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REVIEW

Beyond the sarcoma center: establishing the Sarcoma HASM network—a Hub and Spoke Model network for global integrated and precision care

B. Fuchs[1,2]* **& A. Gronchi**[3]*

[1]Sarcoma Center/IPU, Department of Orthopaedics and Trauma, LUKS University Hospital, Lucerne; [2]Faculty of Health Research & Medicine, University of Lucerne, Lucerne, Switzerland; [3]Department of Surgical Oncology, Fondazione IRCCS, Istituto Nazionale die Tumori, Via Giacomo Venezian, Milano, Italy

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The landscape of sarcoma treatment has evolved significantly, transitioning from amputations to limb-sparing surgeries, underpinned by advancements in multidisciplinary strategies. The establishment of specialized sarcoma centers has been pivotal, though challenges in accessibility and expertise persist. This manuscript proposes the Sarcoma Hub and Spoke Model (HASM) network to address these issues, enhancing coordination and expanding access to specialized care. The HASM network centralizes complex case management at hubs while peripheral spokes manage routine diagnostics and treatments, optimizing resource use and ensuring patient-centered care. Integration with digital interoperable platforms facilitates real-time/real-world data exchange, supports multidisciplinary team meetings, and enables advanced predictive analytics such as Sarcoma Digital Twins and causal machine learning for personalized treatment. The Sarcoma Care Data Warehouse further enhances this model by aggregating comprehensive patient data, supporting quality assessment and continuous improvement. This innovative approach aims to set a new standard for sarcoma care, leveraging technology and collaborative expertise to improve outcomes globally.

Key words: sarcoma, Hub and Spoke Model (HASM), multidisciplinary, digital interoperable platforms, predictive analytics, Sarcoma Digital Twins, quality assessment

INTRODUCTION

Over recent decades, the landscape of sarcoma treatment has been profoundly transformed. The evolution from traditional methods to highly specialized, multidisciplinary strategies has significantly enhanced patient outcomes. Initially dominated by amputations, the field has shifted toward limb-sparing surgeries, enabled by pioneering advancements in surgical techniques and the integration of both local and systemic therapies. Today, limb salvage is the preferred approach in >95% of sarcoma cases, demonstrating a major commitment to preserving quality of life while aggressively managing the disease.[1,2] These advancements highlight a paradigm shift from reactive to proactive patient care, where the goal is not just survival but maintaining life quality. Alongside these therapeutic advancements, the establishment of sarcoma centers has emerged as a cornerstone in modern sarcoma care, underscoring the importance of a cohesive approach through multidisciplinary teams (MDTs).[3-6]

Definition, role, and structure of a sarcoma center

The definition of a sarcoma center is at least problematic; the primary requirements are weekly MDT meetings and case volume. However, these criteria alone do not ensure the center's effectiveness. Sarcoma centers are specialized facilities dedicated to the comprehensive care of patients with sarcomas, characterized by their use of MDTs.[6-8] These teams, typically comprising experts such as pathologists, radiologists, sarcoma surgeons, radiation oncologists, and medical oncologists, are foundational to the centers' operations.[9,10] They convene regularly at MDT meetings to collaboratively assess each patient's case, ensuring that treatment decisions are not only based on the collective expertise of various specialties but are also deeply rooted in evidence and a thorough understanding of sarcoma biology.

However, it is crucial to note that the true measure of a center's capability goes beyond mere numbers; while case volume is often thought to be indicative of a center's

*Correspondence to: Prof. Bruno Fuchs, Sarcoma Center/IPU, Department of Orthopaedics and Trauma, LUKS University Hospital, Spitalstrasse, 6000 Luzern, Switzerland; Faculty of Health Research & Medicine, University of Lucerne, Frohburgstrasse 3, 6002 Luzern, Switzerland. Tel: +41-41-205-6048
E-mail: fuchs@sarcoma.surgery (B. Fuchs).
Prof. Alessandro Gronchi, Fondazione IRCCS, Istituto Nazionale die Tumori, Via Giacomo Venezian, 20133 Milano, Italy. Tel: +39 02 2390 3234
E-mail: alessandro.gronchi@istitutotumori.mi.it (A. Gronchi).

