SunCHECK* it.

*2.0: INDEPENDENT QA. YOUR WAY.
Integrated. Independent.

Radiation Oncology departments are busy. In pursuit of Patient Safety, Medical Physicists manage complex processes, complicated machines, and high expectations for overall treatment quality. With SunCHECK™ 2.0, balancing the workload can now be done far more efficiently. **Full integration and independence intact.**
It’s about time.
Greater efficiency in quality assurance has been a long time coming.
In the last 30 years, countless new radiation therapy modalities and treatment techniques have been embraced. Independent QA tools have kept pace, but they’ve arrived as separate packages – designed for specific tasks, with unique software, databases and workflows to learn.

With demands for increased patient throughput, improved quality of care and reduced operational costs, every minute counts. And, with Patient Safety on the line, shortcuts are not an option.

SunCHECK 2.0 provides flexible workflow automation for fully integrated and independent QA. **Integrated** QA provides the workflow efficiency and time savings needed to get the job done. **Independent** QA provides the rigor needed to be confident issues are caught.

It’s what the field needs now, and it’s ready for you.

Globally, nearly **119 million** treatment fractions were treated in 2012. By 2035, that number is expected to jump to at least **204 million** per year.

*Lancet Oncology Commission, September 2015*
When we introduced PerFRACTION™ and SNC Machine™, we started the journey towards the fully integrated QA platform that is now SunCHECK.

With the introduction of SunCHECK 2.0, the platform is complete – able to address all your needs for Patient and Machine QA in a convenient and consistent software solution. But more than that, SunCHECK 2.0 will change the way you perform QA. It reduces process steps, produces clear results to better inform clinical decisions, and generates reports to make your life easier.

A recent report from RO-ILS demonstrated overall **76 percent** of events were discovered by either a radiation therapist or physicist.

RO-ILS: Radiation Oncology Incident Learning System® 2017 Year in Review Report
• One Solution for Radiation Therapy QA
• Speed and Efficiency through Automation
• Access from Anywhere
• Seamless Clinical Integration

Platform

• Secondary Checks
• Phantomless Pre-Treatment QA
• In-Vivo Monitoring

Patient

• Daily, Monthly, Annual QA
• Measurement Device Connectivity
• Imaging, VMAT, MLC QA

Machine
Apply the Platform

In keeping with all Sun Nuclear solutions, SunCHECK is independent. It’s designed from the ground up to support the real world of radiation therapy – where every combination of OIS, TPS, linac and clinical implementation is unique.

SunCHECK’s purpose is Patient Safety.

With SunCHECK, you have a fully independent, integrated workflow.

• **One Solution for Radiation Therapy QA**
  Manage all Patient and Machine QA in the same place to save time and reduce the likelihood of errors going undetected.

• **Speed and Efficiency through Automation**
  Cut time consumed by manual tasks, and build in more bandwidth for data analysis, clinical decisions and continuous improvement.

• **Access from Anywhere**
  Untether your team with secure, browser-based visibility to the insights they need to see, wherever they are.

• **Seamless Clinical Integration**
  Make your QA work harder, regardless of technologies in place. Count on custom installation, with a quick start-up guaranteed.
“Being able to really see the whole system in one location is a huge advantage. Having patient information, having machine information all in one easily accessible place... that’s basically what you would want in a system.”

Robert Staton, Ph.D., UF Health Cancer Center at Orlando Health, Orlando, FL
SunCHECK™ Patient

Prioritize Your Patients

Trade time spent moving, saving and searching for files for greater focus on improving treatment quality.

“Because this system is fully automated so that no physicist time is required for data acquisition and evaluation, daily patient treatment QA is feasible.”


With SunCHECK Patient, all phases of Patient QA integrate into a flexible, automated and seamless workflow.

- **Secondary Checks**
  Perform 3D secondary dose calculation for the systems your clinic uses.

- **Phantomless Pre-Treatment QA**
  Complete your 2D/3D pre-treatment QA, with both EPID measurement and log file-based options.

- **In-Vivo Monitoring**
  Verify and track dose throughout your patients’ courses of treatment.
Verify setup, first fraction, and intra-fraction motion (when in EPID mode) against the treatment plan. Patient position and anatomy are factored into the analysis to enable true dosimetric In-Vivo Monitoring.

