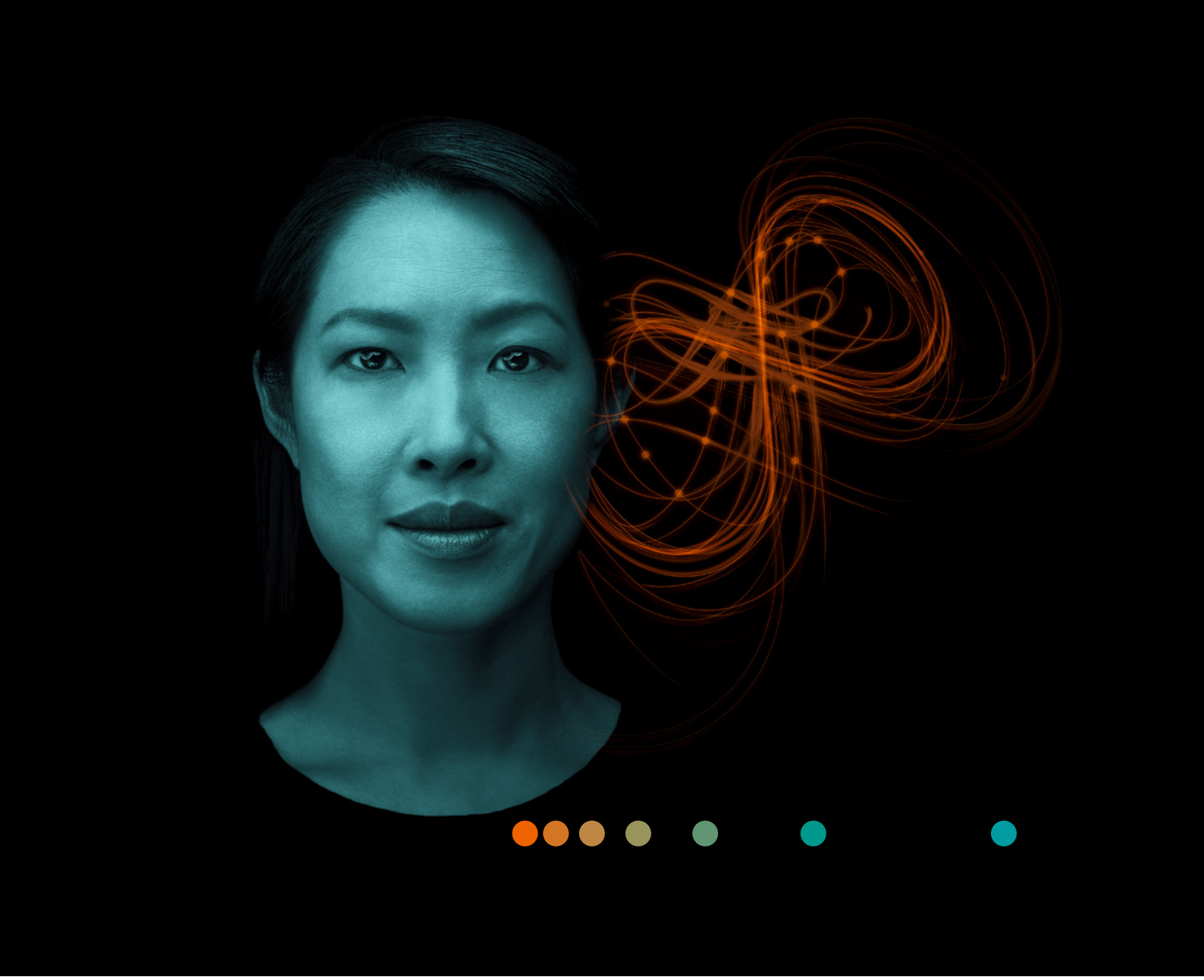

Case study: Kantonsspital Baden, Baden, Switzerland

Designing and planning a future-proof imaging center

A human-centered approach to improve patient experience, increase staff satisfaction, and optimize workflow efficiency

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Executive summary

Transforming care delivery through applying intelligent Facility Design measures

The Kantonsspital Baden (KSB), a healthcare provider located west of the Swiss metropolis of Zurich, is constructing a new hospital that's expected to start operations in 2023. This new 400-bed building with an extensive outpatient unit is designed to meet the most modern architectural requirements and was designed according to the principle of Healing Architecture[1], implemented by the healthcare-experienced architects from Nickl & Partner.

