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Pulmonary Hypertension: Encourage clinical research and innovation

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Therapy of PH: Development of PAH Drugs

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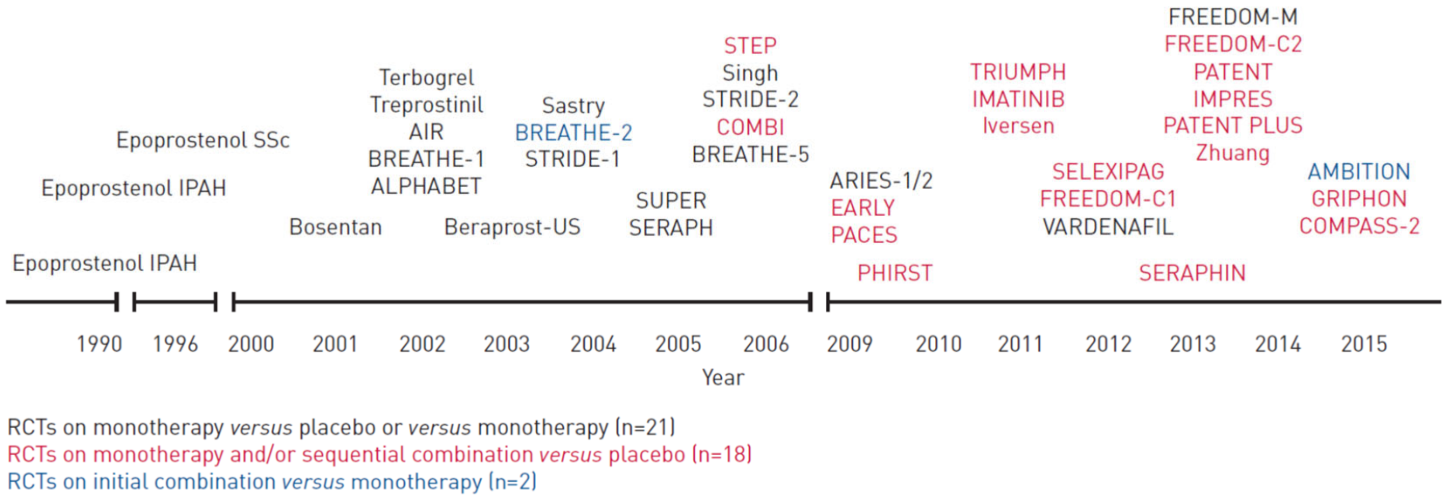

FIGURE 1 Time-course of completed randomised controlled trials (RCTs) in pulmonary arterial hypertension (PAH) (n=41) according to treatment strategy. SSc: systemic sclerosis; IPAH: idiopathic PAH. Reproduced and modified from [70] with permission.

Galie et al. ERJ 2019.

Therapy of PH

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A lot has been done but it is still a long way to go…

Encourage clinical research and innovation

- Clinical trials in PH subtypes other than PAH
- Patient-relevant treatment outcome goals: Quality of Life
- Non-invasive diagnostic tests
- Artificial intelligence & machine learning
- International Collaborations

