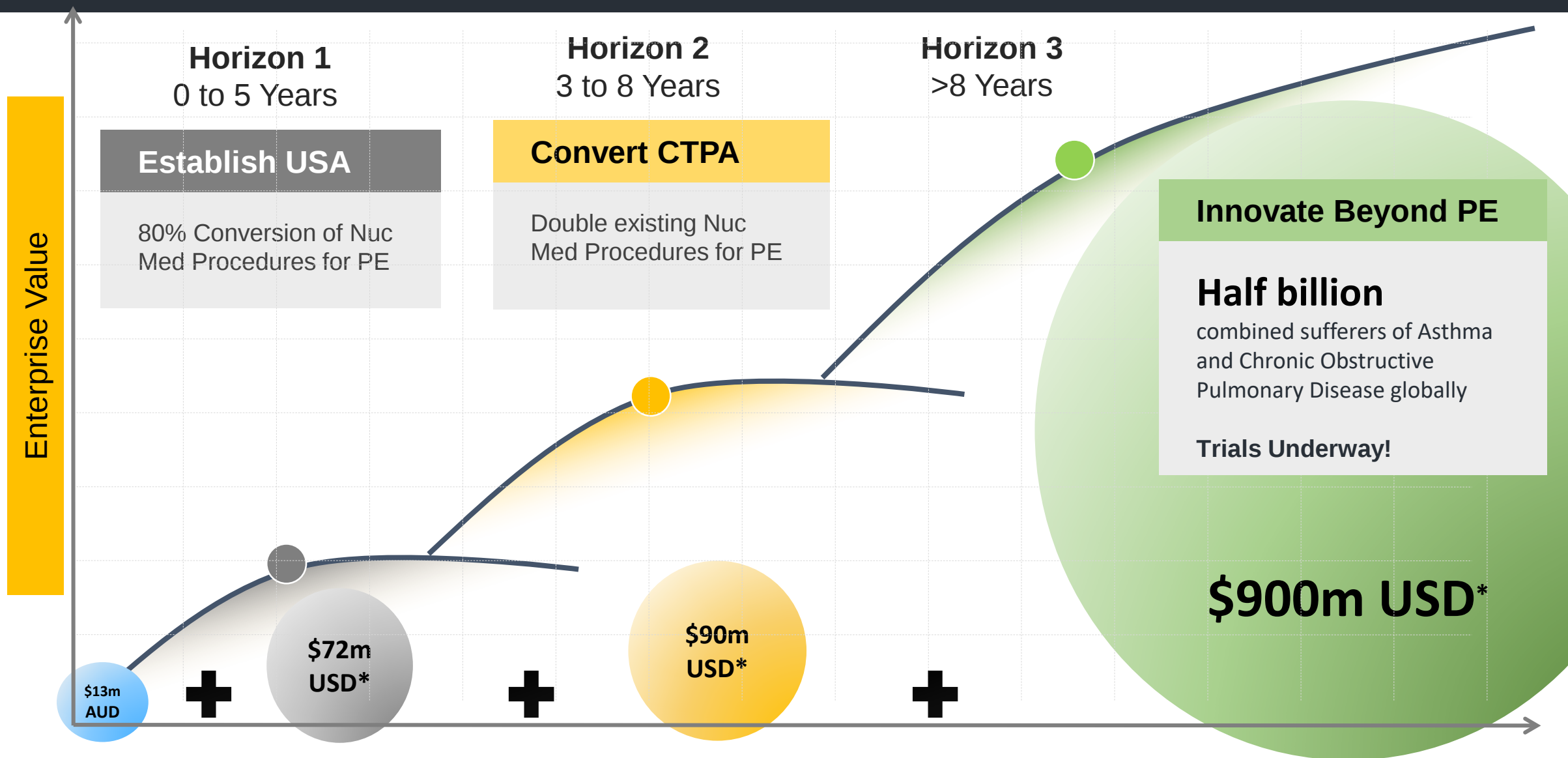
opportunity to convert
CTPA to nuclear
medicine imaging by
shifting market to SPECT
imaging



Half billion

combined sufferers
of Asthma and
Chronic Obstructive
Pulmonary Disease
globally.

