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# CRADLE

Improving contrast media performance  
in CT examinations.

User  
Services

# Focused on a maximum of patient safety

## Without compromising on image quality

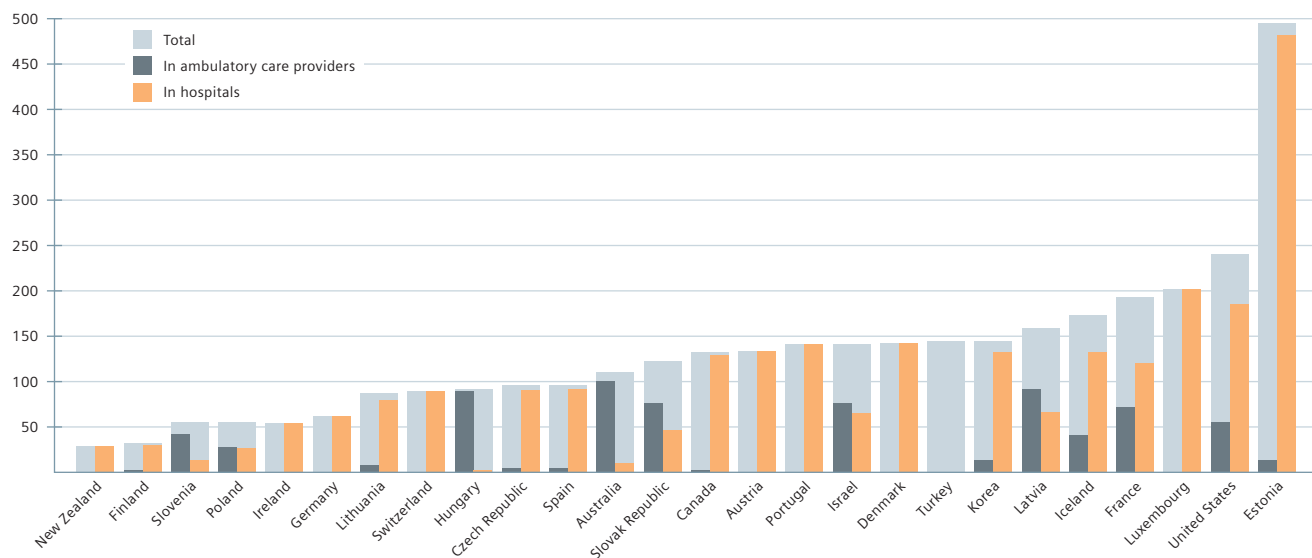
Today, Computed Tomography (CT) is carefully observed as despite all its pioneering achievements in diagnostic medicine, it is still a substantial contributor to man-made radiation exposure. Developments to reduce patient exposure to radiation are taking place rapidly, and they are urgently needed as dose reduction remains a priority for outcome oriented healthcare providers. Exemplary proof of such developments is the ongoing critical assessment of the application of iodinated contrast agents. This scrutiny is based on the fact that for patients at risk, insensitive application of iodinated contrast agent may contribute to kidney damage: A study from the Philipps University Marburg (Germany) has even shown that iodinated contrast agents may also amplify the effect of radiation to induce DNA damage.<sup>1</sup>

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## Wanted: leaders in contrast media management as utilization of diagnostic imaging increases on a global scale

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Regarding the number of CT examinations in selected OECD countries, it rapidly becomes clear healthcare providers are facing big challenges, now and in the years to come: In 2013, there were 240.2 CT<sup>2</sup> examinations per 1,000 residents in the USA, with an OECD average of 131<sup>3</sup>. This trend is rising as the availability of CT scanners has increased rapidly in most OECD countries over the past two decades. In the United States, evidence even suggests that there is an overuse of CT examinations. Especially between 1997 and 2006, the number of scans has increased rapidly while the occurrence of illnesses remained constant.<sup>4</sup>