efficacy, the main requirements are not just the case volume and regular MDT meetings: it requires a nuanced approach that includes the ability to manage complex cases effectively.[11-17] This involves not just surgical expertise but also the strategic composition of treatment teams that can adapt to the unique challenges posed by different sarcoma types. The lack of formal training of sarcoma specialists means that an MDT with little experience cannot compensate for the lack of expertise of a single specialist. Furthermore, even in centers where specialists are available, the relationship between volume and outcome may vary depending on the resources and staff that the center is given.

In addition to clinical care, sarcoma centers function as hubs for advanced training and research, hosting specialized education programs for medical professionals. These programs typically include opportunities for international collaboration, fellowships, and other forms of professional development, crucial for nurturing a new generation of sarcoma specialists. Moreover, sarcoma centers provide all contemporary therapeutic options available in the field, including cutting-edge surgical methods, interventional radiology, and advanced radiation therapies. They also ensure access to clinical trials and maintain comprehensive prospective databases, instrumental in refining treatment protocols and advancing sarcoma care.[18-22]

The role of a sarcoma center extends beyond mere treatment of the disease; it encompasses a holistic approach to care that integrates workup, biopsy, and initial diagnosis, comprehensive treatment planning, and follow-up care under one roof, ensuring a seamless patient journey. In this context, it is crucial that each sarcoma center functions as both a Diagnostic Coordination Hub and a Therapeutic Integration Hub:

The Diagnostic Coordination Hub is where the radiologist, pathologist, and sarcoma surgeon convene to review referral consultations and jointly determine the appropriate course of action for patients with suspected sarcoma (Figure 1). This may involve deciding whether a biopsy is necessary, or if the patient should be referred directly for further treatment. This hub serves as a critical point of convergence where specialists analyze and discuss the submitted queries from referring physicians who seek guidance on whether to refer a patient, what further steps to take, or how to proceed with treatment. By centralizing this expertise, the center ensures that all patients receive a thoroughly considered and unified approach to their diagnosis and care plan.

The Therapeutic Integration Hub coordinates the actual treatment of patients, managing and integrating various modalities such as surgery, chemotherapy, and radiotherapy to ensure personalized and continuous care (Figure 1). This hub facilitates the implementation of treatment plans, ensuring that each patient's therapy is optimized for the best possible outcomes. It serves as a central point for executing complex treatment strategies, closely monitoring patients' progress and adjusting therapies as necessary based on real-time evaluations.

CHALLENGES FACING SARCOMA CENTERS

Sarcoma centers are essential for advancing treatment standards but face significant challenges that limit their reach and effectiveness. The centralized nature of these centers often necessitates long-distance travel for care, creating significant accessibility issues. This geographic barrier results in ∼50% of patients with sarcoma receiving care outside specialized centers, often not adhering to established guidelines.[18] These challenges are particularly pronounced during the initial workup and biopsy of patients suspected of having sarcoma, where strict adherence to guidelines is crucial for accurate diagnosis and management.[23-27]

Furthermore, many sarcoma centers struggle with shortages of skilled experts, exacerbated by an aging workforce and ongoing financial pressures.[9,17,28] These shortages critically impact the center's ability to maintain high-quality, patient-centric care. Healthcare models that prioritize patient volume over quality further compound these issues, diluting the focus on patient-centric outcomes and stifling opportunities for essential collaboration and knowledge sharing.

To effectively address these multifaceted challenges, a rethinking of the organizational model of sarcoma care is crucial. Transitioning from isolated centers to a cohesive Hub and Spoke Model (HASM) network could enhance coordination, optimize resource use, and expand access to specialized care.[29-32] This model not only promises to streamline care delivery but also empowers peripheral physicians to effectively triage patients, taking into account local capabilities and specific patient needs. This strategic shift aims to integrate care locations into a unified system that enhances both the reach and quality of sarcoma treatment, thereby establishing a new standard of care that is inclusive and effective.

