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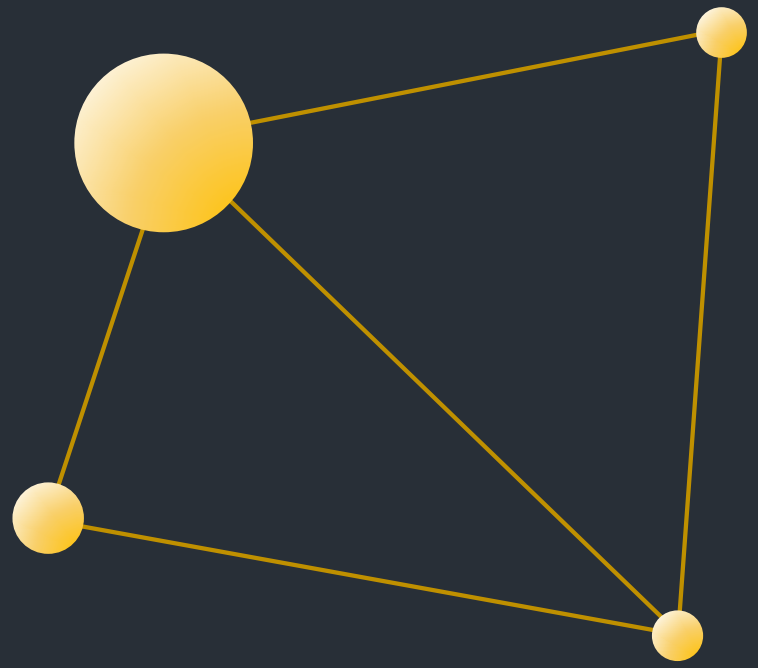

Financial Year 2019
Results Presentation

James McBrayer, CEO & Managing Director

Technegas® is not commercially available in the USA

3 March 2020

Safe Harbour Statement

Certain views expressed here contain information derived from publicly available sources that have not been independently verified.

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.

Company Overview

Cyclopharm Limited (CYC) is a leading diagnostic lung imaging company

- A world leader in functional lung ventilation imaging technology
- Recurring consumables and capital equipment revenue streams
- A profitable and growing company with a history of dividend payments
- Lead nuclear medicine product Technegas® is currently available in 59 countries with significant opportunity to expand into the USA with sales targeted for early 2021 following completion of USFDA New Drug Application review
- Opportunity to broaden Technegas applications beyond pulmonary embolism diagnosis into large addressable markets such as COPD and Asthma

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Our Strategic Priorities

CYC has clear strategy to leverage our position as a leading player in the global nuclear medicine imaging market and lung health space to expand the use of our proprietary products and introduce new innovative technology.

We will do this by:

1. Attaining approval to distribute Technegas in the USA

2. Expanding the use of Technegas beyond the traditional diagnosis of Pulmonary Embolism into significantly larger applications such as COPD[1] and Asthma, Lung Cancer and Pulmonary Hypertension for both diagnosis and patient management.

3. Identifying, developing and commercialising complementary innovative technology such as Ultralute™

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

1. Chronic Obstructive Pulmonary Disease

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Technegas

World's Best Functional Lung Ventilation Imaging Agent

Patient inhales extremely small carbon particles labeled with ^{99m}Technetium[1]

The small size and hydrophobic properties demonstrates gas like-behavior and alveoli deposition into the lungs[2-3]

Clinicians can visualise functional ventilation using Technegas

1. Senden TJ, et al. J Nucl Med 1997; 38: 1327-1333
2. Fawdry RM, et al. Australas Radiol 1988; 32(2): 232-238
3. Leblanc M, et al. CANM guidelines; Nov 2018: www.canm-acmn.ca/guidelines

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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

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FY2019 Results Highlights

Group Sales Revenue	$14.08 million - an increase of 5%
Gross Margin	$11.62 million – an increase of 7%
Gross Margin %	82.5%
Net Loss After Tax	($2.91) million including USFDA investment
Dividends	1.0 cents per share
Underlying Technegas PBT[1]	$0.89 million
FDA Trial expenses	($3.84) million
Strong balance sheet	$12.66 million of cash reserves as @ 31 December 2019
Guidance	The Board expects continuing modest growth in underlying Technegas revenues from existing markets for FY2020

1. Profit Before Tax

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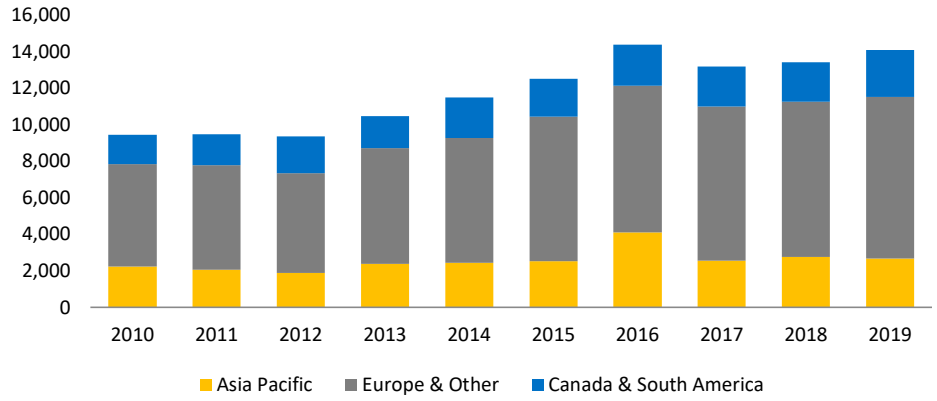
Building for Growth – Company Development

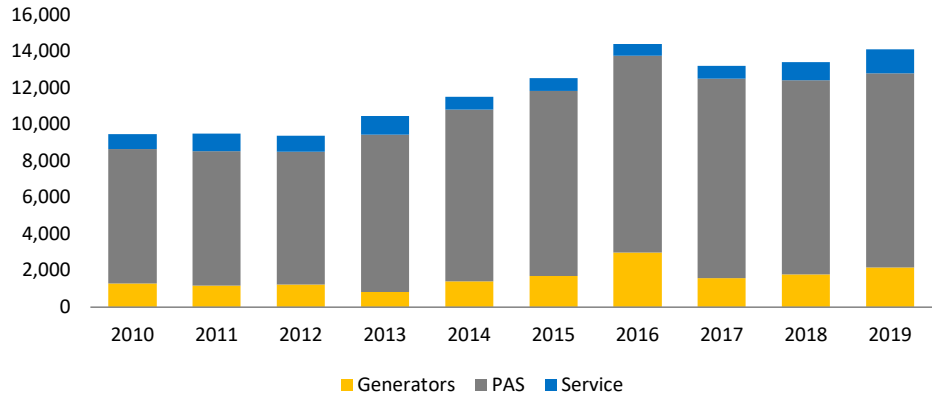
Technegas is a substantially de-risked commercial proposition with significant upside in the USA market

- Total **global sales of $118 m from** 2010
- Technegas currently available in **59 countries**
- **Over 4,200,000 patient procedures** performed since first approved
- **1,600 Technegas generators** sold globally since first approved
- Approximately **182,100** patient procedures in 2019
- **Europe** represents **62%** of global revenue in 2019
- **Canada** was the **largest single country** market by volume (45,400 patients) followed closely by **France** (42,500 patients) in 2019
- CYC is growing, the underlying business is **profitable** and the company has a history of paying **dividends**
- **Stable gross margins** of greater than **80% - (82% in 2019)**
- Around **80%** of historical revenue is recurring consumable sales - (**75% in 2019**)