The directors of the radiology and the nuclear medicine departments approached on behalf of the hospital board the Siemens Healthineers team of Value Partners for Healthcare Consulting and Design Planning for professional input on the planned layout of the imaging center. This collaboration was intended to ensure efficient patient and staff pathways and optimized workflows by leveraging the vast clinical expertise of the KSB staff, as well as the long-standing layout planning knowledge and global experience of Siemens Healthineers. Another crucial objective was to provide patients and staff alike with the experience of working and being diagnosed in a pleasant and healthy working environment.

As a first step, the Siemens Healthineers Value Partners interdisciplinary team of consultants, architects, and medical planners interviewed imaging department staff to understand the needs of all stakeholders. Then, the team reviewed the previous layout plans and identified potential bottlenecks and other opportunities for optimization. Finally, they presented a proposed new design to the KSB hospital board and building commission.

In order to create an human-centered environment that maximizes performance in the radiology and nuclear medicine department, the KSB and Siemens Healthineers teams collaborated closely to further refine the new layout through a series of iterative exchanges, culminating in plans that were ultimately accepted by the building's protection authorities.

This partnership between Siemens Healthineers and the radiology team has laid a solid foundation for further successful exchanges involving the current diagnostic imaging facility, as well as a new outpatient radiology center that will open in 2022.

[1] *Healing Architecture is defined as a layout supporting the convalescence of the patient including reduced stress levels. Moreover, today it is used in a much broader context including the wellbeing of staff and relatives as well as conveying the feeling of comfort, security and competency. See also: Christine Nickl-Weller and Hans Nickl, HEALING ARCHITECTURE, Braun, 2013*

The offering and method

Striving for a pleasant and healthy working environment that also lowers costs

In imaging departments around the world, demand for resources is increasing while budgets are shrinking.

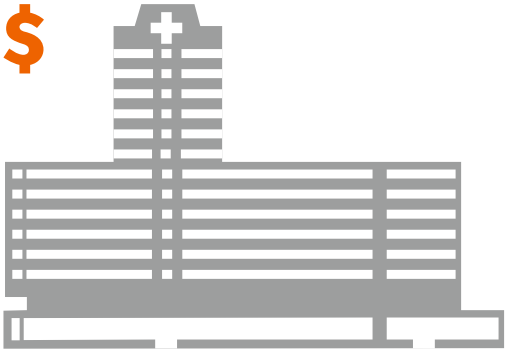
In addition to addressing this problem, the layout of an imaging center must be flexible enough to accommodate fluctuations in patient volume – such as occur throughout day times, seasons or in times of crisis – as well as future developments and evolving needs. Furthermore, the layout shall enable optimized workflows with high patient throughput, while also considering special patients´ needs e.g. of children, obese patients or patients requiring monitoring.

Attracting qualified staff is also an ongoing challenge. An optimized and future-proof layout can be a deciding factor in persuading potential new team members to choose one employment situation over another as a healing environment and efficient workflows can significantly improve both the staff and patient experience.

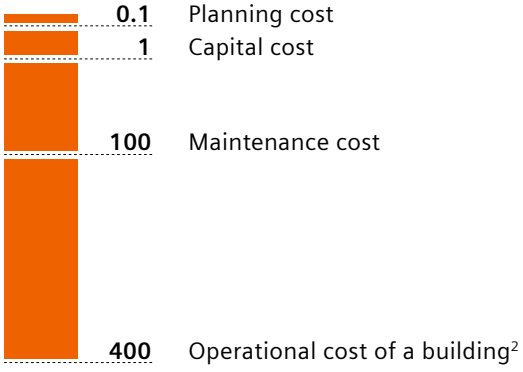
Moreover, streamlining processes can significantly reduce department operational costs over the long term.