PATIENT-CENTRIC MODEL OF CARE

Effective sarcoma treatment necessitates a clear definition of the roles between centralized sarcoma centers and peripheral healthcare facilities in both the workup, including biopsy, and therapy of patients.[9] This balance of centralization and decentralization is essential to cater to the unique needs and circumstances of each patient, considering both the complexity of the disease presentation and the capabilities of the available medical team. Typically, centralization is favored for managing complex sarcomas due to the specialized resources and expertise required; however, there may be exceptions where decentralized care may be appropriate and effective, particularly when local conditions permit.[33-38]

The question of what can be decentralized has to be customized to each sarcoma center and depends on various parameters such as case volume on the one hand, but also the teaching and education of future sarcoma experts at lower-volume sarcoma centers on the other. Decentralization may involve not only the diagnostic workup, including imaging or biopsy, but also parts of the therapy, always in

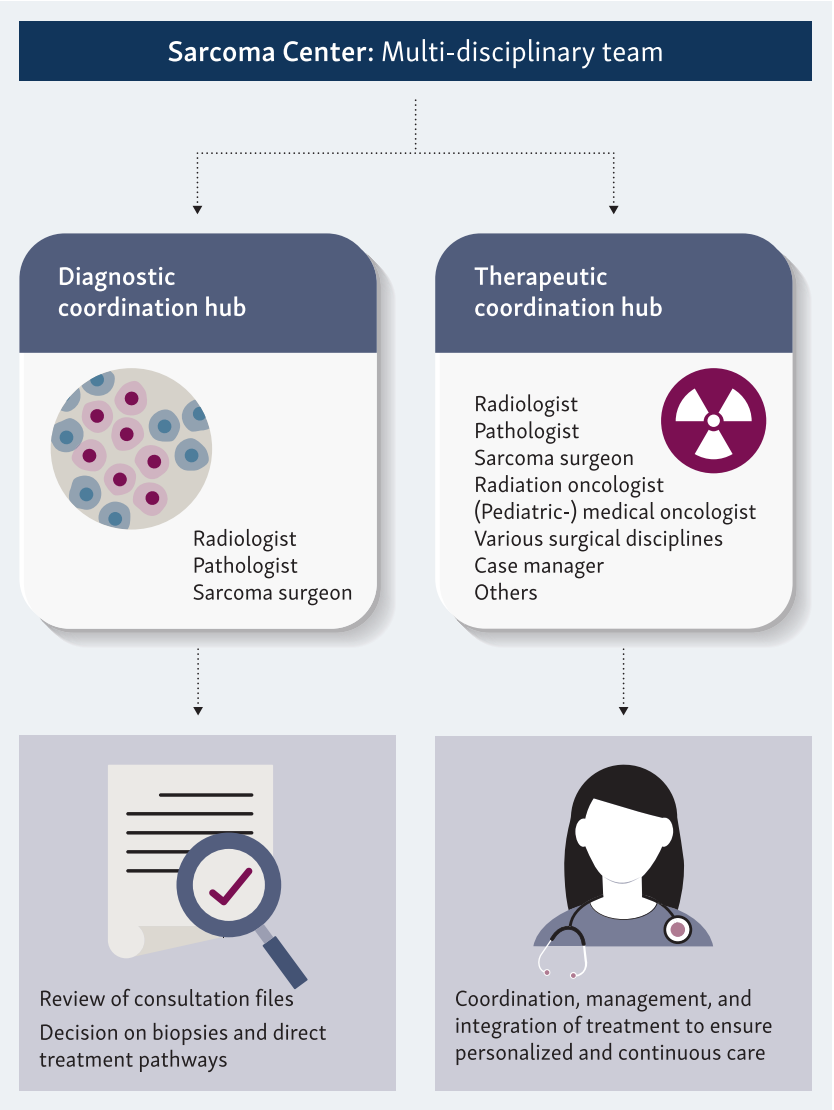

Figure 1. This figure depicts the Sarcoma Center, structured into two main components: the Diagnostic Coordination Hub and the Therapeutic Integration Hub. The Diagnostic Coordination Hub focuses on the initial assessment and diagnosis, where specialists such as radiologists, pathologists, and sarcoma surgeons review referrals and determine the need for biopsies and direct treatment pathways. The Therapeutic Integration Hub coordinates patient treatment, managing and integrating various modalities such as surgery, chemotherapy, and radiotherapy to ensure personalized and continuous care. Together, these hubs streamline the patient journey from diagnosis to treatment, highlighting the center's commitment to comprehensive and coordinated care.

tight consultation with the sarcoma center and its specialists. For example, straightforward cases such as a dedifferentiated liposarcoma of the retroperitoneum, which shows clear clinical—imaging—pathological concordance, might not necessitate a centralized review of the diagnosis. Conversely, more complex conditions, such as extraskeletal myxoid chondrosarcoma, generally require a centralized pathologic review to properly diagnose it and treat it accordingly.

The balance of what might possibly be decentralized can be discussed per discipline as follows:

- Pathology: Diagnostic work for straightforward cases, where the clinical presentation aligns well with common pathologic expectations, can often be handled at local centers. However, complex pathological analyses that are critical for accurate diagnosis should typically be centralized.