Technegas Revenue by Region ($ 000's)



Technegas Regional Revenue by Category ($ 000's)



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FY2019 Operational Highlights

Technegas	Record revenues recorded in the key markets of Canada and France
USFDA	All internal documentation completed with a Q1 2020 USFDA submission
USA Commercialisation	USA entity established
Indication Expansion	HMRI completes recruitment – New initiatives commence in Canada and Australia
R&D Tax Incentive	$2.93 received November 2019
Strategic Partnerships	Leveraging our infrastructure through Distribution partnerships – Draximage, Tema and Rotop
Building a Team for the Future	Key resources in place for growth – Sales, Quality, Regulatory and Service
Guideline Development	CANM and European Guidelines naming TG as the nuclear med ventilation imaging agent of choice for diagnosing PE
Capital Raising	$9.2m net of costs received in December following a strategic share placement

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Group Underlying Performance

Solid Underlying Financial Results

YEAR ENDED 31 DECEMBER	2019 $'000	2018 $'000	INC/(DEC) $'000	CHANGE %
SALES REVENUE	**14,079**	**13,404**	**675**	**5%**
GROSS MARGIN	**11,619**	**10,855**	**764**	**7%**
GROSS MARGIN % SALES	82.5%	81.0%	1.5%	
UNDERLYING PROFIT BEFORE TAX TECHNEGAS®	**887**	**1,406**	**(519)**	**(37%)**
ADD BACK NON-OPERATING ACTIVITIES :				
INCOME				
CYCLOPET DIVISION	746*	(335)	1,081	323%
R&D TAX INCENTIVE GRANT	2,934	2,122	812	38%
REVERSAL OF CONTINGENT CONSIDERATION ON ACQUISITION OF SUBSIDIARY	-	314	(314)	(100%)
UNREALISED GAIN ON FORWARD EXCHANGE CONTRACT	-	275	(275)	(100%)
RECOVERY FROM GERMAN LITIGATION	339	-	339	100%
EXPENSES				
FDA EXPENSES	(3,842)	(2,965)	(877)	(30%)
BEYOND PE CLINICAL TRIALS	(351)	(251)	(100)	(40%)
RETIREMENT/SEVERANCE PAYMENTS	(322)	-	(322)	(100%)
QUALITY AND REGULATORY DEPARTMENT EXPANSION	(238)	-	(238)	(100%)
CYC QUALITY SYSTEM INVESTMENT	(827)	-	(827)	(100%)
LITIGATION EXPENSES	(1,064)	(410)	(654)	(160%)
COST OF TERMINATING PUT OPTION	(309)	-	(309)	(100%)
COST OF LTIP PROGRAM	(378)	(38)	(340)	(895%)
REPORTED (LOSS) / PBT	**(2,425)**	**118**	**(2,543)**	**(2,155%)**

*INCLUDES ONE-OFF RENT ABATEMENT OF $1,043K

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 USA 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.

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Group Balance Sheet

Financial Foundation to Leverage Growth Strategy

Year ended 31 December *($000's)*	**2019**	**2018**	**2017**
Cash	12,660	5,855	8,690
Other current assets	6,950	9,600	8,139
Non-current Assets	12,918	8,082	6,548
Total Assets	**32,528**	**23,537**	**23,377**
Current Liabilities	3,480	5,219	5,212
Non-current Liabilities	5,844	1,302	916
Total Liabilities	**9,324**	**6,521**	**6,128**
Net Assets	**23,204**	**17,016**	**17,249**

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

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Group Cash Position

Cash Position Funding Growth

Year ended 31 December *($000's)*	**2019**	**2018**	**2017**
Operating Activities	(489)	(1,107)	(682)
Investing Activities	(821)	(1,403)	(1,136)
Financing Activities	8,091	(353)	5,828
Net Increase / (Decrease) in Cash	6,781	(2,863)	4,010
Opening Cash	5,885	8,690	4,591
Foreign Exchange	24	28	89
Closing Cash @ 31 December ($000's)	**12,660**	**5,855**	**8,690**

1. Institutional share placement of 8.5 million shares in December 2018 resulting in $9.78m at an 11.7% premium

2. Benefited from expanded R&D tax Incentive Program resulting in Other Income of $2.93 million

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TECHNEGAS™

Coming to America

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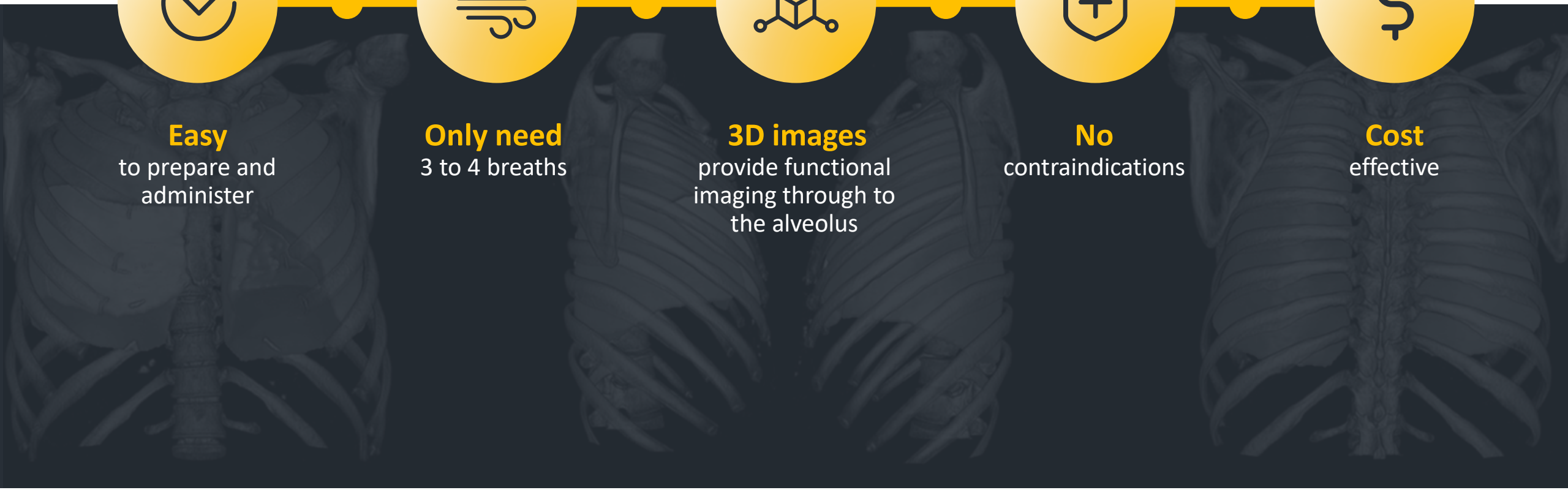
Benefits of using Technegas



Easy
to prepare and administer

Only need
3 to 4 breaths

3D images
provide functional imaging through to the alveolus

No
contraindications

Cost
effective

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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 small airways lung diseases, which is a frequent comorbidity in PE

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Superior to competitive imaging modalities