PH in the world

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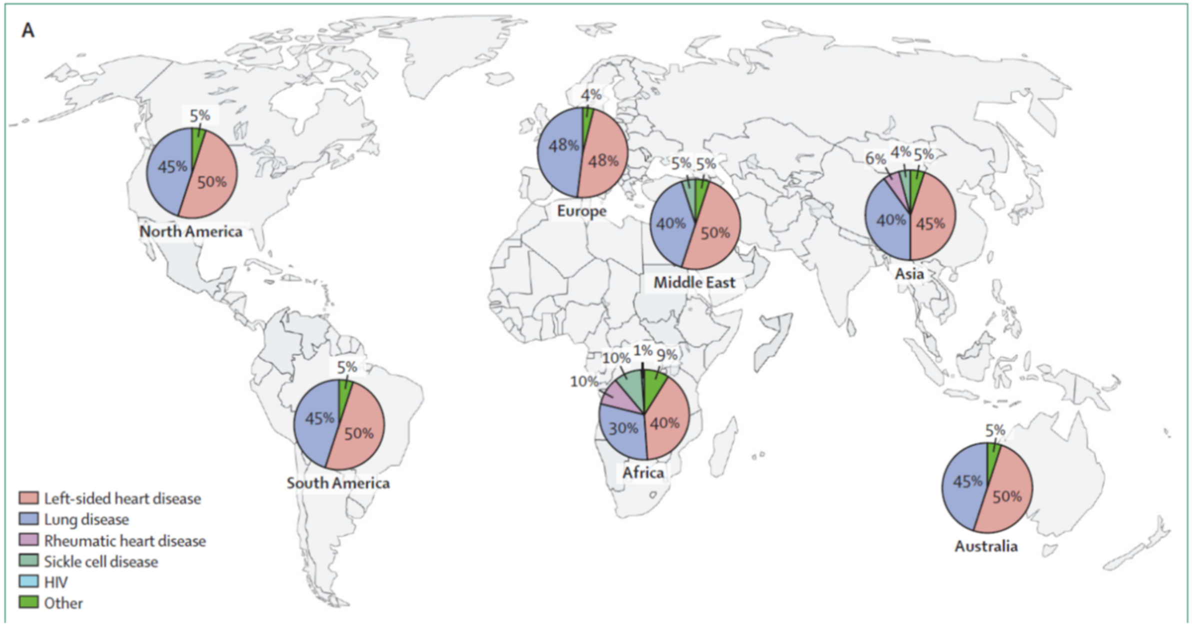

 Hoeper et al. Lancet Resp Med 2016.

Clinical trials in PH subtypes other than PAH: Inhaled Treprostinil bei PH-ILD

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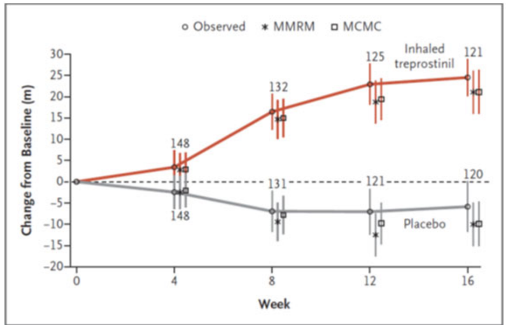
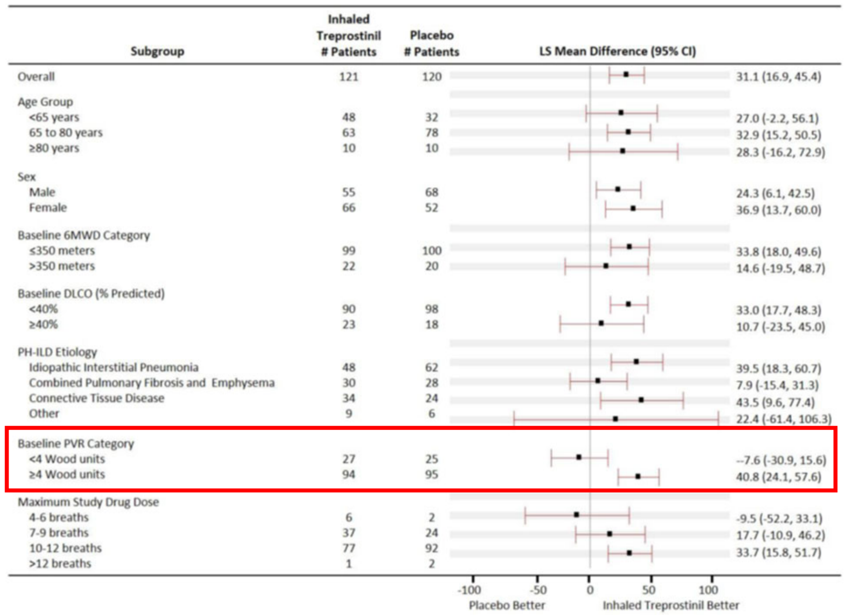


Figure 2. Mean Change from Baseline in Peak 6-Minute Walk Distance through Week 16.