- Surgery: Procedures that are technically simple and carry lower risks, such as the removal of atypical lipomatous tumors, skin sarcoma such as skin leiomyosarcoma or some dermatofibrosarcoma protuberans, or simple gastrointestinal tumor or simple lung metastasectomies, can often be carried out effectively at local centers. High-volume centers might prefer these surgeries to be performed peripherally to focus resources on more complex cases, while smaller sarcoma centers might use them as valuable training for surgeons in training. Complex cases, such as large (>5 cm) superficial or deep soft tissue sarcomas of any size in the extremities or trunk wall, as well as retroperitoneal or pelvic sarcomas, should always be centralized, as their management requires specialized expertise.
- Radiotherapy: While routine post-operative radiotherapy for extremity and trunk wall sarcomas—although rare in current treatment algorithms—and palliative treatments

can be administered locally, more complex scenarios requiring precise coordination and planning, such as preoperative radiotherapy for large extremity/trunk wall sarcomas or retroperitoneal tumors, should generally be centralized.
- Chemotherapy: Standard chemotherapy protocols, such as anthracycline-based regimens in the advanced or adjuvant setting, can often be administered locally. By contrast, intricate chemotherapy protocols, especially those involving neoadjuvant therapies for localized disease, concurrent chemoradiotherapy, or multidrug regimens for aggressive sarcomas such as Ewing's or rhabdomyosarcoma, require the specialized capabilities of high-volume centers.

Decentralizing follow-up care and treatments with established, lower-complexity protocols and telehealth support may enhance accessibility and reduce the travel burden for patients, allowing more frequent monitoring within their community. The decision to centralize or decentralize sarcoma care, especially in large countries, reflects a complex balance of multiple factors. Developing a flexible, reproducible, and transparent model that integrates various levels of care is crucial, with imperative access to the respective data by all providers at any time (e.g. via an interoperable digital platform). This model tailors treatment plans based on the complexity of each case and the local resources available, ensuring that patients receive timely, expert, and personalized care at every stage of their treatment.

ESTABLISHING THE HUB AND SPOKE MODEL NETWORK

In the Sarcoma HASM network, all strategic decisions are centralized to ensure optimal care tailored to the complexity of each patient's condition.[39] The hub, equipped with advanced medical technology and specialized staff, handles the most complex cases, while spokes—regional centers connected to the hub—manage standard diagnostics and, if necessary, treatments, referring more complex cases to the hub.[29-32] This configuration not only enhances the effectiveness of the Sarcoma HASM network by ensuring appropriate escalation of care and resource utilization but also maintains a focus on patient-centered approaches at local levels.

