4DMedical™

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XV Lung Ventilation Analysis Software

(XV LVAS™)

The Modality Gap

Current best practice diagnostic tools have not been updated in decades. While each provides important insights, they are either insensitive, clinically limited or expensive and emit high radiation. Their limitations leave clinicians and patients without a complete picture of lung health.

Spirometry - 1846

One-Dimensional Technology
Accurate but insensitive

Spirometry is the current benchmark in lung diagnostics. It's limitation is that it can only measure pulmonary capacity as an average over the entire lung and is dependent on patient effort.

X-ray - 1895

Two-Dimensional Technology
Inexpensive but clinically limited

X-ray is widely used in clinics to determine changes in lung structure. It emits low radiation and is widely accessible. Clinical limitations exist when diagnosing respiratory illness.

CT - 1971

Three-Dimensional Technology
Sensitive but expensive and emitting high radiation

The current gold standard for determining underlying lung structure, CT requires highly skilled radiologists to infer function from lung structure. It also delivers a radiation dose 70x that of chest X-ray.

XV Technology

Four-Dimensional (3D plus time)

Combines the best of existing modalities

Functional insight **of spirometry** at a regional level

Comparable radiation dose **to X-ray**

High-detail resolution **of a CT scan**

FDA-CLEARED

The FDA-cleared **XV Lung Ventilation Analysis Software (XV LVAS)** is the first and only software-based image-processing technology intended to provide reproducible quantification of ventilation for pulmonary tissue to support diagnosis and follow-up examinations.

Powered by 4DMedical's **XV Technology**™, it returns pinpoint accurate four-dimensional quantitative measurements of regional ventilation deficiencies by imaging the motion of the lung tissue at 10,000s of locations within the lung during the breath cycle.

XV Technology operates with a higher sensitivity than any non invasive competing modality without contrast agents.

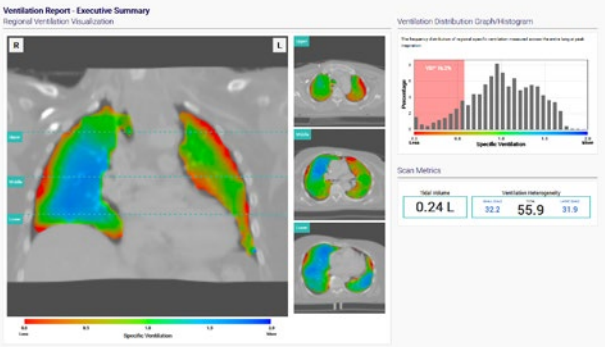
For the first time in medical history, the capacity to simply and effectively view and measure regional lung function is here.

XV LVAS™ Ventilation Report

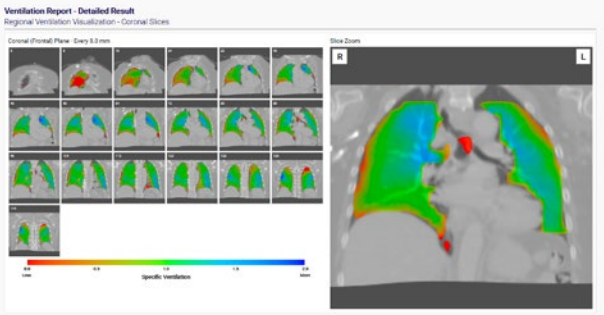
The **XV LVAS Ventilation Report** is the first in a series of reports to be made available for clinical application that provides a state-of-the-art way of understanding regional lung motion and airflow. It enables highly detailed maps of the patterns of both lung motion and pulmonary function, with functional deficits detected through local (regional) differences in movement.

Product Screen Shots

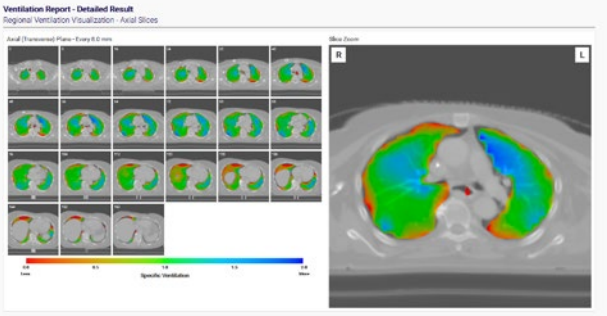
Executive Summary



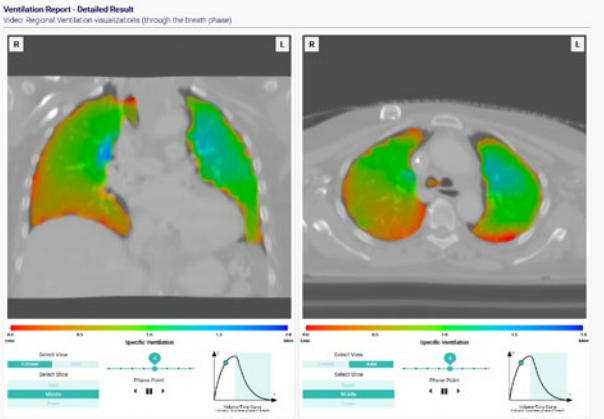
Coronal Slices



Axial Slices



Interactive Ventilation Animation



Regional Ventilation Visualization

The **XV LVAS Ventilation Report** delivers information not available via other modalities.