Shown are mean (±SE) changes from baseline (dashed line) in peak 6-minute walk distance over the 16-week trial period. The data shown are for patients with available data (observed) as well as for the results of two analysis methods used to account for missing data. The values shown at each data point indicate the number of patients assessed at that time point. The primary analysis used mixed-model repeat-measurement (MMRM) methods, with the assumption that missing data were missing at random. The model included the change from baseline to peak 6-minute walk distance as the dependent variable, with treatment, week, and treatment-by-week interaction as fixed effects, and the baseline 6-minute walk distance as a covariate. A sensitivity analysis for the primary end point was performed with the use of a multiple imputation approach with a multivariate normal imputation model using the Markov chain Monte Carlo (MCMC) method. The imputation model included treatment group, all scheduled visits, patient's sex, and patient's age at randomization. The confidence intervals have not been adjusted for multiplicity and cannot be used to infer definitive treatment effects.

Figure S2. Forest Plot on Subgroup Analyses of Peak 6-Minute Walk Distance (meter) at Week 16.



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Waxman et al. NEJM 2021.

Patient-relevant treatment outcome goals: Quality of Life

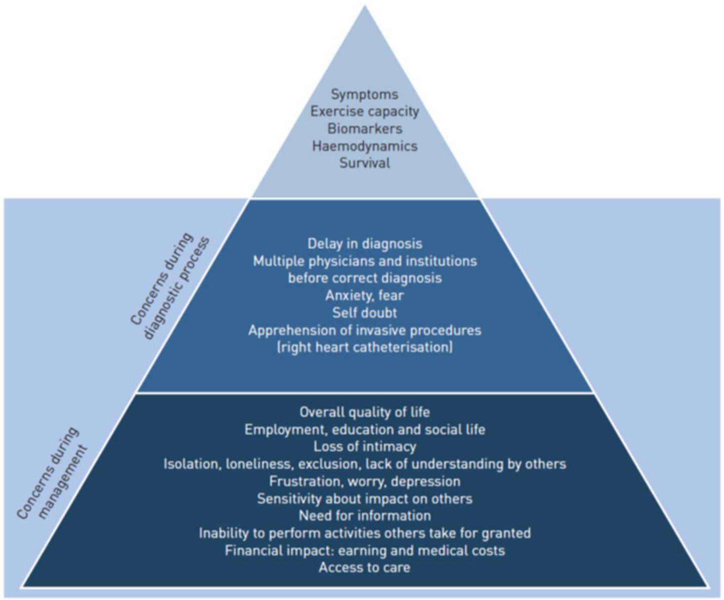
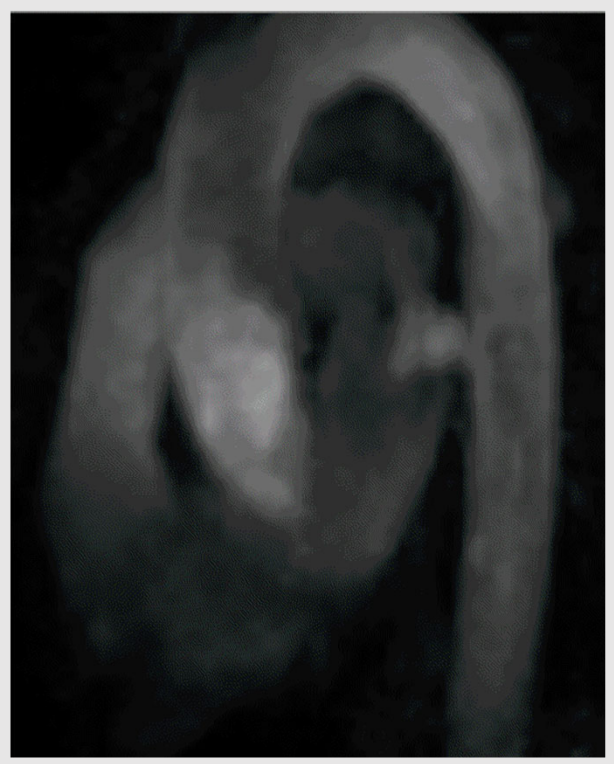