Technegas

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

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

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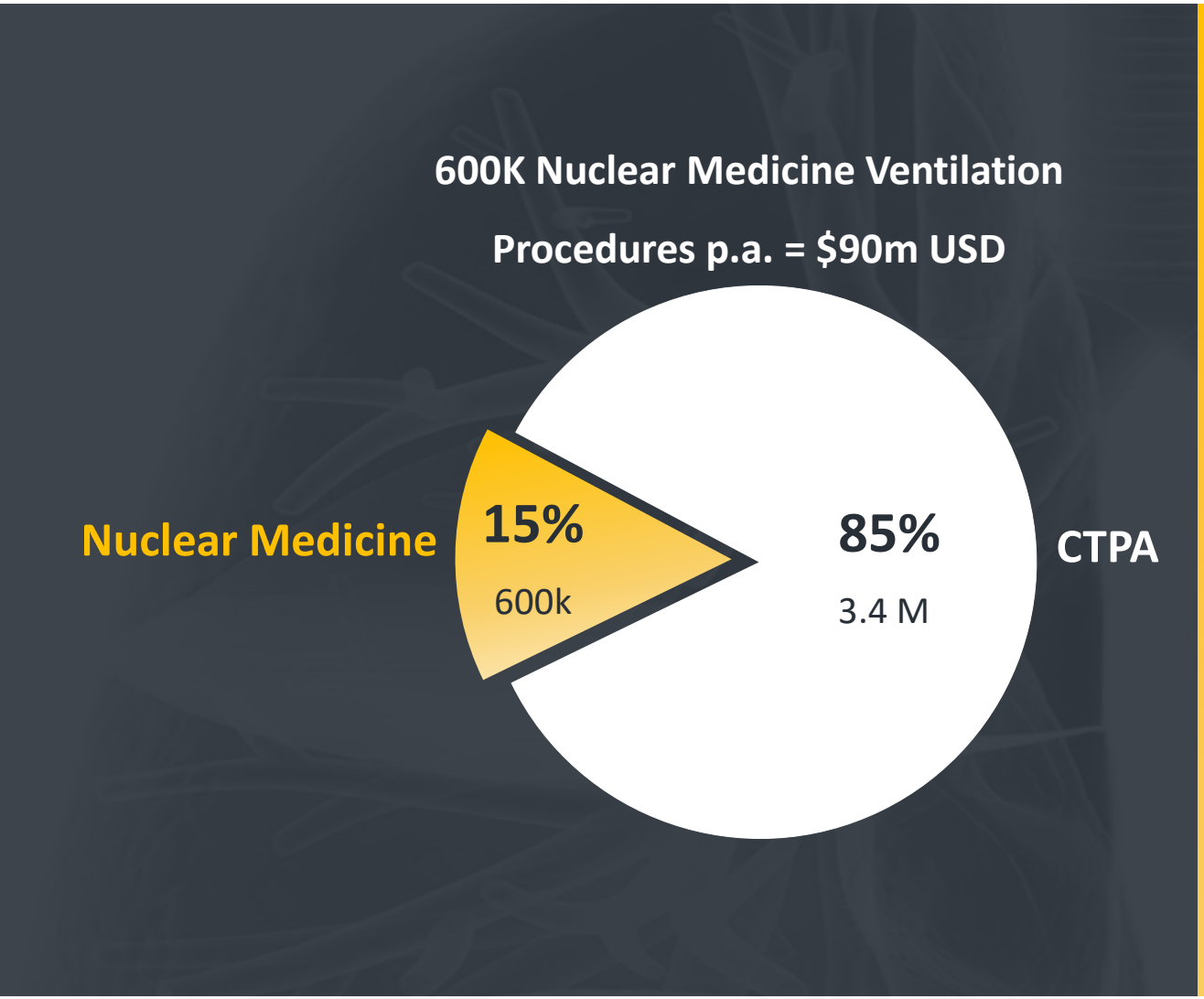
Technegas – USA Market Opportunity



- 4,000,000 patient procedures conducted in the USA per annum to diagnose pulmonary embolism (15% Nuclear Medicine – 85% CTPA)
- 600,000 Nuclear Medicine Ventilation procedures equals $90m USD
- Target market for Technegas in the USA equates to ~480,000 patient procedures of the total 600,000 procedures.
- The USA represents the single largest market for Technegas with half of the world's nuclear medicine departments
- Subject to a successful FDA approval, the Company is targeting US commercialisation in 2021
- First priority following USFDA approval is to repeat our Canadian experience by displacing Xe133 as the standard of care diagnostic product
- 3D SPECT imaging using Technegas is proven to be clinically superior and safer than CTPA. Once commercialised Cyclopharm will target to double the existing nuclear medicine PE market dominated by CTPA from 15% to 30%.
- Once established in the USA market, the company will seek to expand the use of Technegas into disease states exponentially larger than the existing PE market

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Technegas FDA Clinical Trial Process and Design

Approval Pathway

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

200 Patients enrolled as at 25 February 2020

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
Finalised Trial Site Recruitment

1H 2018
Submitted Preliminary Trial Results for FDA Review

1Q 2020
Planned NDA Submission

2H 2019
Commence USA Generator Inventory Build

Q4 2020 – Q1 2021
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

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USA 2020 Commercialisation Plan

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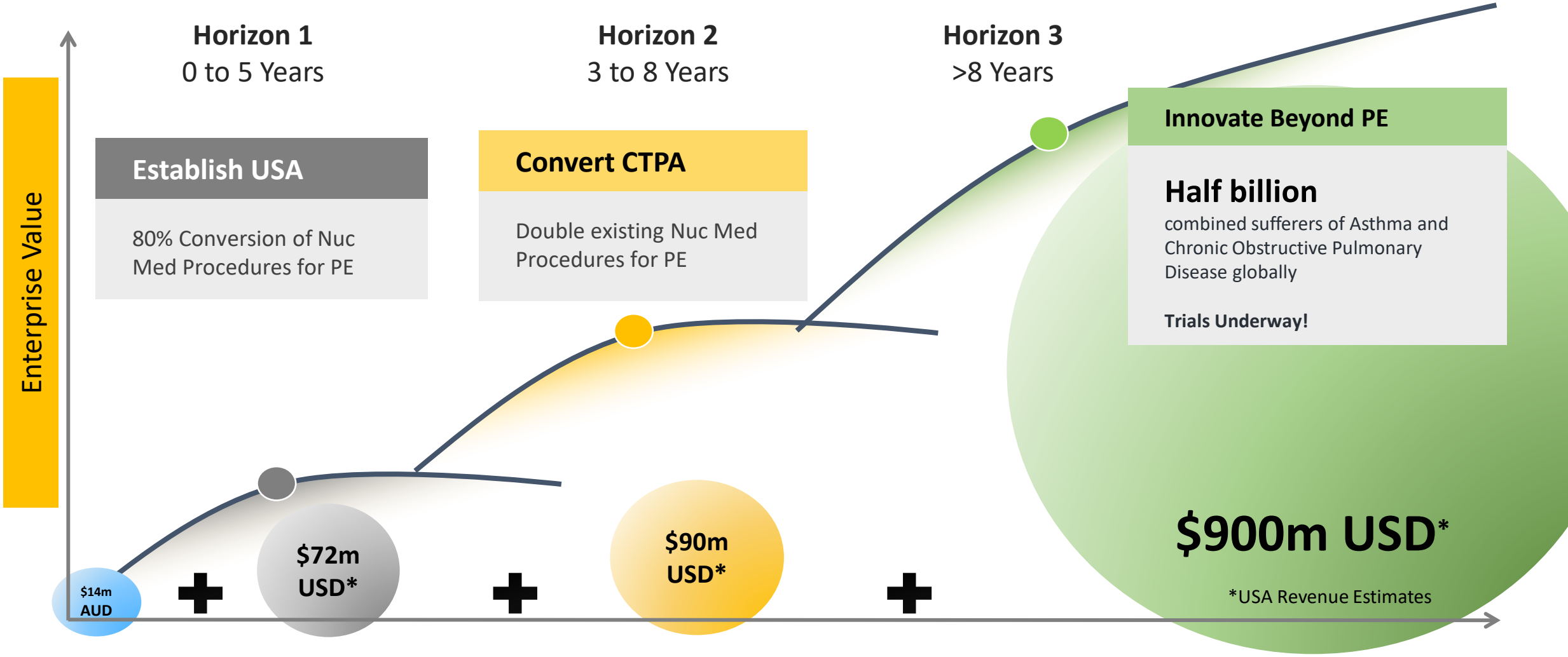
Three Value Horizons