Trials underway



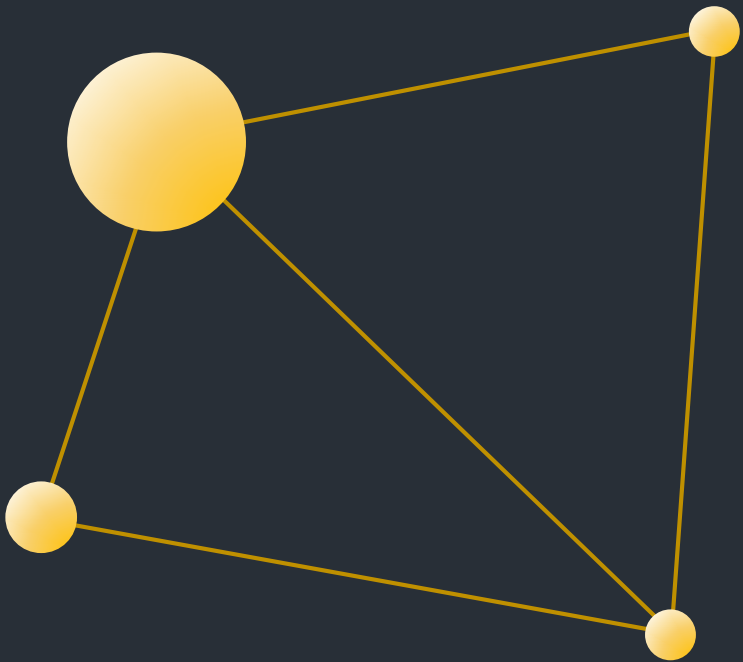
Tecanegas is not commercially available in the USA.

*USA Revenue Estimates



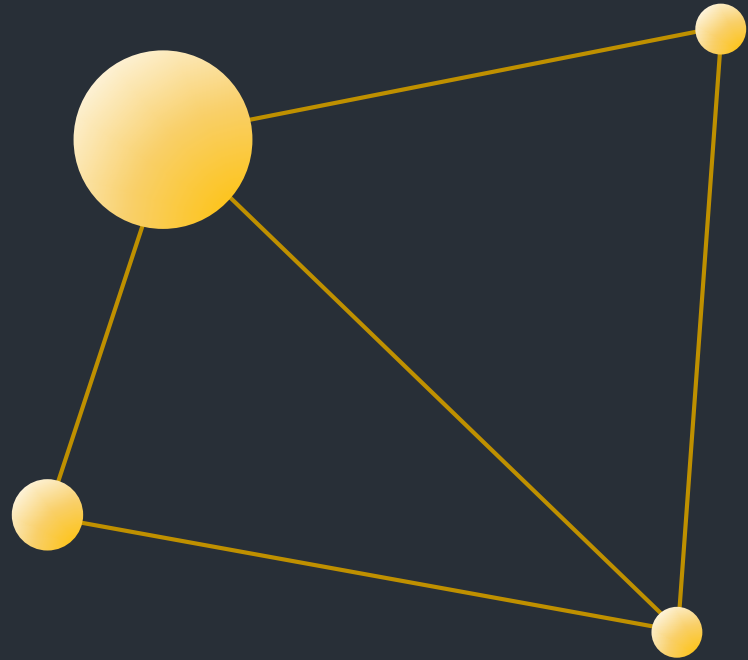
Cyclopharm

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 EBITDA¹

\$1.90 million

FDA Trial expenses

(\$2.96) million

Strong balance sheet²

\$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

Technegas is not commercially available in the USA.

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.

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:

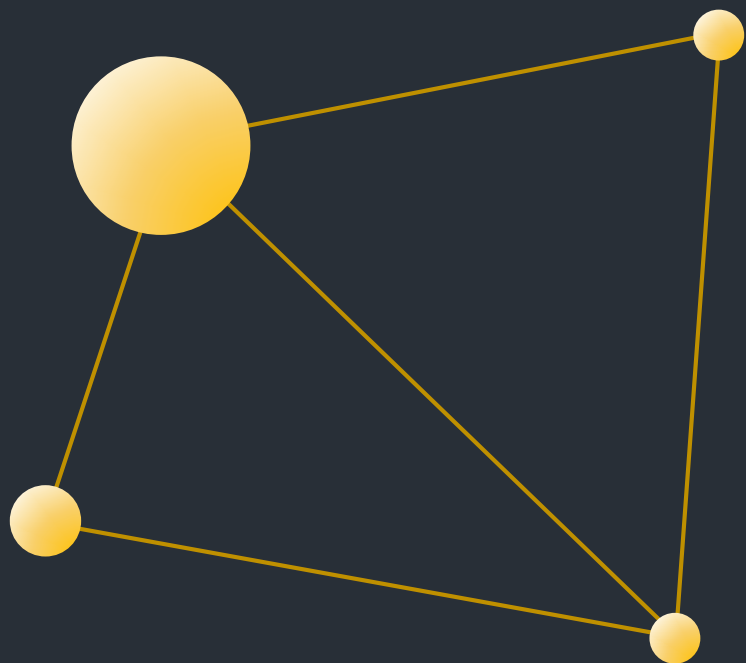
- Low debt & cash on hand – provides balance sheet and funding flexibility
- Funding used toward USFDA clinical trial enrolment and New Drug Application submission
- Strong financial position supports ongoing investment in R&D and expansion into new markets and indications

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

TECNEGAS™



Technegas is not commercially available in the USA.