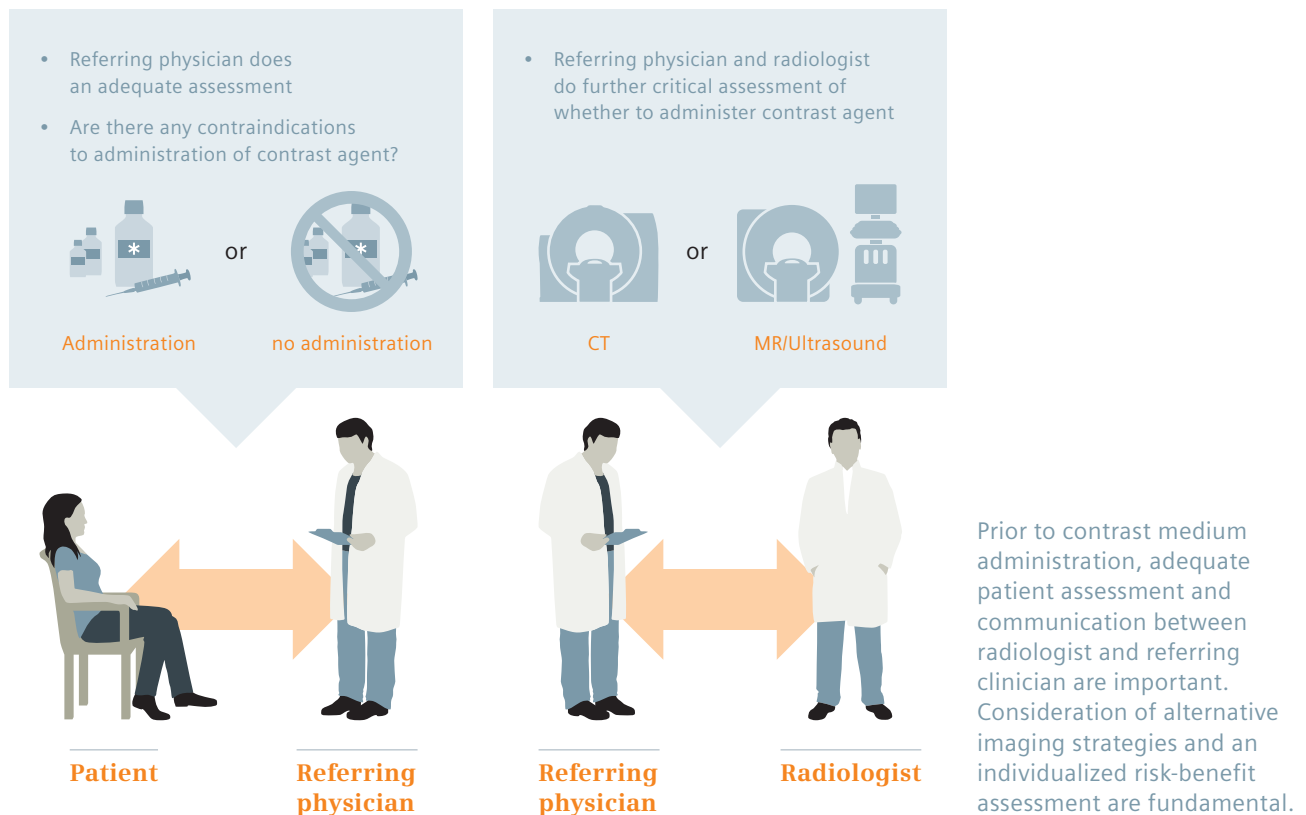


Computed tomography (CT) exams: Total / in hospitals / in ambulatory care providers, per 1,000 inhabitants, 2013.  
Source: OECD Data (<https://data.oecd.org/healthcare/computed-tomography-ct-exams.htm>)