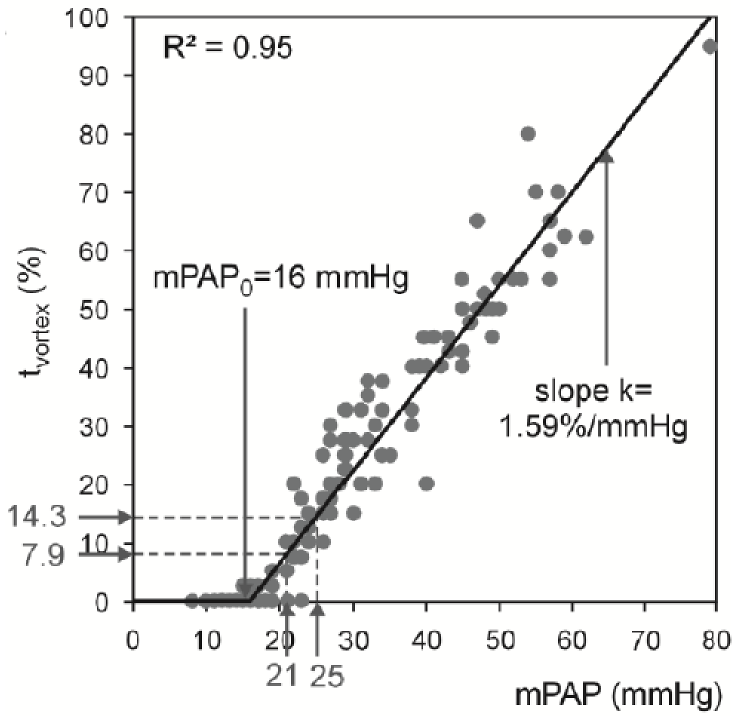
FIGURE 1 Surveys of patients and caregivers suggest that traditional parameters of pulmonary hypertension severity may be the "tip of the iceberg" when the broader range of patient concerns is considered.

FIGURE 2 Representation of components of a multidimensional approach to care of the pulmonary hypertension patient.

McGoon et al. ERJ 2019.

Non-invasive diagnostic tests





Reiter et al. Radiology 2015.

Artificial intelligence & machine learning

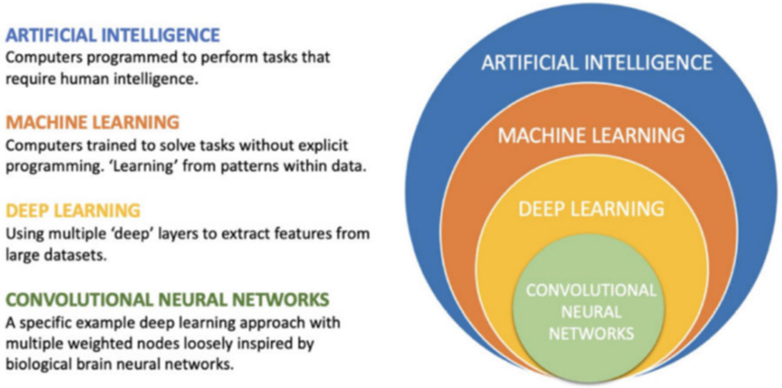


Figure 4. Layers of artificial intelligence approaches applied to medical imaging.

