

# 3DVH

## Complete 3D Patient Dose Analysis

Accurate and intuitive 3D patient dose and DVH analysis

### The 3DVH Advantage

3DVH is a next generation patient dose verification and analysis system. 3DVH can use existing IMRT or rotational delivery measurements (e.g. MapCHECK™ or ArcCHECK™) to perform 3D patient dose and DVH QA, effectively eliminating dose-to-phantom guesswork.

Using conventional QA measurements, 3DVH predicts the impact on patient dose and DVH. 3DVH processes the data from a phantom-based geometry and translates to a heterogeneous patient dose-based geometry using a patent pending algorithm called “Planned Dose Perturbation” (PDP™).

#### Summary

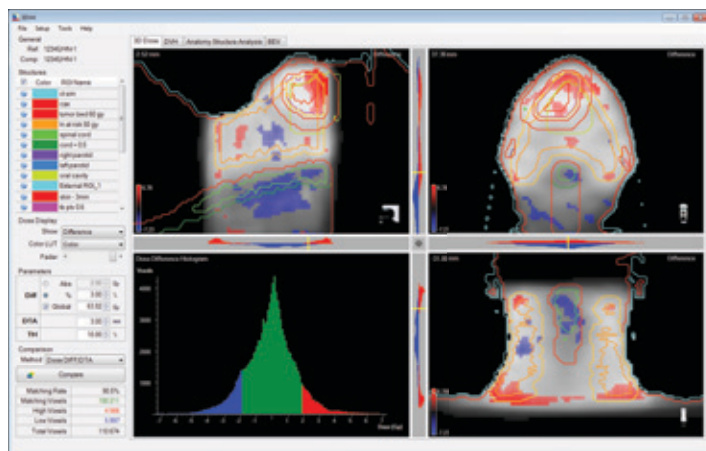
3DVH avoids the uncertainty and overhead of a duplicate dose calculation engine and introduction of new errors.

The 3D patient planned dose is perturbed using the errors measured in conventional QA.

This is the 3DVH method

### Key Benefits

- » DVH Plan on Patient
  - » Use MapCHECK and ArcCHECK high-resolution IMRT QA results to estimate impact on Patient Dose and DVH
- » Universal Comparisons
  - » Plan 1 vs. Plan 2 for a given TPS
  - » TPS 1 Plan vs. TPS 2 Plan using any TPS
  - » Modality “X” vs. Modality “Y”
  - » More...



# 3DVH method

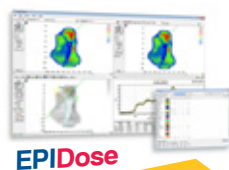
## Input Data

3DVH requires the same data as conventional QA plus the patient DICOM RT files:

- > SNC PDP - One file with all planar QA results
- > RT Dose
- > RT Plan
- > RT Structure

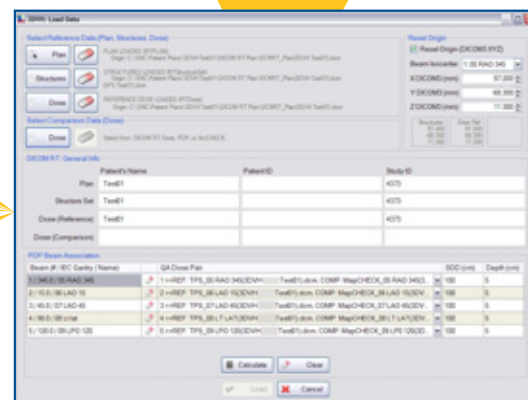


Input Data



EPI Dose

Input Data



3DVH Processing

## 3DVH Processing

3DVH processes estimated patient dose for comparison with the TPS planned dose via:

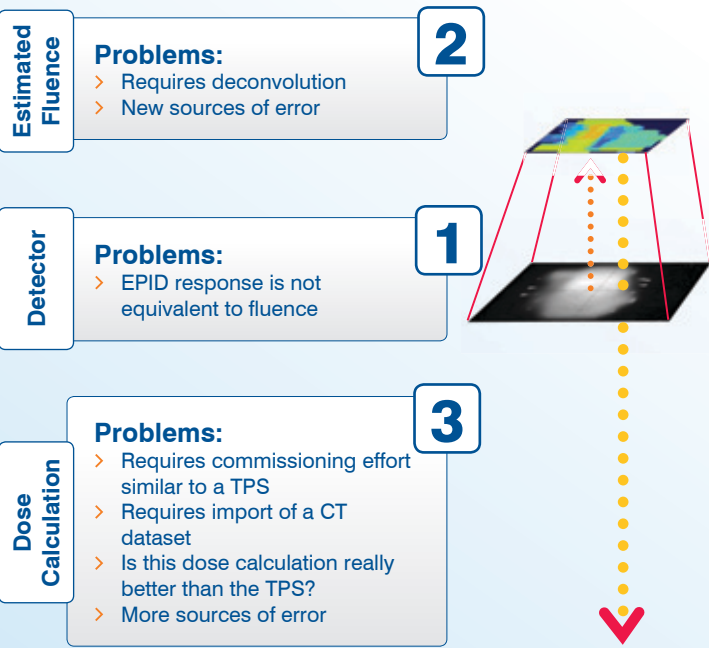
- > 3D dose analysis
- > Patient DVH
- > Analysis per ROI
- > ROI "quick statistics"
- > BEV analysis