Why is optimized layout planning relevant?

Planning for the future can reduce operating costs for years to come.



The relative costs of a building and its operational cost



Source: New thinking for hospital master plans; Health Facitlity Management Magazine

Siemens Healthineers can support healthcare providers in optimizing the layouts of their imaging departments, as well as layouts of other clinical functions, including nuclear medicine, emergency departments, cardiology suites, diagnostic laboratories, operating theaters, and intensive care units.

Through close collaboration with clinical staff, Siemens Healthineers interdisciplinary team of consulting, process, and architectural experts can either enhance existing departmental layouts or design new ones from the ground up through the application of its Facility Design measures.

[2] *By the time a building is completed, up to 90% of is life cycle, economic and ecological costs have been made inevitable.*

The customer

Expanding for the future

About Kantonsspital Baden (KSB), Baden, Switzerland:

- The most important health care hub of the East Aargau region of Switzerland.
- Offers approximately 350,000 area residents great access to safe, cutting-edge healthcare close to home, not just at its 400-bed Baden facility, but also at several satellite locations.
- Employs more than 2,000 staff members.
- Features eight interdisciplinary centers where specialists from different disciplines collaborate closely.
- Committed to the physical and psychological well-being of both patients and staff.

About the KSB imaging center

- Comprises the disciplines of radiology and nuclear medicine; organizational part of the medical services department.
- Three locations and three additional cooperations
- About 130 employees.
- Over 120,000 examinations for in-patients, out-patients and emergency cases.
- 12,6% increase of examinations from 2015–2019.
- Complete radiological spectrum including neuroradiology, pediatric radiology, intervention radiology and nuclear medicine inclusive dedicated bed ward.

The challenge

Creating an efficient imaging center

The bold vision of KSB in approaching its new hospital construction was to create the healing environment of the future, with superior patient and staff satisfaction as well as highly efficient workflows. These same goals came into play in planning the future layout of its imaging center, that includes the radiology and nuclear medicine departments.

During the planning phase the leaders of the departments realized that, in order to fully reflect the team's functional requirements and to generate an optimal result, additional professional expertise would add further value. The clinical stakeholders wanted to have their input reflected in the future layout to ensure that their departments would be prepared for a successful future.

Based on an existing and positive relationship with Siemens Healthineers, KSB opted to work with the Value Partners Healthcare Consulting and Design Planning team. The department heads felt reassured that the planning process could achieve its goals through close collaboration between its clinical stakeholders and the Siemens Healthineers interdisciplinary team of consultants, architects, and medical infrastructure planners.

The fact that Siemens Healthineers had such extensive layout and planning expertise (with more than 7,400 projects per year worldwide) was also a winning argument.

"We wanted a facility layout that benefits from efficient processes and provides a great healing environment for our patients, as well as a pleasant working place for our clinical staff."

René Heule, Project Lead at KSB

The solution

An iterative and collaborative approach to layout optimization

Kick off	Preparation	On-site visit	Layout review
• Meeting at KSB • Definition of project scope	• Familiarization of existing layout • Identification of key stakeholders • Development of questionnaire	• Interviews with key stakeholders • Observation of current environment and workflows • Evaluation of individual layout requirements	• Architectural layout and process view • Discussion points: – State-of-the art Healing Architecture – Efficiency – Patient and staff flow – Patient experience – Working environment

KSB and Siemens Healthineers launched an iterative 3-month Facility Design project. The goal was to design a future-proof diagnostics and therapy center based on current trends and state-of-the-art planning principles. Through in-depth input from the clinical stakeholders, the Siemens Healthineers team developed an enhanced layout.

First, the consulting experts interviewed all relevant stakeholders and conducted process observations at the existing hospital to better understand the group's established way of working together.