1 Intravenous Iodinated Contrast Agents Amplify DNA Radiation Damage at CT, radiology.rsna.org, Volume 275: Number 3 – June 2015  
2 [http://www.oecd-ilibrary.org/social-issues-migration-health/computed-tomography-ct-exams-total\\_ct-exams-tot-table-en](http://www.oecd-ilibrary.org/social-issues-migration-health/computed-tomography-ct-exams-total_ct-exams-tot-table-en)  
3 <http://de.statista.com/statistik/daten/studie/172707/umfrage/computertomographie-untersuchungen-ct-in-ausgewaehlten-laendern-europas/>  
4 <http://www.ncbi.nlm.nih.gov/pubmed/20008690>

## Helping healthcare providers connect productivity with patient safety and care

Patient safety and innovative procedures are top priorities that challenge healthcare providers all over the world: To achieve these goals, they need the right tools at hand to implement individualized and optimized contrast media treatment plans for patients and their examinations, which consider all facets and special aspects. This is where a dedicated Siemens Healthcare User Services offering called Contrast Reducing Analysis Decreasing Load & Expenses, namely CRADLE, comes into play. CRADLE is a comprehensive consultancy program with a holistic approach to optimize contrast media performance in CT examinations. As a first step, the offering is designed to review and analyze the contrast media dose rate. Following this analysis, Siemens Customer Services is on hand to support healthcare providers in establishing an effective contrast media medication program in their clinical practice, based on fundamental application knowledge to help staff understand the importance of medication safety and dose management. An excellent reputation of healthcare providers and their facilities – including its personnel – will follow automatically. Results will expand to noticeably higher throughput of satisfied patients who feel being taken seriously and exceptionally well cared for.



Timing is perfect for such offerings as by July 2015, all hospitals and critical access hospitals must meet the New Joint Commission's "Revised Requirements for Diagnostic Imaging Service". They require that hospitals must track, record, and improve X-ray dose performance against external benchmarks. What this means in detail is that the Joint Commission has proposed some significant radiology process flow and quality performance standards that may require new ways of working for some healthcare providers, amongst others regarding education requirements. In Europe, new regulations are expected to be in place by 2018.<sup>5</sup>

<sup>5</sup> <http://www.acr.org/Quality-Safety/eNews/Issue-10-June-2015/New-Requirements>

# Valuable measures in times of transition

In the transition to value-based care, all healthcare industry stakeholders are facing various challenges to staying financially viable, including those presented by healthcare reform and consumerism. Many healthcare providers have realized that valuable measures to overcome those challenges and create a sustainable revenue stream often lie within the realms of operational optimization and within strict clinical imperatives. Siemens believes there is great potential to be achieved with CRADLE in all three areas of clinical imperatives, operational optimization and financial performance.

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## Clinical imperatives

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- Widen your examination portfolio, with scan procedures such as cardiac CT scans, to equally serve patients with CT-contraindications such as renal insufficiencies by effectively reducing contrast media and not compromising on image quality.
- Effectively lower the risks of allergic reactions or side-effects of CT scanning in general, such as risks of kidney nephropathy, by training staff to administer contrast media sensibly and as effectively as possible.
- Enhance your department's clinical capabilities by educating your staff on effective and sensible contrast media administration, even in complex CT scans, with a knowledge-targeted consulting offering.
- Expand your institution's clinical capabilities by offering contrast-enhanced CT scans even to patients with borderline creatinine values by educating your staff to administer contrast media in a most sensible and effective manner.

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## Operational optimization

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- Improve possible process inefficiencies based on lack of expert knowledge on contrast media administration by standardizing contrast protocols and respective workflows.
- Speed up clinical workflows and patient handling by teaching staff how to use and successfully implement tools dedicated to sensible contrast media administration and confident monitoring of contrast media injection.
- Facilitate contrast enhanced clinical workflows by synchronizing CT scans and contrast media injection using a single button control from either the scanner or the injector.
- Reduce the need for separate documentation in contrast enhanced clinical workflows by implementing tools that enable automatic transfer of injection parameters to the patient protocol, the logbook and the MPPS, thus completing examination data from therein.