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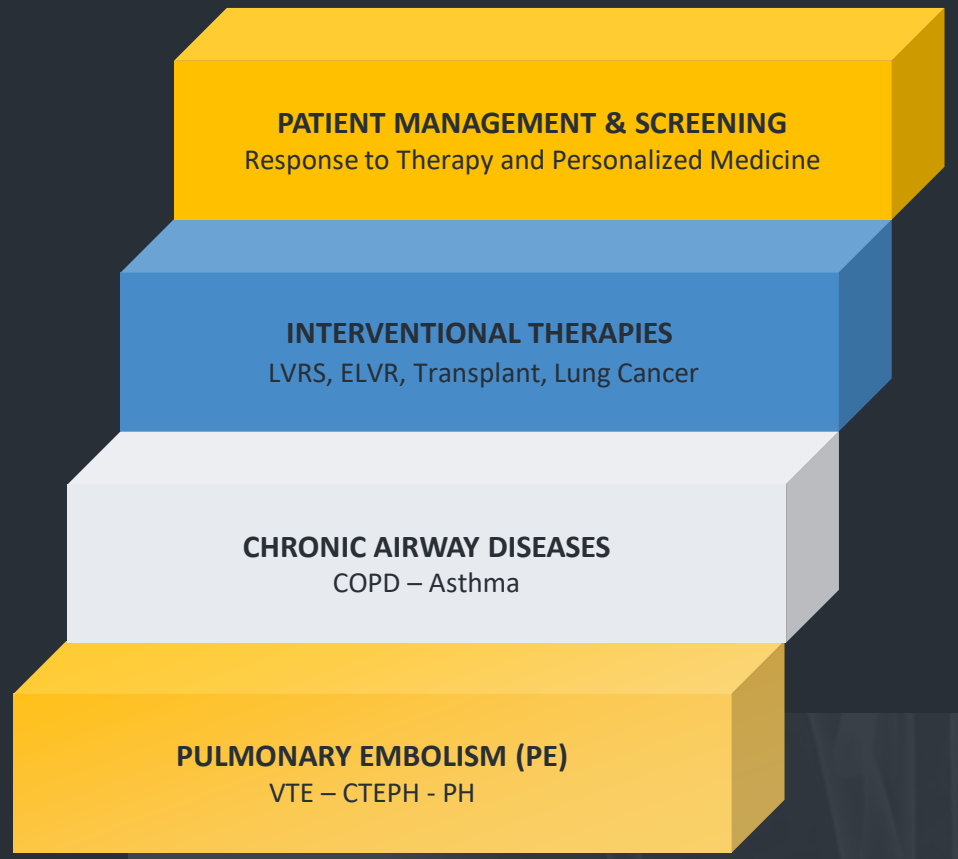
Beyond PE : clinical initiatives



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[3]
- **CHUM (Montreal, CA):** Early detection of COPD in asymptomatic smokers[4]
- **Dalhousie (Halifax, CA):** Post-lung transplant patients
- **Firestone Institute (St. Joseph's Healthcare Hamilton, CA):** Prevalence and clinical relevance of ventilation heterogeneity and luminal cellular inflammation in lung cancer patients pre and post lung resection [2]

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. https://clinicaltrials.gov/ct2/show/NCT04191174?term=technegas&draw=2&rank=3
2. http://investor.cyclopharm.com/site/PDF/1561_0/BetterDefiningAirwaysDiseasewithTechnegas
3. https://ichgcp.net/clinical-trials-registry/NCT03728712

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CYCLOPHARM INVESTMENT CASE

TECHNEGAS™

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

First in class
proprietary product sales to 59 countries with over 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

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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

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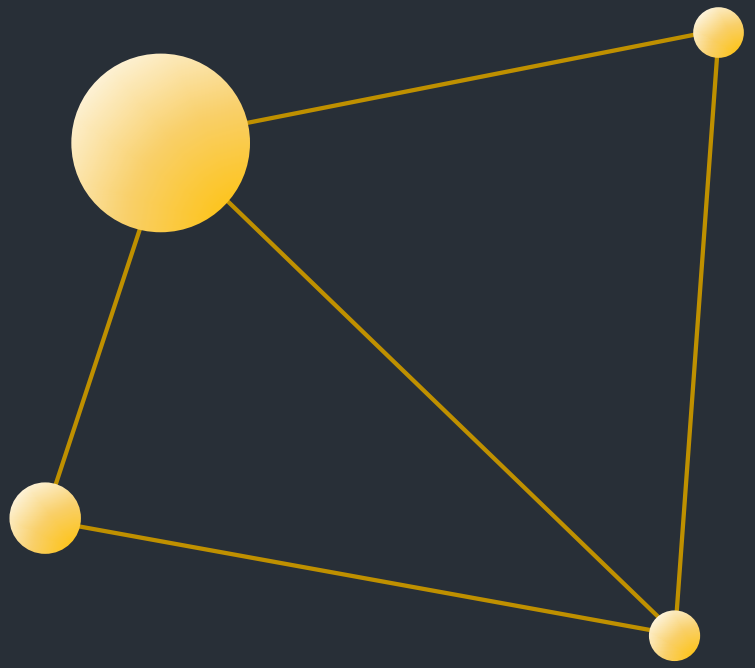

Thank You

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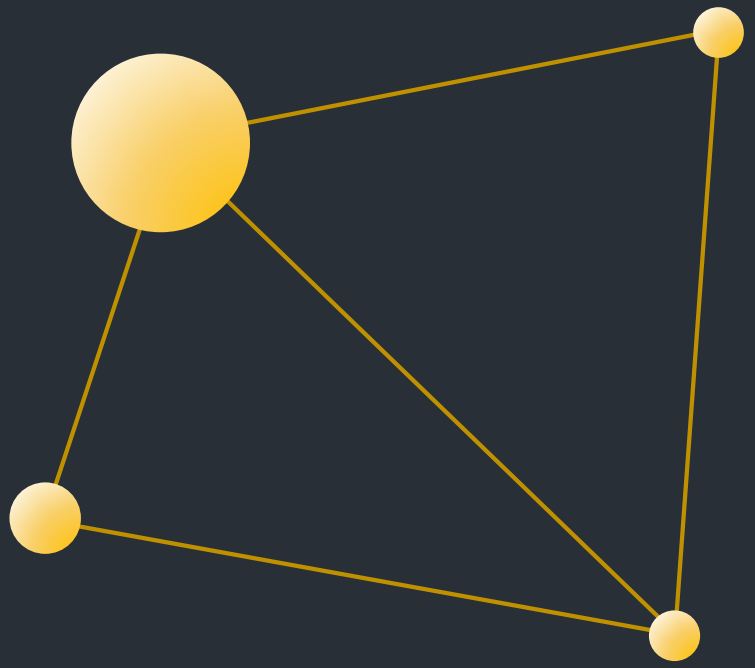