Then the Siemens Healthineers Value Partners suggested changes to the proposed layout, drawing upon their extensive experience and knowledge about international best practices and with the intention of avoiding bottlenecks and identifying opportunities for optimization.

Finally, the Siemens Healthineers Value Partners designed an optimized layout for the imaging center through an iterative exchange in close collaboration with the KSB team as well as the general hospital planners.

Consolidation of information	First revised layout	Iterative layout optimization	Finalized layout
• Insights from on-site visit • Findings from layout review	• Two layout options for radiology and nuclear medicine • First alignment with KSB	Incorporation of stake-holder feedback from: • Medical staff • General planer • Building services	Optimization of: • Process efficiency • Staff satisfaction • Patient experience

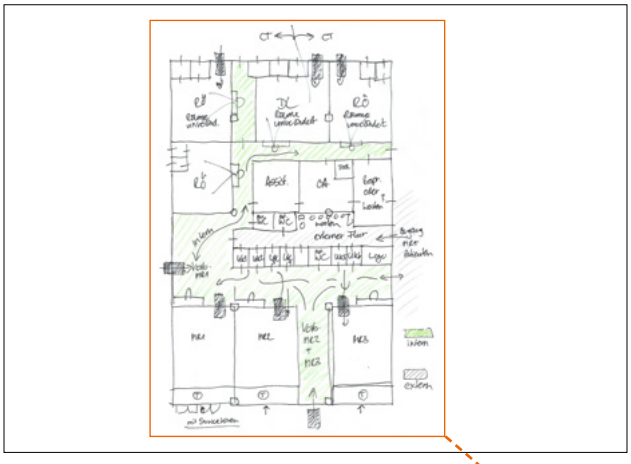
"We felt understood, and that our needs were being represented in the layout. We also got very helpful insights and ideas from the experts of the Siemens Healthineers team."

PD Dr. Irene Burger, Head of Nuclear Medicine, KSB

Creation process of the optimized imaging center design:

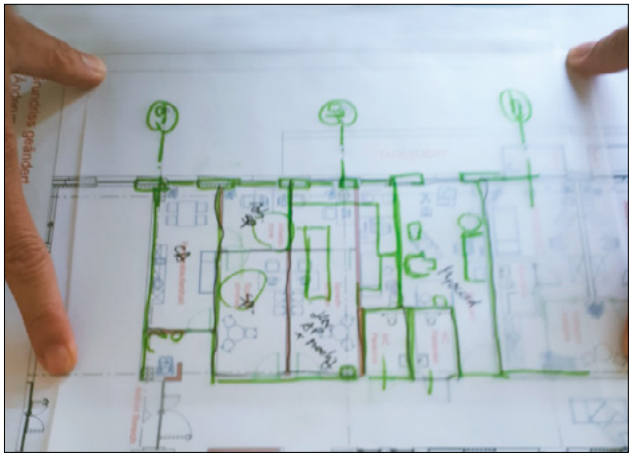
Illustrated here by the radiology part of the imaging center

2



First sketch of a revised radiology layout to optimize patient and staff pathways.

1



Interactive brainstorming to develop first layout revision ideas.