The hub's role extends beyond just providing diagnostic workups and treatments. It acts as a center for research and development, pushing forward the boundaries of sarcoma treatment and serving as a training ground for medical professionals. This enhances the overall quality of care by disseminating advanced knowledge and practices.[40] In addition, hubs orchestrate the clinical strategies and protocols across the network, ensuring uniformity in care standards and methodologies.

Spokes often act as the first line of interaction for patients, offering diagnostics and treatment for less complex conditions. They play a crucial role in the continuity of care, managing ongoing treatments and follow-ups, which alleviates the demand on hub facilities. Spokes ensure that care is accessible and timely, providing a critical local presence that supports the broader health system's efficiency.

The success of this model is contingent upon its integration into the specific healthcare framework of each country, tailored to accommodate local nuances such as financial systems, staffing of experts, and the geographical distribution of medical facilities. For instance, European examples such as NETSARC in France, and models in the UK, Germany, Poland, and Italy each demonstrate adaptations to their respective national healthcare environments. The European Reference Network on Rare Adult Solid Cancers (EURACAN), the European Union-wide initiative, exemplifies regional collaboration across Europe, aiming to standardize care and improve outcomes across member states.[41,42]

Such adaptations ensure that the HASM network provides high-quality care efficiently and sustainably. By matching the number of hubs and spokes to the needs and resources of each country, the model supports extensive and equitable access to specialized sarcoma care. The HASM network represents a practical solution to the challenges of delivering high-quality sarcoma care across diverse geographic and systemic landscapes. By centralizing complex decision-making and treatment strategies rather than all-patient care, this model ensures that expertise is utilized effectively while maintaining patient-centered care at local levels. This approach not only maximizes resource utilization but also supports the overarching goal of improving health outcomes for patients with sarcoma throughout various healthcare systems.

INTEGRATION WITH DIGITAL INTEROPERABLE PLATFORMS

For the effective function of a Hub and Spoke Model in sarcoma care, a robust and dedicated digital data infrastructure is crucial, enabling seamless exchange of information and supporting comprehensive management of patient care across various settings. The digital platform facilitates real-time/real-world access to patient records, imaging, and test results, ensuring that all healthcare providers, regardless of location, have up-to-date information to inform patient care decisions.[43,44]

The integration of real-time/real-world data into the network's digital platform enhances patient care by allowing immediate updates to patient records. This capability ensures that any changes in a patient's condition or treatment response are promptly reflected in their records, accessible during consultations or treatments across the network. This level of immediacy in data updating is crucial for maintaining continuous monitoring and adjusting treatment protocols as needed swiftly.

This digital interoperable platform supports the logistics of MDT meetings, which are essential for discussing complex cases.[44] These meetings are supported technologically to ensure that all team members—whether they are at the hub or any of the spokes—have access to comprehensive, real-time patient data. The platform also enables telemedicine capabilities, allowing participants from all spokes to

log in and actively participate in these critical discussions. This inclusivity ensures that expert opinions are leveraged during decision-making processes, enhancing the quality of care provided.

The platform is also instrumental in collecting and managing patient-reported outcome measures (PROMs). Patients are regularly asked to fill out PROMs during their follow-up visits to immediately update the disease status in the platform, and any local or systemic recurrence is immediately flagged for discussion at the next MDT meeting, while regular and uneventful follow-up is also recorded.[45] This process guarantees that all significant patient health events are captured and reviewed by the full team, facilitating timely and appropriate clinical responses.

To fully harness the potential of a hub and spoke network in sarcoma care, the digital interoperable platform must be designed to support comprehensive data analysis. This interoperable platform should facilitate not just the collection and relay of data but also the sophisticated analysis of critical parameters. Such capabilities are essential for enabling informed decision-making processes such as triage between the hub and the spoke, ensuring that every patient receives the most appropriate level of care. By integrating these technological advancements, the network can maintain cohesive and integrated operations, essential for delivering high-quality, patient-centered care across various settings.