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## Financial performance

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- Reduce your department's expenditures for contrast media by effectively training staff and implementing standards on sensible contrast media administration leading to reduction of contrast media usage overall.
- Attract more patients and generate more revenue with expert-level personnel for contrast enhanced clinical workflows that cannot be performed with the same high level of clinical outcomes by your competition.

# CRADLE – Contrast Reducing Analysis Decreasing Load & Expenses

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Advanced and optimized staff knowledge  
and practices help achieving new clinical goals  
and legal requirements

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Nothing is as constant as change: on the one hand, progress in medical technologies continues to transform health care delivery day by day and improves both life expectancy and quality of life. On the other hand, it is also one of the main drivers of raising health expenditures. CRADLE can help healthcare providers address these factors proactively – with lots of potential for improving both quality and financial efficiency of health services. As CRADLE helps to realize a respective contribution to an optimized contrast media performance – or in other words, will lead to a reduction of patients' individual contrast media medication in the long run – Siemens is in a position to substantially support healthcare providers by advancing and optimizing staff knowledge and practices to achieve the clinical imperatives of new governmental guidelines and prerequisites.

Always keeping an eye on multiple use cases, the service is not restricted to SOMATOM CT scanner models, dedicated software versions or the contrast injector producer – thus expanding the clinical scope of the offering. Furthermore it is adaptable to any conceivable customer level of competency and experience in contrast media management: from small and medium-sized institutions up to big houses with several hundred beds. With its tested contrast media dose reduction strategy, CRADLE has achieved high clinical user acceptance, best image quality, and is delivered through the following components: (a) in-depth analysis of the customer baseline for contrast media performance, (b) assessment of the CT staff experience and competency, (c) customized training focusing on the customer needs including optimal utilization of CARE Contrast (if applicable) and timing technique, (d) theoretical knowledge session on contrast medium in all its appearances, (e) on-site contrast media protocols optimization for CTA's and parenchyma examinations, (f) tested change strategy which guarantees image quality acceptance, and (g) a sign-off protocol and Siemens certificates for excellence in contrast media performance.

Comprehensive consultancy program advances and optimizes medication safety and dose management

Patients get the appropriate medical contrast media dose per CTA examination, adapted to their individual medical condition

Reduction in contrast media administration can lead to decreasing institutions' spending while staff knowledge and imaging practice will immensely increase

Medical devices are used to their full potential and patients' safety and confidence in the institution are enhanced