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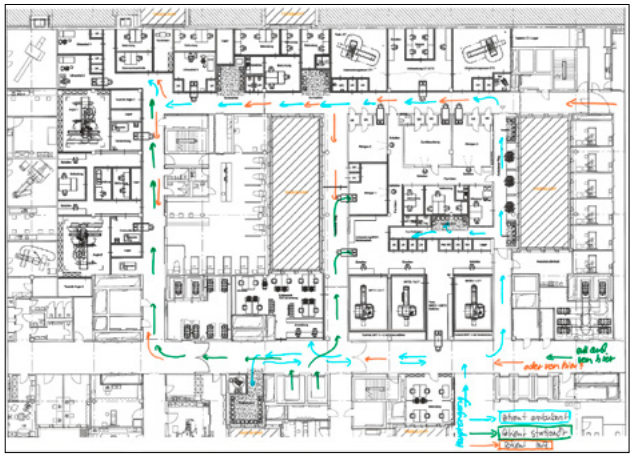
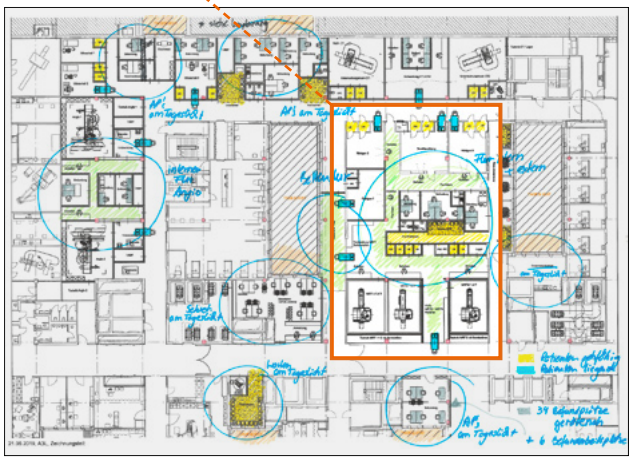
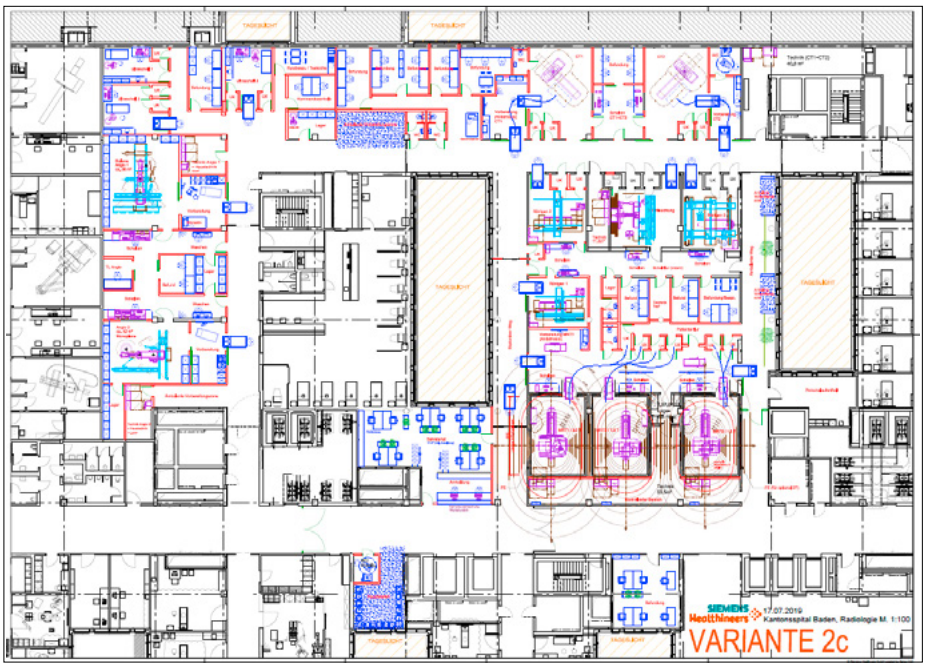


Revised layout reflecting new, more efficient processes, such as separate pathways for inpatients and outpatients, as well as reduced staff movement largely through internal pathways.

4



Revised layout featuring healing and comfort factors – access to daylight, further changing rooms, pathway optimization and easy orientation.



Final layout plan, approved by the KSB team.

6

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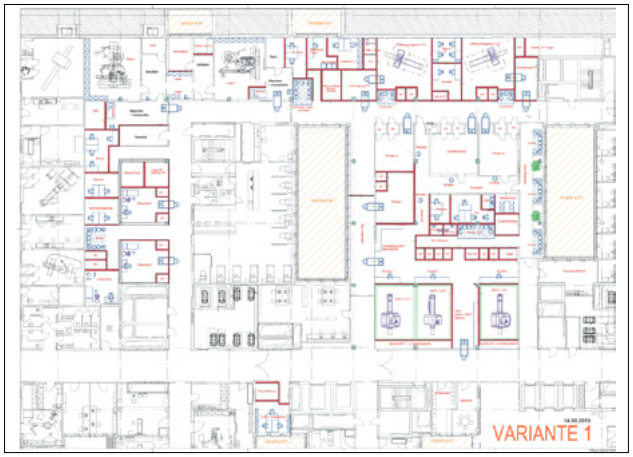

CAD* drawing of the first layout revision.
Used for further discussions with the KSB team.