Appendix Section

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 Product Overview

Cyclopharm's leading product is the Technegas technology system

- The Technegas proprietary technology provides high quality diagnostic functional lung imaging.
- Predominantly used to diagnose the presence of blood clots in the lung otherwise known as Pulmonary Embolisms (PE). With advances in complementary technology, the potential for use in other indications is rapidly evolving.
- In a clinical setting, the patient inhales, in only a few breaths, an ultrafine dispersion of Technegas particles. Once inhaled and deposited in the lungs, Technegas images are then captured by using conventional nuclear medicine scanning equipment.
- The Technegas images provide the clinician an understanding of how well the patient's lungs are functioning across a range of disease states.
- CYC sells the Technegas Generator to hospitals as a one-off capital item. Consumable components are inserted into the Technegas Generator which then produce the gas like particles that are inhaled by the patient. The consumables which deliver Technegas are single patient use items.

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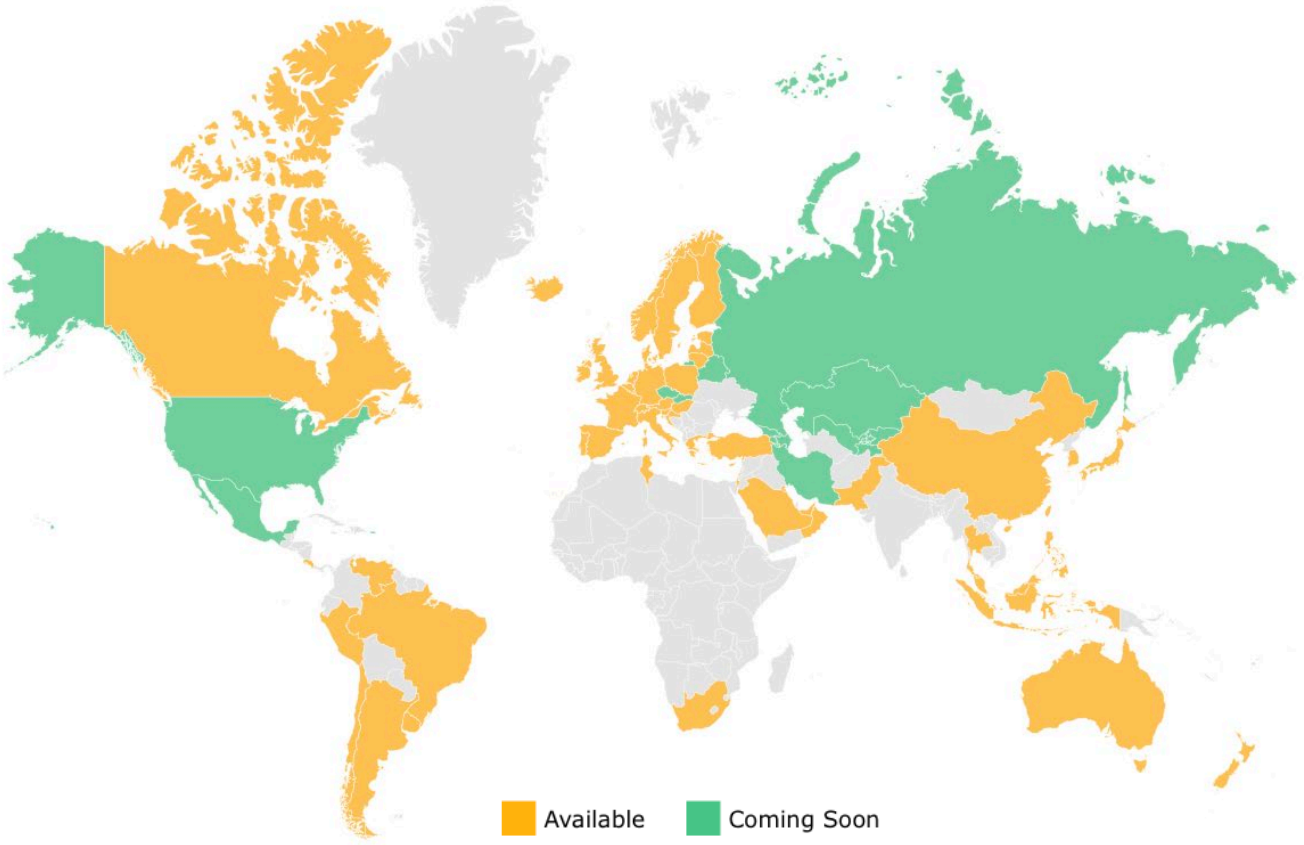
Technegas around the world

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

Technegas revenues are generated **in 59 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

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Advantages of Technegas

Technegas provides clinically superior outcomes to its competitors

- Better clinical results at a fraction of the high radiation doses used in CTPA (angiograms)
- No contraindications
- More accurate and sensitive measurement in diagnosing pulmonary embolism
- Particularly effective when CTPA is contraindicated e.g. renal impairment
- Improved patient comfort and tolerance with only 3-4 breaths required for delivery
- Allows for 3D images and regional quantification
- Named as the preferred ventilation imaging agent of choice in the European Association of Nuclear Medicine Guidelines

IP/Generic protection

- Technegas is a system - needs the generator, patient administrator set (PAS) and service capability
- R&D on 3rd generator generation underway set to extend IP protection

Competitive Nuclear Medicine Products	
Product	**Comparison to Technegas**
Xenon 133	▪ Patient has to continually re-breathe gas causing patient discomfort / anxiety ▪ Can't provide 3D images ▪ Costly air-handling infrastructure required in order to administer
DTPA	▪ Inferior images in patients with obstructive lung disease (COPD)

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Existing Market Development Strategy

- Sales and marketing program targeting referring respiratory physicians
- Implemented educational programs for Distributors
- Updating Technegas distribution contracts to include detailing to respiratory physicians
- Leveraging New Complementary Technologies
- Strengthening relationships with KOL's and industry bodies
- Guideline Development
- Product Renewal & Enhancements
- Sponsoring pilot clinical trials targeting expanded indications
- Introduction of new products by leveraging off of existing network - Ultralute™