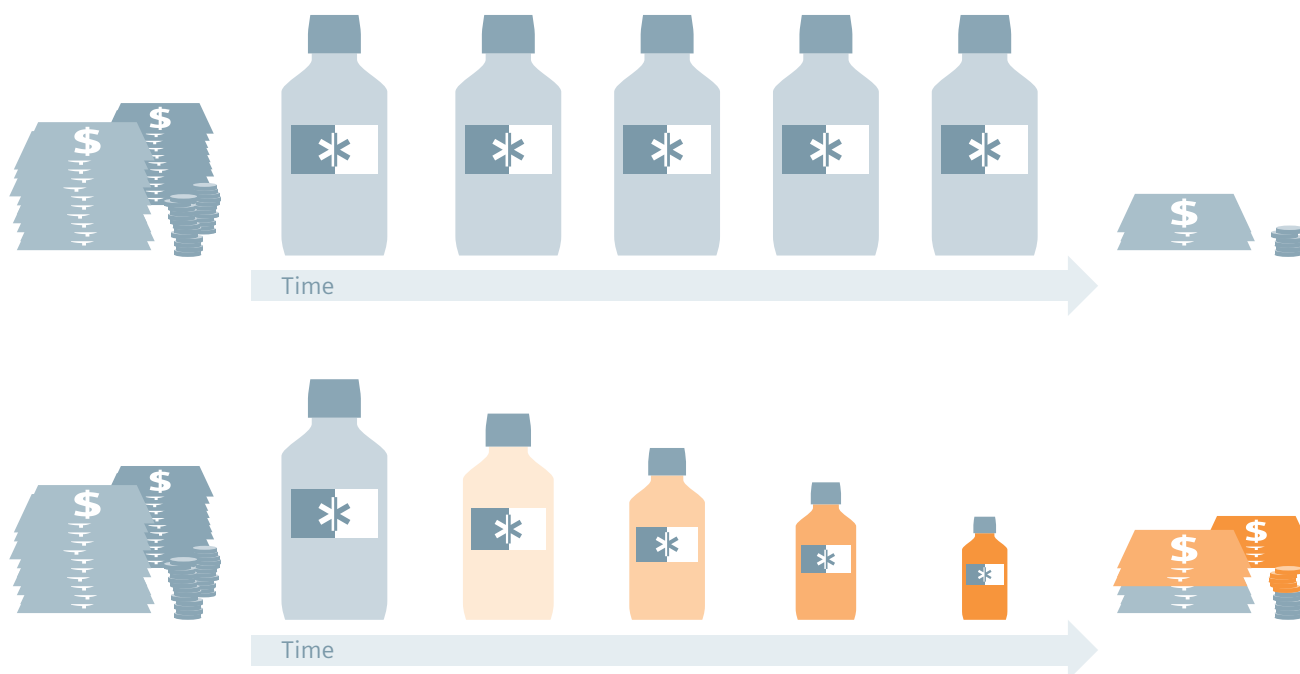


# Monetizing care value

The following examples are based on generic assumptions. They are intended to trigger a general discussion and thought exchange on how continuous education in care providing environments, or the lack thereof, can substantially influence a healthcare institution's profit and loss statement.

Depending on a healthcare provider institution's business model, the target-oriented reduction of contrast media reduction can lead to cost savings over time

Before CRADLE		After CRADLE*	
Procedure	CT standard vascular examination	Procedure	CT standard vascular examination
Amount of contrast media administered per scan	100 ml	Amount of contrast media administered per scan	74 ml
Average number of scans per day	20	Average number of scans per day	20
Amount of contrast media administered per day	2000 ml	Amount of contrast media administered per day	1480 ml
Amount of contrast media administered per year	*260 = 520,000 ml	Amount of contrast media administered per year	*260 = 384,800 ml
<b>Total contrast savings per year for 1 CT examination</b>			<b>135,200 ml</b>



\* Estimated amount of contrast media reduction after completion of CRADLE consulting offering = 26%. Results achieved at St. Jans Gasthuis, Weert, Netherlands in January 2015.

# Transformation through partnership: working with you to drive success



**Martijn van Buggenum, Onsite Project Coordinator CRADLE**  
SJG Weert, the Netherlands

“Not only was this program an added value to our workflow, implementation of optimized contrast parameters went undetected. And looking at the achieved reduction I guess that is probably the most prominent feature of CRADLE.”



Number of beds:  
300



Amount clinical staff:  
1,200 employees, 100 clinicians



Number of annual admissions:  
10,000



Number of short-stay treatments:  
11,500



Siemens equipment: Interventional Imaging,  
Computed Tomography including  
post-processing,  
Magnetic Resonance



Clinical specialties:  
Cardiology, Neurology, Oncology, Surgery, Orthopedics



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## Next steps

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## Related offerings

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Education Management Check

Education Plans

Asset Planning Session

Hospital Strategy Planning

Asset Capacity and Demand Analysis

Business Planning for Radiology Equipment

Act on Radiology

Act on Outcomes

Thought to Action Sessions

Integrated Service Management

Shared Services

Remote Assist

The products/features and/or service offerings (here mentioned) are not commercially available in all countries and/or for all modalities. If the services are not marketed in countries due to regulatory or other reasons, the service offering cannot be guaranteed.

Please contact your local Siemens organization for further details.

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