THE SARCOMA CARE DATA WAREHOUSE: REGISTRY WITH INTEGRATED AUTOMATED ANALYSIS

The Sarcoma Care Data Warehouse (e.g. Sarconnector) extends beyond mere data aggregation to actively contribute to clinical decision making and healthcare management.[44] This sophisticated data repository and processing center aggregates comprehensive patient data, including detailed patient demographics, specific treatment protocols used, immediate treatment outcomes, and long-term follow-up data.[46] With the integration of clinical-reported outcome measures, PROMs, patient-centric omics measures, and economic measures, the data warehouse supports a holistic approach to care quality assessment and enables value-based healthcare.[47] This structured approach allows for continuous improvement and benchmarking, ensuring that each Sarcoma HASM network contributes to the global effort of improving outcomes for patients with sarcoma.

The data warehouse aggregates a wide array of patient data, including treatment histories, outcome metrics, and patient-reported outcomes. Specific metrics critical for sarcoma care such as time and accuracy to establish a diagnosis, the thoroughness of pathological analysis, and whether a reference review has occurred, which are collectively summarized with the definition of quality indicators of sarcoma care, are meticulously tracked.[48-52] This information is crucial in assessing the efficiency and quality of the diagnostic pathway and allows comparison and benchmarking with other Sarcoma HASM networks.

By applying sophisticated and automated data analytics, the system identifies patterns and trends that can inform treatment protocols and patient management strategies. For instance, analysis of time to treatment initiation, 30/90-day morbidity and mortality after surgery, and the complexity of tumor resections (soft tissue versus bone) provide insights that assist in deciding whether a case should be centralized for more specialized care or can be managed locally, not only within one given Sarcoma HASM network, but also among hubs of the wider geography, using federated data structures.[53] Automated analysis within the warehouse includes algorithms designed to support real-time/real-world decision making, such as triaging patients based on the complexity of surgery needed, as well as benchmarking. This dynamic approach to data handling helps optimize resource allocation across the hub and spoke network.

Regularly updated analytics dashboards provide clinicians and policymakers visibility into both hub and spoke facilities' performance.[52] This facilitates quality improvement initiatives and ensures that standards of care are uniformly high across all locations. Metrics such as the accuracy and type of biopsies performed are crucial for evaluating diagnostic precision and ensuring that sarcoma diagnoses are timely and accurate.[54]

The data warehouse is an invaluable resource for research, enabling the study of long-term treatment efficacy and outcomes across a diverse patient population. It also supports participation in clinical trials by quickly identifying eligible patients and efficiently monitoring trial outcomes, thus enhancing the network's contribution to global sarcoma research efforts. An emphasis on developing and refining sarcoma-specific instruments to follow the longitudinal outcomes of patients ensures continuous improvement in the accuracy of treatment responses and long-term patient care.

This advanced data warehouse, integral to our digital interoperable platform, ensures that every piece of data collected serves a purpose beyond mere recordkeeping.[55] It transforms raw data into a cornerstone of high-quality sarcoma care, facilitating a proactive, predictive, and patient-centered approach that is essential for modern healthcare. By leveraging real-time/real-world data and automated analytics, the network can continuously improve care processes and outcomes, aligning with the broader goals of precision medicine and integrated care. This strategic use of data not only streamlines the clinical patient pathways but also strengthens the decision-making process regarding the centralization versus decentralization of patient care based on detailed, real-time analyses.

STANDARDIZING DATA FOR QUALITY ASSESSMENT

In the evolving landscape of sarcoma care and as a prerequisite, standardizing prospective data collection across Sarcoma HASM networks is crucial for ensuring consistent and high-quality treatment across different regions and countries. A harmonized prospective minimal dataset is foundational for evaluating and comparing the quality of care provided by these networks. This set includes patient demographics (essential for understanding the diverse

impacts of treatments across different population groups), treatment protocols used (details of surgical interventions, chemotherapy regimens, radiotherapy, and other relevant treatments), immediate treatment outcomes (early results of treatments which include surgical success and initial response to other therapies), and long-term follow-up data (critical for assessing outcomes such as local recurrence rates and metastasis-free survival), which are pivotal for evaluating the long-term efficacy of the treatments administered (Table 1).