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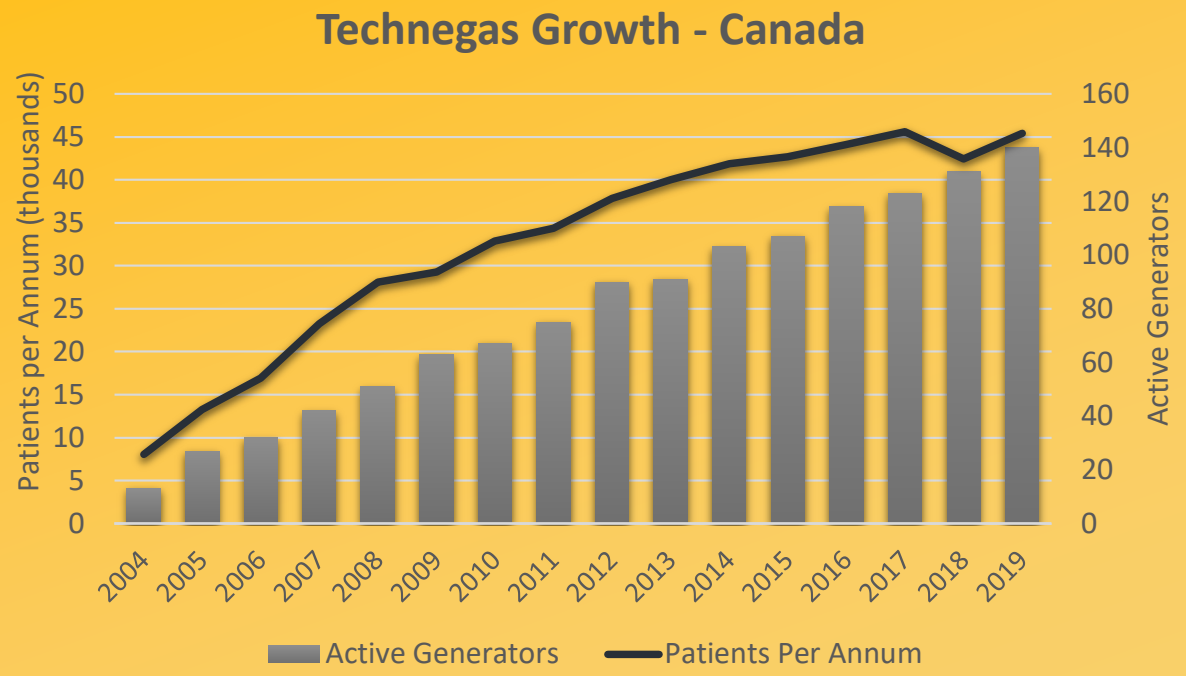
Technegas – The Canadian Case Study

Canada is Cyclopharm's largest single country market

Market leader for diagnosing PE
14 consecutive years of PAS growth
Represents a strong indicator of USA acceptance
Xe-133 rapidly displaced by early adopters
Direct correlation with the number of active generators and annual consumable sales
Market driven by public healthcare sector
Market launch initiated province by province, leveraging off pilot sites

The Generator and Consumable Relationship



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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.

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].
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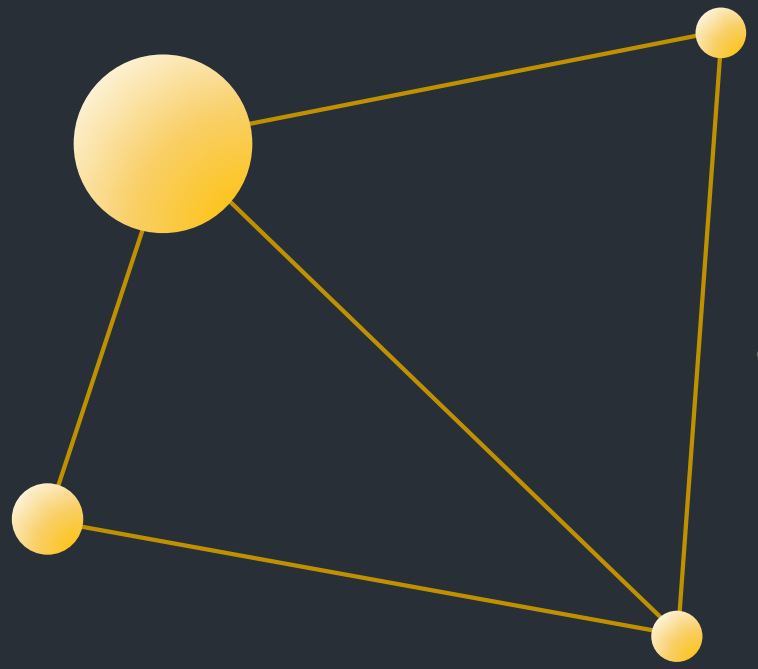
Pulmonary Imaging With

TECHNEGAS™



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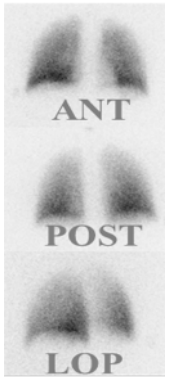
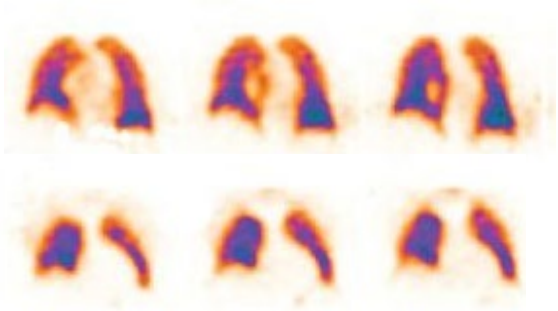
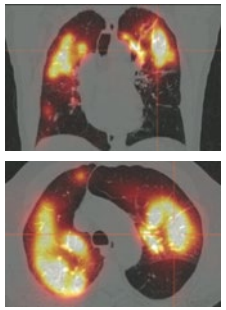
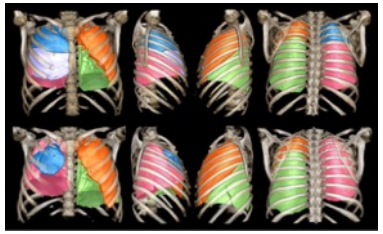
Evolution of Functional Lung Ventilation Imaging

- Improvements in 3D imaging techniques, hybrid imaging and the advent of analytical software have dramatically improved the sensitivity and specificity in functional lung imaging with Technegas
- Traditionally used in the diagnosis of Pulmonary Embolism, nuclear medicine functional lung ventilation imaging utilising improved imaging techniques are expanding the potential clinical utility for Technegas
- The following Technegas images underscore the advancement in complementary technology Cyclopharm is leveraging today:









1980s

Planar Imaging

2000

SPECT Imaging

2010

SPECT with Low Dose CT

2015

SPECT with Low Dose CT & Lobular Quantification

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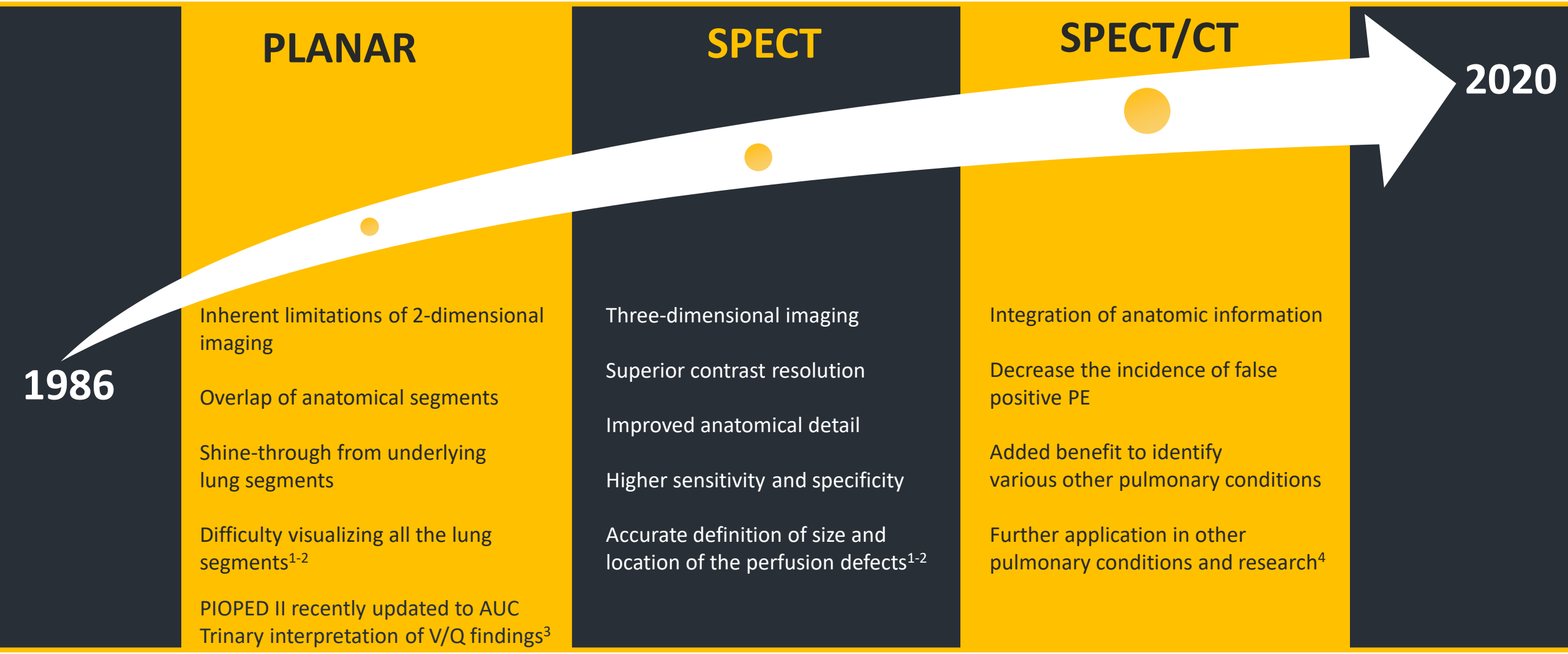
Nuclear Medicine Imaging Technology Has Evolved Beyond CTPA in Diagnosing PE



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

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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

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Nuclear Medicine provides better diagnostic outcomes in Diagnosing PE

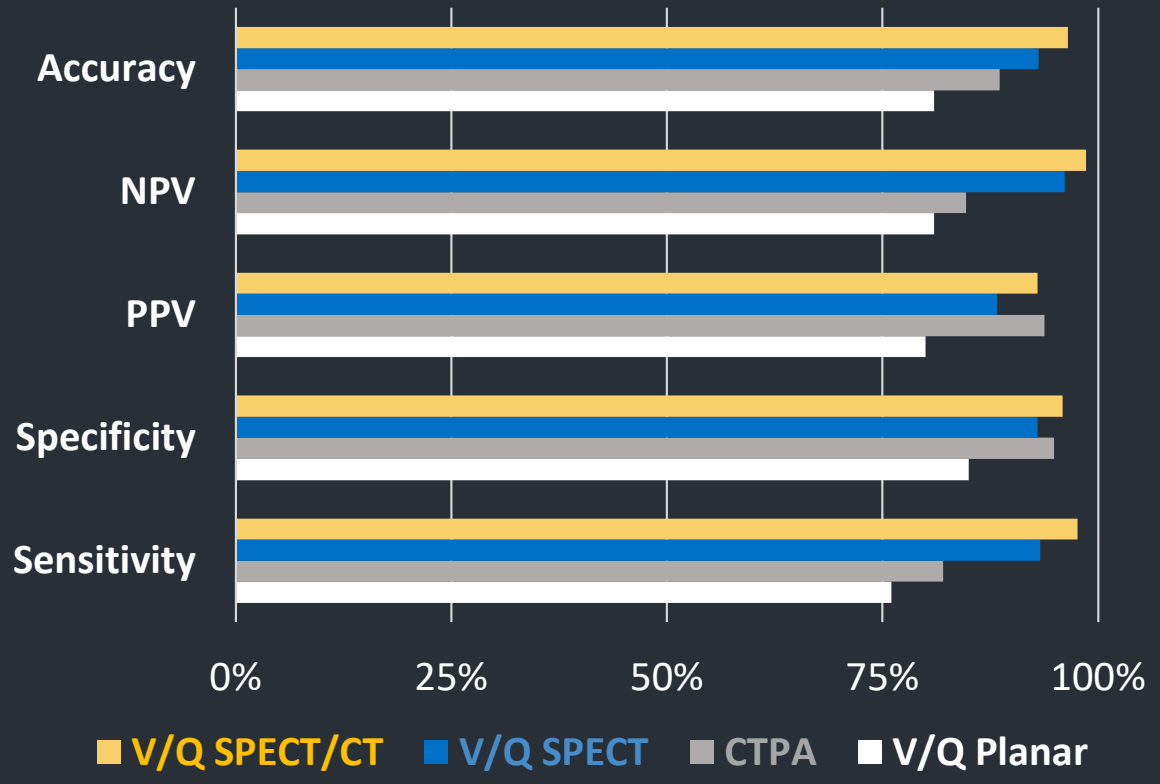

Table: Diagnostic ability of V/Q SPECT/CT[1], V/Q SPECT[1], CTPA[1] and V/Q Planar[2] to detect PE (adapted from Hess and al, 2016[1] and from Reinartz et al, 2004[2])

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
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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

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Expanding Indications

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Technegas – Global Indication Expansion

- ✓ Applications in chronic disease has the potential to dwarf the use of Technegas in Pulmonary Embolism
- ✓ In 2015 Cyclopharm commenced a clinical program targeting Technegas indication expansion to include:

Chronic Obstructive Pulmonary Disease

- 30x the size of total PE market
- **1 in 7 Australians** over the age of 40
- In 2008, the total economic impact of COPD was estimated to be **$98.2 billion** of which **$8.8 billion** was attributed to financial costs and $89.4 billion to the loss of wellbeing.
- COPD is a leading cause of death and disease burden after heart disease, stroke and cancer
- Global estimates show that COPD will be the **third leading cause of death by 2030**

Lung Reduction Intervention

- Application in determining ventilation pre and post lung reduction intervention

Asthma

- 334 million people globally
- **1 in 9** Australians have asthma
- **$655 million** was spent on asthma in 2008-9; which is 0.9% of all direct health spend on diseases.
- **34%** of people report that asthma interferes with their daily living, and **21.8%** of people aged 15-25 required time off work, school or study due to their asthma

CTEPH

- Ventilation/Perfusion imaging is recommended
- Up to **40 million** patients globally

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Clinical Call for Action

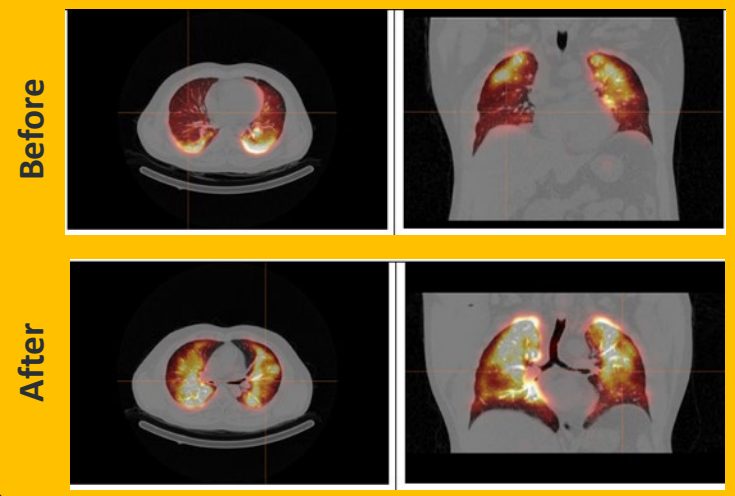
A new way of thinking about respiratory Medicine