Measuring regional ventilation, the report enables physicians to accurately detect areas of high and low ventilation.

A color-coded visualization is generated, showing both coronal and axial slices at peak inspiration, plus a four-dimensional animation. Red depicts regions of low ventilation, green regions of average ventilation, and blue regions of high ventilation.

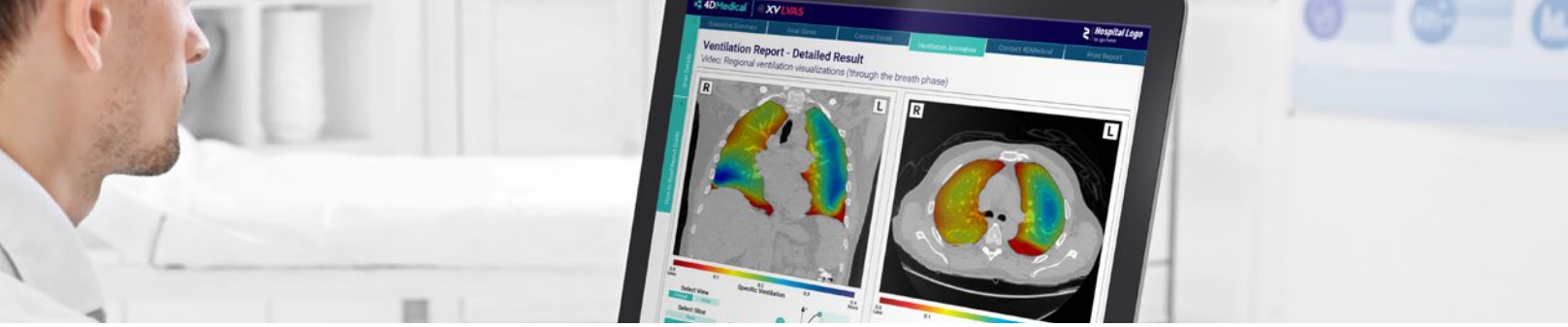
The report also quantifies ventilation heterogeneity, which is a widely recognized indicator of lung health.[1]

Earlier detection means earlier treatment.

If subtle, functional losses can be detected early before the lung structure is irreversibly affected by disease, treatment can be applied earlier, and this can lead to better outcomes for patients.[2]

1. Downie SR, Salome CM, Verbanck S, et al. Ventilation heterogeneity is a major determinant of airway hyperresponsiveness in asthma, independent of airway inflammation Thorax 2007; 62: 684–689.

2. M. Aiello, et al. The earlier, the better: Impact of early diagnosis on clinical outcome in idiopathic pulmonary fibrosis. Pulmonary Pharmacology & Therapeutics, 2017, 44:7-15, ISSN 1094-5539.



SaaS Delivery Model

Obtaining a **XV LVAS Ventilation Report** is easy.

A Software-as-a-Service (SaaS) delivery model means that no equipment needs to be purchased or installed. Once the **XV LVAS Ventilation Report** is complete, it is securely saved back onto the hospital's Picture Archiving and Communication System (PACS).

XV LVAS imaging is done on existing hospital X-ray hardware (fluoroscopes).

A prior chest CT is sourced from the patient's electronic medical record (EMR) and co-registered to the XV scan to provide the patient's airway tree and thoracic cavity.

Five one-breath cinefluoroscope sequences are acquired, and raw DICOMs are automatically de-identified and securely sent to the 4DMedical cloud for processing.

Using our patented **XV Technology**, the lung motion field is reconstructed. A detailed **XV LVAS Ventilation Report** is then generated and sent back to the hospital as a DICOM encapsulated PDF or HL7 file and re-identified and saved to the hospital PACS or Radiology Information System (RIS).

Potential Clinical Applications

Patient and treatment monitoring

Low radiation makes **XV LVAS** an ideal solution for supporting monitoring disease progression and therapeutic effectiveness.

Diagnostic support

Earlier diagnosis and treatment can be assisted by more sensitive and accurate assessments of regional lung ventilation.

Surgical planning

A more intricate and sensitive analysis of a patient's lung health may support physicians with follow-up treatments such as surgical options.

Clinical trial support

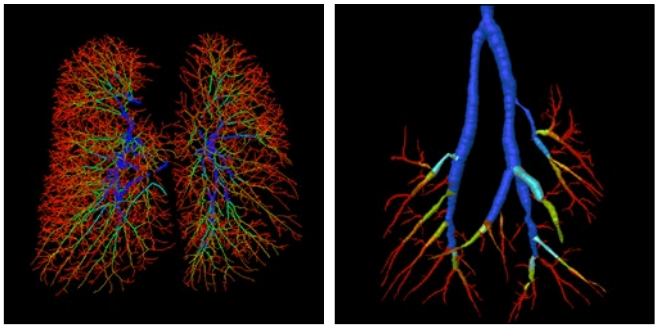
XV LVAS provides more sensitivity, repeatable measures and novel endpoints for new clinical trials.

Intensive care

By providing more accurate parameters which could be used to support physicians for ventilator utilization.

Future Product Development

The next generation of **XV Technology** is currently in research and development and may explore areas such as expiratory quantification and contrast-free pulmonary angiography.



To find out more about our products, including our FDA-cleared XV LVAS, get in touch with your local 4DMedical team today.
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