2.0 FEATURE IN FOCUS:
TRANSIT DOSIMETRY

Pre-set, yet customizable dose tolerances for each phase of Patient QA allow you to obtain meaningful QA results quickly and easily. See the impact to different criteria sets instantly.
SunCHECK™ Machine

Get More from Your Machines

Improve standardization and ease compliance reporting for Daily, Monthly and Annual QA.

With SunCHECK Machine, you drive efficiency and critical consistency across locations, machines and staff. In turn, you are able to satisfy requirements of TG-142, TG-51 and your internal requirements.

• **Daily, Monthly, Annual QA**
  Ensure consistency among machines and clinics with shared tolerances. Apply ready-to-use, but customizable templates for efficient QA. No more spreadsheets!

• **Measurement Device Connectivity**
  Automate beam measurement with direct device integration to Sun Nuclear’s Daily QA™ 3 and IC PROFILER™. Eliminate the need for additional software and transfer of data.

• **Imaging, MLC and VMAT QA**
  Simply deliver test beams. With acquired image or log file data, SunCHECK Machine automatically processes the data and analyzes results.

Monthly constancy and beam quality checks take only **15 minutes** for 5 beams with SunCHECK Machine vs. **60 minutes** without.

*Sun Nuclear internal testing*
TG-142 pre-set templates by modality support Daily, Monthly and Annual QA. Easily customize templates and tolerances to fit your needs.

2.0 FEATURE IN FOCUS: DEFAULT TEMPLATES

Auto-populate your Daily, Monthly and Annual QA results with direct connectivity to Daily QA 3 and IC PROFILER devices, eliminating the need for additional software and potential data entry errors.
## SunCHECK Platform

### NEW 2.0 Feature

**Action-oriented dashboard**

- Overview of Patient and Machine QA actions
  - Results/review for patient data
    - Secondary Checks, Pre-Treatment and In-Vivo Monitoring
  - Due, pending and approved Machine and Patient QA tasks
- Access a snapshot of results data
- Easy approval mechanisms, right from the dashboard

### Practical Application

- Consistent user experience across the platform

### Common navigation mechanisms between Patient and Machine workflows

- • Access a snapshot of results data
- • Easy approval mechanisms, right from the dashboard

## SunCHECK Patient

### NEW 2.0 Feature

**Transit Dosimetry**

- 2D absolute dose for Fraction N
- Streamlined calibration process

### Practical Application

- Fully independent absolute dosimetric QA of patient treatments, using only calibrated EPID data
- Ability to verify setup and first fraction against plan (74% of errors occur in first fraction – Bojecho et al, Med Phys)
- Patient position, movement and anatomy inherently included in analysis
- Makes true dosimetric In-Vivo Monitoring clinically feasible
- For European Union, supports required compliance with 2013/59/EURATOM – Article 83

### Universal Metrics

- "Plug and Play" metrics - no customization needed
- Use for each phase of Patient QA
- May apply >1 metric set to QA simultaneously

### Practical Application

- Simpler, more automated assessment of all Patient QA results
- Works relative to approved treatment plan, eliminating the need for adjustment or customization for each patient
- Instantly analyze the impact of different metric criteria sets, including dose coverage and limits, and quickly switch criteria

### Event Summary Display

- Target and OAR gamma dose metrics displays
- All event data in a single view

### Practical Application

- Fewer mouse clicks to get to the data you need
- View Points, Beams, Targets, OARs, Overall Gamma, DVH, and Images in a single navigable view
- Auto identification of Targets and OARs

### Results approval mechanism for Patient QA

- Physicist can record and report QA approval according to their clinical judgement

### Interactive CT image viewer

- Scroll through images in transverse, coronal and sagittal views
- Set window/level on images
- Pan and zoom on images

### Practical Application

- Observe dose in all slices of the CT image
- Find hot and cold spots throughout the dose distribution
- Particularly useful for multiple target/single isocenter treatments which are often used for multi-met cases
- Set image displays appropriate to anatomy (e.g., lung vs bone)
- Zoom in on images for more detailed review of dose
### SunCHECK Patient (cont.)