Lancet Commission - After asthma: redefining airways disease, September 2017

Executive Summary:

*Progress in reducing hospital admissions and mortality in people with asthma have **stalled in the past 10 years**. This Lancet Commission examines where we are in the understanding of this heterogeneous syndrome and where we need to go to **kickstart a new era of examining, monitoring, treating, and ultimately preventing airways diseases**. The Commissioners recommend to deconstruct airway disease into component parts before planning treatment with a **focus on traits that are identifiable and treatable**. This approach will require **a complete change** in how we think about airways diseases with the goal of achieving **real precision treatment with better patient outcomes**. In addition, primary prevention and disease-modifying interventions need to become a more important ambition. It is unacceptable that people still die from asthma attacks in 2017.*

Functional ventilation imaging using Technegas may provide useful biomarker information in assessing baseline diagnosis and response to therapy in respiratory disease



Assessing Response to Monoclonal Therapy using Technegas

Technegas SPECT/CT Images provided by HMRI

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Hybrid V/Q SPECT/CT

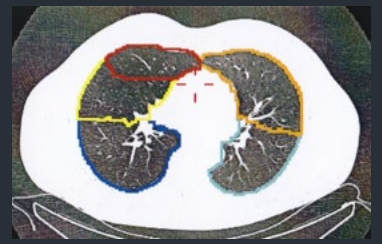
V/Q SPECT provides **functional** information on ventilation and perfusion of the lungs[1,2]

Low-dose CT provides **anatomical** information such as fissures delineation[3]

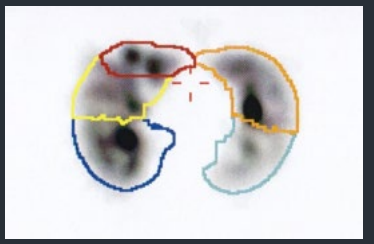
Combination of functional and anatomical information allow for objective results through **quantitative software**[2,3]

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

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

Treatment response in asthma patient

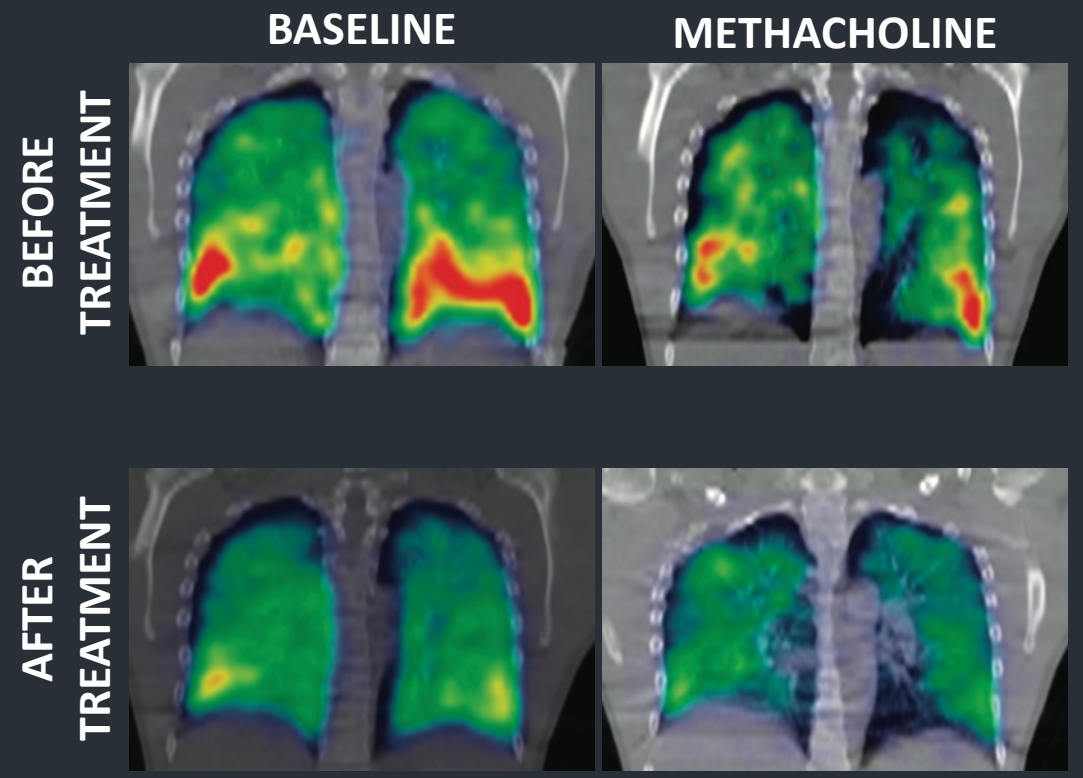
Case 1

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

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



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

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

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Planning lung volume reduction surgery

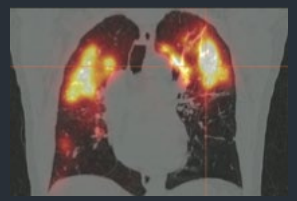
Case 2

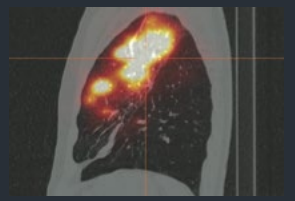
CLINICAL HISTORY
Male patient of 64 years old with emphysema

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

PROTOCOL
VQ SPECT/CT imaging with Technegas as ventilation agent

Images and data were kindly provided by Macquarie Medical Imaging


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

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

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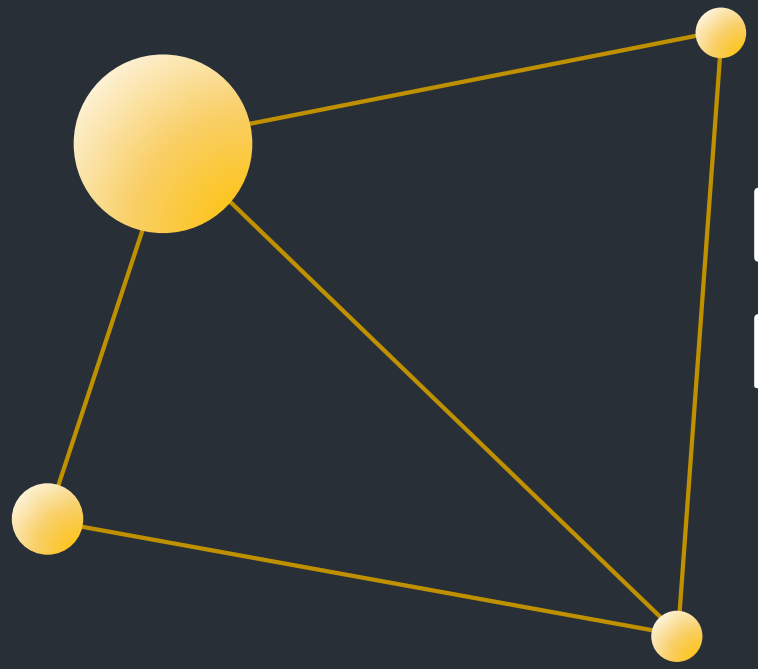
BUILDING FOR GROWTH



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