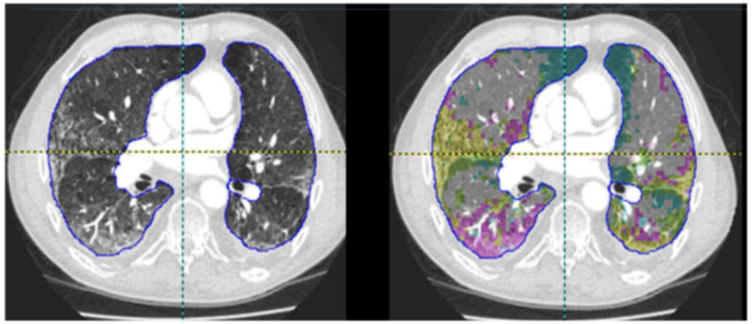


Figure 6. Demonstration of a quantitative CT (QCT) approach (adaptive multiple features method), acquired using PASS software. Different lung parenchymal disease patterns are identified and highlighted. Blue, emphysema/low attenuation pattern. Yellow, fibrotic changes. Pink, ground glass change.

Dwivedi et al. Diagnostics 2021.

International Collaborations

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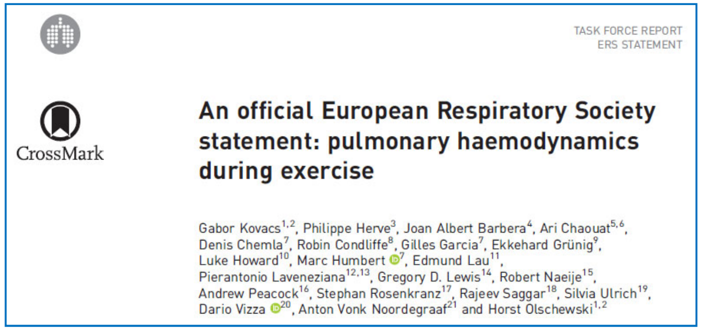
- Pulmonary Hemodynamics during Exercise – Research Network (PEX-NET)
- ERS Clinical Research Collaboration: investigating the clinical relevance of pulmonary hemodynamics during exercise
- Established in 2017
- 39 expert centers participating from 15 countries (EU, CH, GB, US, BRA, AUS)
- More than 1500 patients included so far
- Data analysis ongoing for retrospective registry
- Recruitment ongoing for prospective registry


TASK FORCE REPORT
ERS STATEMENT

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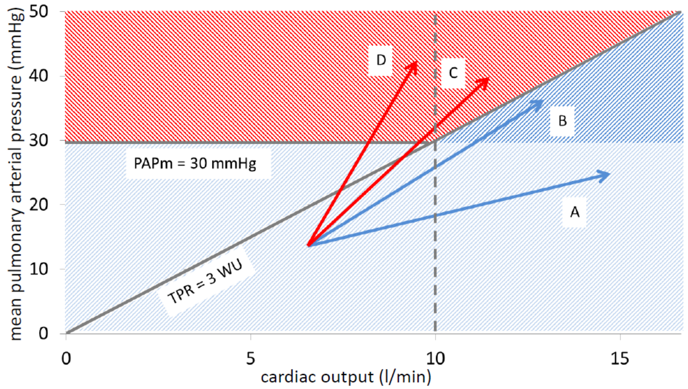
An official European Respiratory Society statement: pulmonary haemodynamics during exercise

Gabor Kovacs[1,2], Philippe Herve[3], Joan Albert Barbera[4], Ari Chaouat[5,6], Denis Chemla[7], Robin Condliffe[8], Gilles Garcia[7], Ekkehard Grünig[9], Luke Howard[10], Marc Humbert[7], Edmund Lau[11], Pierantonio Laveneziana[12,13], Gregory D. Lewis[14], Robert Naeije[15], Andrew Peacock[16], Stephan Rosenkranz[17], Rajeev Saggar[18], Silvia Ulrich[19], Dario Vizza[20], Anton Vonk Noordegraaf[21] and Horst Olschewski[1,2]



Kovacs et al. ERJ 2017.

early diagnosis • best treatment • better quality of life • finding a cure

PHA EUROPE for the patients

PULMONARY HYPERTENSION ASSOCIATION

April 2022

ADDRESSING THE UNMET NEEDS OF PERSONS LIVING WITH PULMONARY HYPERTENSION:

A Call to Action