

# Choose SmartArc CDR to reduce treatment times on a budget

“In our experience, patients who have problems lying on the couch definitely benefit from CDR.”

Nesrin Dogan, PhD  
 Professor and Director  
 of Clinical Medical Physics  
 Department of Radiation Oncology  
 Virginia Commonwealth University

Pinnacle<sup>3</sup> customers and their patients at Virginia Commonwealth University are benefiting from the efficiency of VMAT without a variable dose rate (VDR) capable linear accelerator or R&V upgrade.

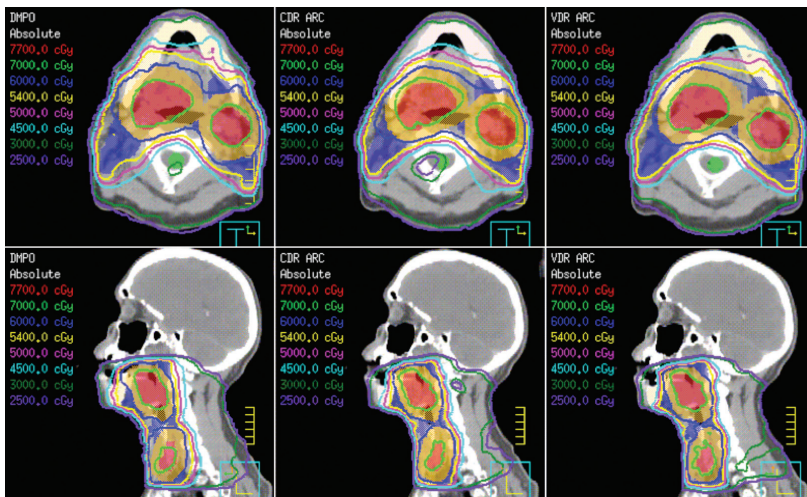
- Reduce delivery time by up to 83%
- Lower monitor units by up to 37.5%
- Reduce QA time by up to 50%

SmartArc VMAT plans delivered with constant dose rate (CDR) linear accelerators allow IMRT/DMPO quality treatments with lower monitor units and reduced delivery times.

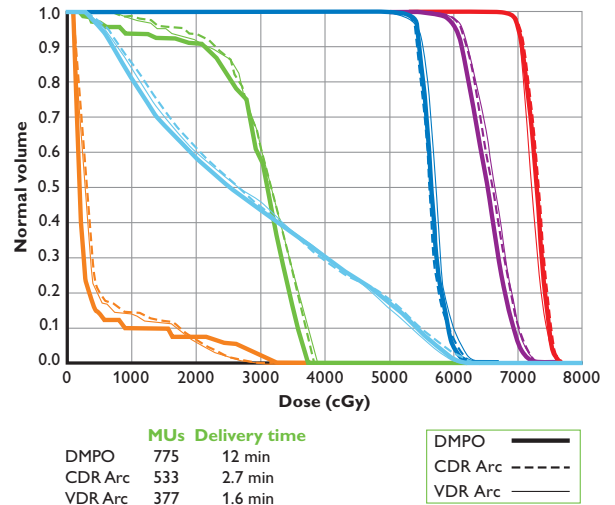
	IMRT/DMPO	CDR Arc	VMAT
Mean delivery times	12-15 min.	2.5 min.	1.5 min.
MUs	~800	~500	~300
QA time*	30 min.	~10-15 min.	~10-15 min.
<b>Investment to realize benefits</b>			
VMAT planning module	No	Yes	Yes
VMAT QA module	No	Yes	Yes
VMAT linac upgrade	No	No	Yes

\*QA time includes the measurement field-by-field analysis

NOTE: Results based on Virginia Commonwealth University experience.



A head and neck case comparing DMPO, constant dose rate, and variable dose rate plans.



NOTE: Results based on Virginia Commonwealth University experience.

Images courtesy of Virginia Commonwealth University

#### Who/where

Virginia Commonwealth University  
(VCU)  
VCU Massey Cancer Center  
Radiation Oncology Department  
Richmond, VA

VCU Massey Cancer Center is one of only 66 National Cancer Institute-designated institutions in the country that leads and shapes America's cancer research efforts. The radiation oncology department at VCU Massey Cancer Center was founded more than 50 years ago and today it has grown from a single site at Medical College of Virginia to six locations throughout the Greater Richmond area.

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**System information**  
Pinnacle<sup>3</sup> 9 with SmartArc

Philips Brilliance CT Big Bore

Varian Trilogy and Varian 21EX  
accelerators with ARIA Record  
and Verify System (version 10)

## An interview with Nesrin Dogan, PhD, Virginia Commonwealth University

**Q.** You have been using Pinnacle<sup>3</sup> SmartArc for VMAT plans using constant dose rate (CDR) for over 6 months now. Is that correct?

**A.** Yes, we did our first CDR plan with SmartArc in July of 2010. Since then, we've planned 15 cases.

**Q.** What was your rationale for first trying CDR with SmartArc?

**A.** Initially, we did not have the VMAT upgrade for our linear accelerator which facilitates the variable dose rate (VDR) delivery.

**Q.** What benefits do you experience with CDR over other techniques, like IMRT/DMPO?

**A.** Compared to DMPO the delivery time and QA time are noticeably reduced. Delivery time with CDR is about 2.5 minutes for a typical head and neck case with three target volumes, compared to 12-15 minutes with DMPO. QA time is also reduced since we only have to shoot one or two arcs at the most. Analysis of the patient-specific QA is also very short. Also, MUs are reduced, ~500 MUs with CDR compared to ~800 with DMPO.

**Q.** How does CDR compare to VMAT with variable dose rate?

**A.** The VDR dose distributions are slightly more conformal than the CDR isodose distributions. And, VDR delivery times are slightly shorter: 2.5 minutes with CDR for a typical head and neck case with 3 target volumes and 1.5 minutes with VDR for the same cases. MUs with VDR are further reduced: ~500 MUs with CDR to ~300 MUs with VDR for a typical head and neck case with three target volumes.

**Q.** What types of cases benefit most from CDR?

**A.** From my experience, head and neck cases with multiple targets and prostate cases benefit most. I did 10 body-lung stereo cases (3-4 fractions) using both CDR and VDR. The gain was not as much as compared to standard techniques.

**Q.** Are there any reimbursement issues when planning CDR with SmartArc?

**A.** The CDR option is still IMRT treatment since the plan is obtained using inverse planning and this is technically an IMRT delivery. I do not believe there is any reimbursement issue.

**Q.** Would you recommend CDR with SmartArc to a colleague who does not have access to a variable dose rate capable linac?

**A.** Yes I would, since you can noticeably reduce treatment times and MUs as compared to IMRT/DMPO plans. In our experience, patients who have problems lying on the couch definitely benefit from CDR.

In our experience, we found that VDR provides reduced delivery times and enhanced MU reductions as compared to DMPO. However, the improvements obtained with CDR are definitely very good and this is definitely a good option to use if you do not have an accelerator with a variable dose rate option.

Please visit [www.philips.com/radiationoncology](http://www.philips.com/radiationoncology)



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