<table>
<thead>
<tr>
<th>NEW 2.0 Feature</th>
<th>Practical Application</th>
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| 3D Monte Carlo-based TomoTherapy® secondary dose calculation support | • Complete 3D secondary dose calculations for TomoTherapy in the same system used for conventional linacs  
  - Eliminate need for standalone solution  
  - Monte Carlo algorithm provides high accuracy  
  - 3D display and analysis of TomoTherapy dose |
| 3D TG-43-based HDR Brachytherapy secondary dose calculation support | • Complete 3D secondary dose calculations for HDR brachytherapy in the same system used for conventional linacs and TomoTherapy systems  
  • Compliance with TG-43  
  • 3D display and analysis of HDR brachytherapy dose |
| 3D secondary dose calculation support for Varian ICVI and BrainLab Stereotactic Cone systems | • Expands 3D secondary dose calculations for the most popular stereotactic cone systems |
| Display of planned vs SunCHECK calculated Monitor Units (MUs) | • View either dose difference or calculated MU difference for required reference points |

### SunCHECK Machine

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| Comprehensive Daily, Monthly and Annual QA  
  • Standard and complete TG-142 templates for Daily, Monthly, Annual QA  
  • User-friendly editing or creation of customized QA templates/tasks  
  • Share QA templates across machines and centers  
  • Automated imaging, MLC, and VMAT QA task integration | • Get up and running quickly with complete and detailed templates  
  • No need for spreadsheets!  
  • Reduce QA delays, contributing to increased Patient Safety  
  • Set QA to standards, or customize to your own specific requirements  
  • Ensure consistency across your enterprise |
| Daily QA™ 3 and IC PROFILER™ direct device integration | • Perform beam measurements for certain Daily, Monthly and Annual QA tasks with a quick one-step process  
  • Operate and save results in real-time—no uploads or file transfers |
| Fully TG-142/MPPG8 compliant | • Demonstrate compliance with — for accreditation purposes |
| Flexible data trending | • See if a given parameter is moving towards an out-of-tolerance condition  
  • Opportunity for pro-active machine management |
| Centralized data storage and flexible reporting | • Easy report retrieval for accreditation/compliance audits  
  • Meet documentation needs |
Supporting Publications

The evidence is mounting. Listed below are publications from your peers that address workflow best practices for Machine QA and Patient Safety.

- **Sensitivity study of an automated system for daily patient QA using EPID exit dose images**

- **Validation of a GPU-Based 3D dose calculator for modulated beams**

- **Do Task Group External Beam QA Recommendations Guarantee Accurate Treatment Plan Dose Delivery?**

- **Can a commercially available EPID dosimetry system detect small daily patient setup errors for cranial IMRT/SRS?**
  Hsieh et al., PRO Journal (2016)

- **Characterization of a new EPID-based system for in-vivo dosimetry in VMAT treatments**
  S. Bresciani et al, ESTRO 2016

  AAPM

- **AAPM Medical Physics Practice Guideline 8.a.: Linear accelerator performance tests**

Visit [sunnuclear.com/publications](http://sunnuclear.com/publications) for up-to-date peer-reviewed articles.
Partnership from the Start
Implementing SunCHECK, as with any Sun Nuclear solution, is more than a one-time interaction.

In-Depth Training
Our headquarters includes a 5,000-square-foot Training Center that replicates the clinical environment of a Radiation Therapy center, including a fully functional Varian TrueBeam®. Courses on a variety of subjects are offered year-round and are delivered by Sun Nuclear subject matter experts and experienced clinical users.

World-Class Support
Live support is available Monday-Friday, from 8 a.m. to 8 p.m. U.S. Eastern Time. Virtual support is available 24/7 through our support website, with access to helpful documents like FAQs and user guides. Enter support tickets at your convenience—staff are available to support after hours commissioning and testing.

Engaging, Ongoing Education
In support of continuing education, Sun Nuclear hosts live webinars and talks at relevant meetings and symposia throughout the year. Practical topics are presented by clinical users and product experts. And live events include demonstrations of hardware and software solutions.
SunCHECK™
Used by 300+
Clinical Sites Worldwide

Platform  Patient  Machine

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