# Phantom Geometry

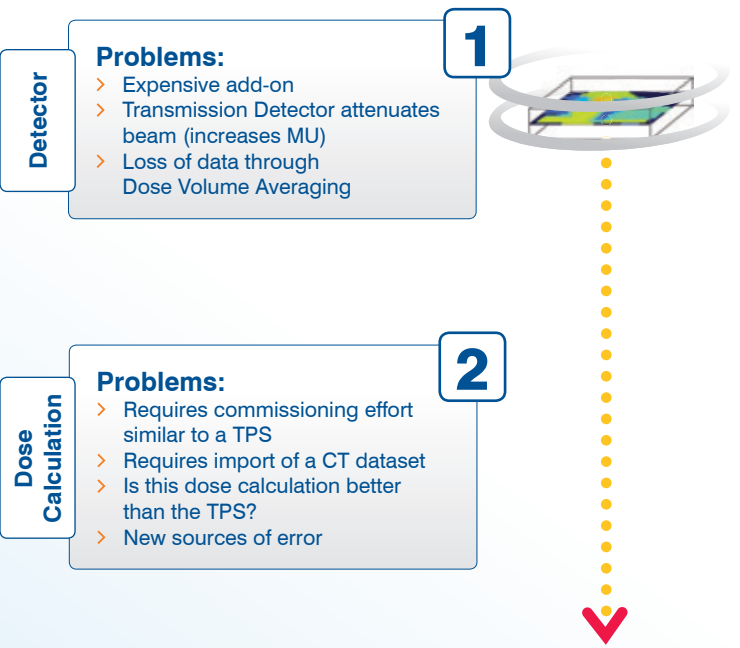


# Other methods

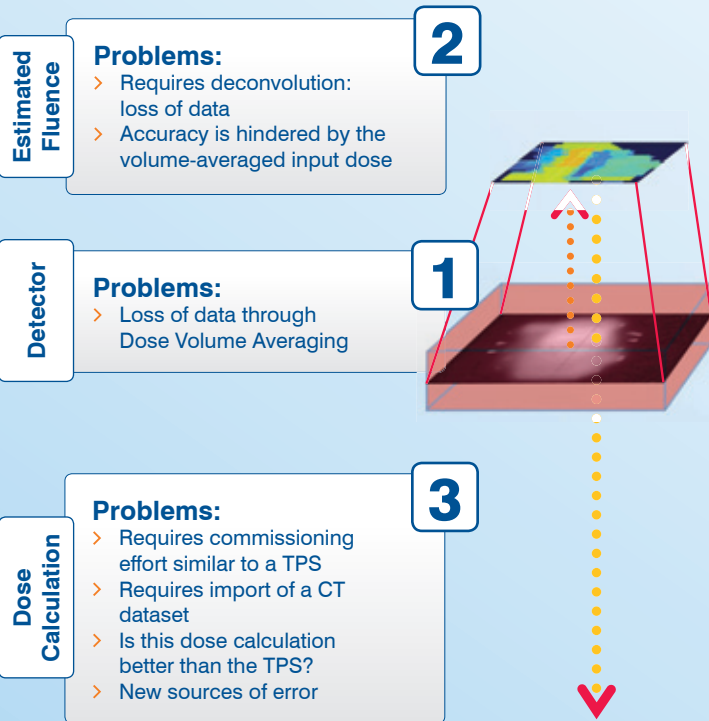
## METHOD 1: EPID Fluence



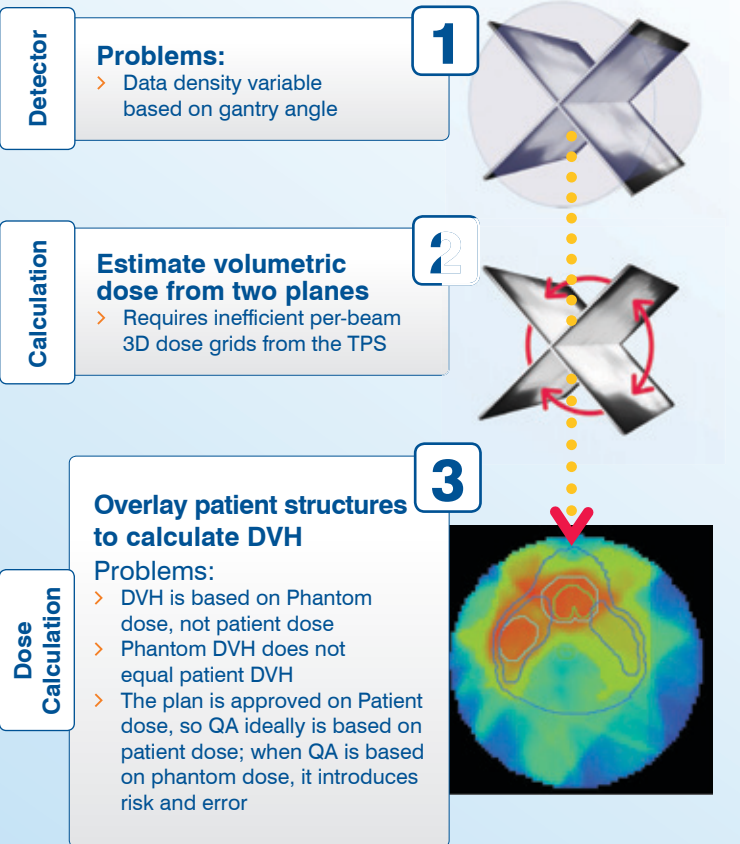
## METHOD 2: Transmission Chamber



## METHOD 3: 2D Array (ion chamber)



## METHOD 4: Phantom DVH



## 3DVH = Patient relevant Dose QA

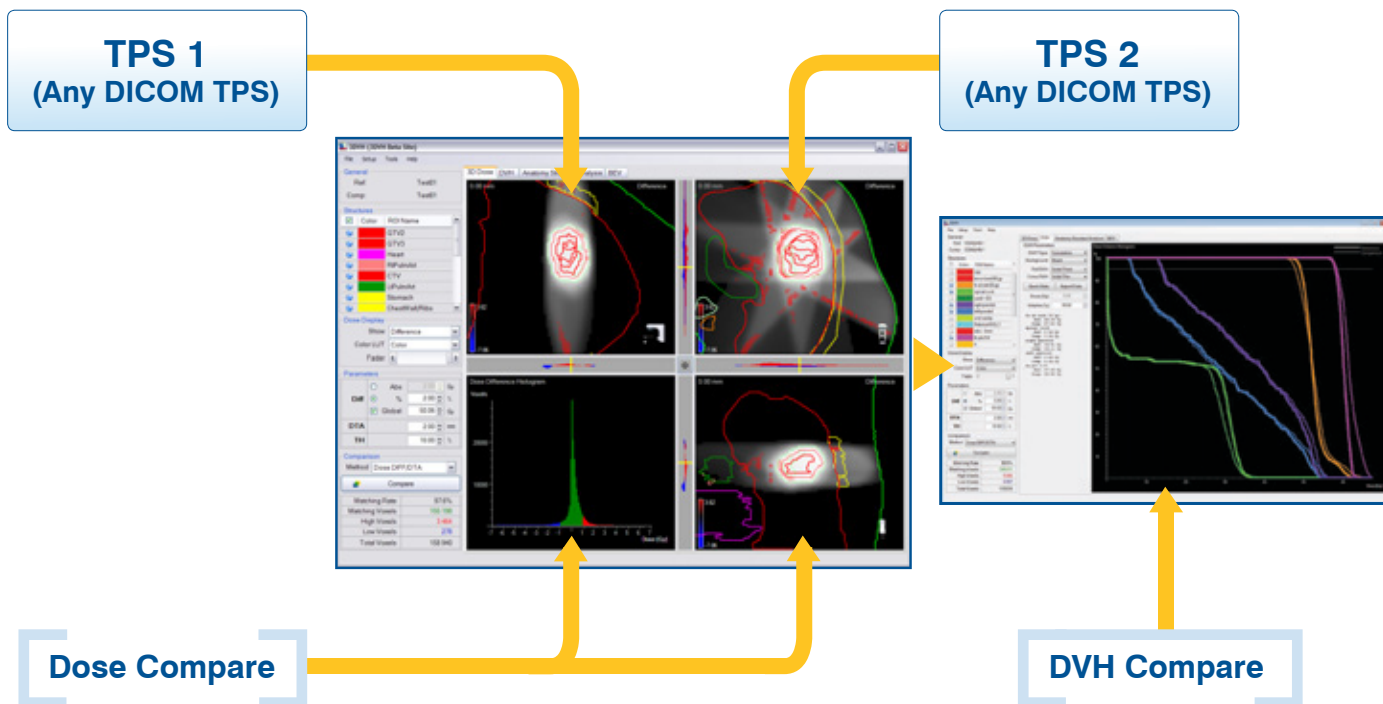
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- ▶ 3DVH presents patient DVH for clinically relevant dose & DVH QA
- ▶ Measured **phantom** dose differences are transformed to **patient** dose geometry
  - ▶ Patent-pending PDP™ algorithm predicts 3D dose in patient
  - ▶ Direct DVH, slice, and absolute point dose comparisons
  - ▶ Automatic depth, SSD, and patient geometry physics corrections
  - ▶ All major Linac/MLC/energy models included - no beam modeling!

## Benefits for the **Clinician**

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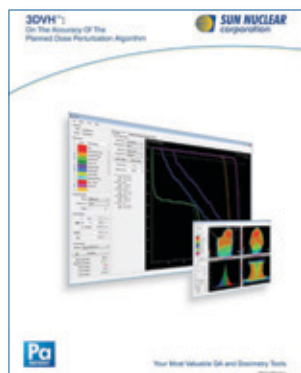
- ▶ Plan documentation matches QA documentation
- ▶ Detailed dose information for anatomic regions-of-interest
- ▶ Understand any patient plan in clinical detail
- ▶ Make informed decisions for greater comfort levels
  - ▶ Analyze in greater detail when plan quality is questioned
  - ▶ See cold and hot spots impact to DVH
    - > See actual dose fall off in target
    - > See actual dose impact to critical structures
    - > See why more stringent QA is required today



## Features and Specifications

For more information on how 3DVH can improve patient QA outcomes, ask for:

**“3DVH: On The Accuracy Of The Planned Dose Perturbation Algorithm”**



### Features

Estimation of absolute patient dose:	Yes
Analysis by Patient DVH:	Yes
Requires a secondary dose algorithm:	No
Estimates impact of TPS error:	Yes
Estimates impact of delivery errors:	Yes
Statistics per anatomical structure:	Yes
DICOM RT compatibility:	Full integration
VMAT, RapidArc® support:	Version 1.2
Analysis of beam by beam errors:	Yes
Requires user commissioning or data modeling:	No

### Software requirements

Operating system:	Windows XP, Vista, 7
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### Hardware requirements

CPU:	• Minimum: 1.5GHz (Intel or AMD)
	• Recommended: 2.4GHz or better
RAM:	• Minimum: 2GB
	• Recommended: 4GB or more
Hard drive space:	• Minimum: 3GB
	• Recommended: 5GB or more