Hybrid V/Q SPECT/CT

V/Q SPECT provides **functional** information on ventilation and perfusion of the lungs¹⁴⁻¹⁵

Low-dose CT provides **anatomical** information such as fissures delineation¹⁶

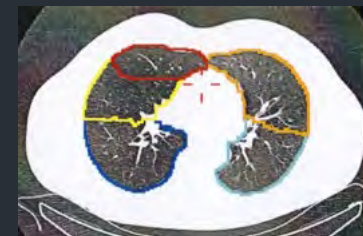
Combination of functional and anatomical information allow for objective results through **quantitative software**¹⁵⁻¹⁶



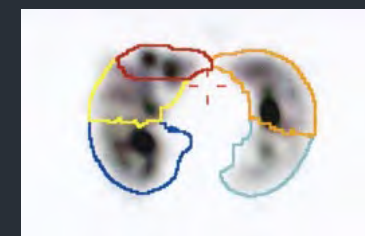
Ventilation SPECT



Low-dose CT



Fused SPECT/CT



Lobar distribution of ventilation

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

Technegas is not commercially available in the USA.

Treatment response in asthma patient

Case 1

CLINICAL HISTORY

Male patient of 25 years old with life-long asthma

REFERRAL

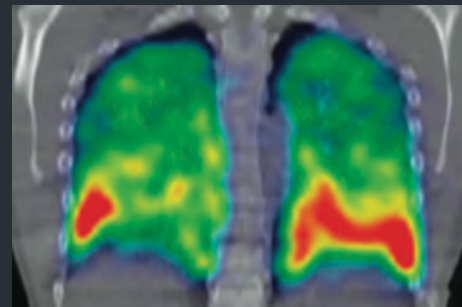
Evaluation of asthma treatment efficacy

PROTOCOL

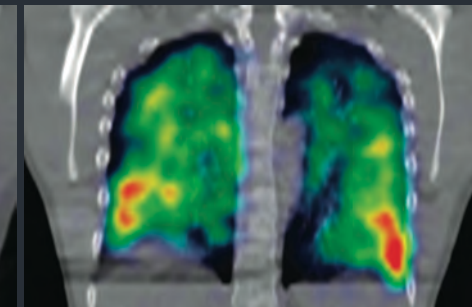
Ventilation SPECT/CT imaging at baseline and after methacholine challenge before and after asthma treatment



BEFORE
TREATMENT

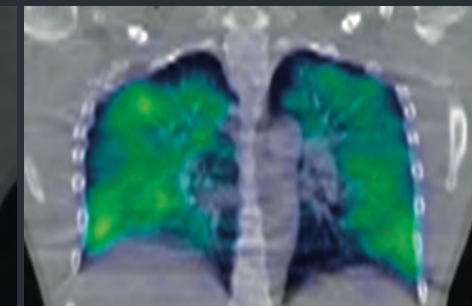
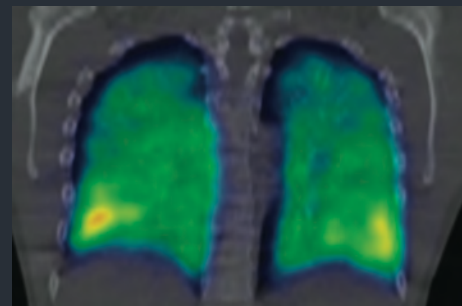


METHACHOLINE



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

AFTER
TREATMENT



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

Technegas is not commercially available in the USA.

Planning lung volume reduction surgery

Case 2

CLINICAL HISTORY

Male patient of 64 years old with emphysema

REFERRAL

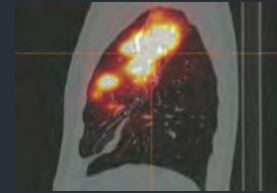
Assessment of lung ventilation function before planning endoscopic lung volume reduction

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

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