The heads of radiology and nuclear medicine are joining forces to create an optimized combined imaging department for their patients and staff.

Computer-aided design

The results

An imaging center department that KSB can be proud of, and that the imaging staff is looking forward to working in

At the end of the project, the joint team had designed a new layout for the radiology and nuclear medicine departments that is well positioned to remain effective for many years to come, with an environment that is healing for patients and pleasant for staff.

Comparing the initial and the final layouts, it's clear that multiple positive changes and benefits were achieved for all stakeholders.

The redesigned imaging center will transform care delivery, improve patient experience, and increase workforce satisfaction.

Design Modification	Enhanced Efficiency	Improved Patient Experience	Increased Staff Satisfaction
Shorter travel distances for patients and staff	Reduces time lost to movement throughout suite	Reduces transit time	Reduces transit time
Creation of **separate preparation and follow-up rooms**	Smoother workflow, more efficient use of the scanners for increased throughput	Reduces waiting time	Provides dedicated, optimized working environment for preparation and follow-up
Separation of inpatient and outpatient pathways	Chance to design the environment according to specific demands of in-/outpatients	Less traffic and confusion, more pleasant environment	Less traffic and distraction, quieter and more relaxed working environment
A **flexible layout** that will allow the addition of new rooms	Allows the department to accommodate an increased patient population or the addition of new technology		Future adaptions can be made without compromising a comfortable working environment
Allocation of **two changing cabins** per imaging room	Increases throughput	Reduces waiting time	Reduces stress during changing periods

"We are very satisfied with our decision to bring an expert planning team on board, to help us design an imaging center we can be really proud of. We believe our staff and patients will notice a huge difference"

Prof. Rahel Kubik, Head of Radiology, Director of Medical Services, KSB

Design Modification	Enhanced Efficiency	Improved Patient Experience	Increased Staff Satisfaction
Separation of the reception area from the waiting room (behind closed doors)		Offers patients greater privacy, while still ensuring adequate visibility and convenience	Less traffic, quieter and more relaxed working environment
Placement of **reporting rooms near imaging rooms**	Efficient exchange and communication between radiographers and radiologists ensures highest quality and no delays	Shorter waiting due to quick exchange and reaction on unforeseeable findings, short reaction time for doctors in case of emergency	Allows for greater communication between radiographers and radiologists; dedicated reporting rooms ensure the quiet needed for concentrated work
The establishment of a **dedicated VIP and retreat room**	Smoother process e.g., no patient communication in the reporting room/ preparation area needed	Allows for more discreet conversations between staff and patients	Dedicated area to examine patients quietly and/or for communication with patients
Improved radiation protection and sound isolation	Reduces costs by reducing the lead required for x-ray protection		Increases staff safety and job satisfaction
Daylight access for diagnostic and reporting rooms, where feasible			Creates a more pleasant working atmosphere

About Value Partnerships

Siemens Healthineers Value Partnerships are long-term, performance-oriented, collaborative engagements. We bring a combination of clinical insight, medical technology innovation, strategic vision, implementation expertise, and operational excellence to the table for you. As trusted partners, we help you formulate and achieve your strategic goals, increasing enterprise-wide value.

Value Partnerships drive value across your entire enterprise with focus on four domains: Technology, Operations, Workforce and Facility. Furthermore, together we enable breakthroughs through holistic and transformative initiatives such as Strategic Transformation and Digital Innovation.

Siemens Healthineers Value Partnerships help you optimize operations today, expand with new capabilities tomorrow, and advance the level of innovation in your network.

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