These elements ensure a baseline from which each Sarcoma HASM network can assess and compare its performance. For instance, standardized metrics on local recurrence and metastasis-free survival provide clear indicators of treatment success or need for improvement. The initial set of quality indicators includes basic yet critical metrics such as treatment efficacy, patient survival rates, and complication rates. These indicators provide immediate feedback on the direct impacts of the care processes implemented.

To foster a more holistic assessment of care quality, this dataset will be expanded to include granular data such as patient satisfaction and quality of life metrics. These aspects are vital for comprehensive care assessments, going beyond clinical outcomes to encompass the overall well-being of patients. Expanding this minimal dataset aligns with the vision recently articulated, aiming to provide a holistic assessment of quality indicators across Sarcoma HASM networks.[52] This approach not only facilitates large-scale quality comparisons within and between countries but also highlights the model's efficacy in delivering specialized sarcoma care.

A recent benchmarking study illustrates that benchmarking is not only feasible but also instrumental in identifying unexpected variations in care quality.[44] By identifying key parameters of strengths and areas for improvement, Sarcoma HASM networks can implement targeted interventions to elevate the standard of care. This benchmarking process underpins the continuous improvement ethos of the network, ensuring that each Sarcoma HASM network not only meets but also exceeds the standards of sarcoma treatment and patient care.

By standardizing data and expanding quality indicators, Sarcoma HASM networks can achieve a detailed and actionable understanding of their performance. This structured approach to data enables a continuous cycle of assessment, benchmarking, and improvement, ensuring that each Sarcoma HASM network is a beacon of excellence in sarcoma care. The ultimate goal is to create a robust, data-driven environment where every Sarcoma HASM network contributes to the global effort of improving outcomes for patients with sarcoma, making high-quality care a universal standard.

Table 1. Patient data and clinical outcomes at the Sarcoma Center/Integrated Practice Unit

Parameter	Description
Patient ID	Unique identifier for each patient
Gender	Male (M) or female (F)
Date of birth	Patient's birthdate
Tumor site	Anatomical location of the tumor
Tumor depth	Superficial or deep
Histological diagnosis date	Date when the tumor was histologically diagnosed
Surgery date	Date when the patient underwent surgery
Surgery type	Primary surgery, re-excision, etc.
Margin status	Surgical margin status (R0, R1, or R2)
Maximal tumor size (mm)	Size of the tumor in millimeters
Histology	Histological type of the tumor
Grading	Grading of the tumor
Chemotherapy	Details about chemotherapy
Radiotherapy	Details about radiotherapy
First local recurrence date	Date of the first local recurrence
First local recurrence treatment	Treatment administered for the first local recurrence
Second local recurrence date	Date of the second local recurrence
Second local recurrence treatment	Treatment administered for the second local recurrence
Pulmonary metastasis date	Date when pulmonary metastases were detected
Extrapulmonary metastasis date	Date when extrapulmonary metastases were detected
Metastasis site	Anatomical site of extrapulmonary metastases
Metastasis treatment	Treatment details for metastases
Current status	Patient's current health status
Last follow-up date	Most recent follow-up date

ADVANCING SARCOMA TREATMENT: PREDICTIVE ANALYTICS AND PERSONALIZED CARE MODELS

As we continue to standardize and expand the dataset within Sarcoma Hub and Spoke Models (Sarcoma HASM networks), the foundation is set for leveraging these robust datasets to drive advancements in predictive analytics and personalized care.[56,57] The integration of comprehensive quality indicators with structured data provides an ideal basis for developing advanced predictive tools such as Sarcoma Digital Twins and using causal machine learning (CML) to enhance treatment precision.[58-60]

A Sarcoma Digital Twin is a virtual model that represents an individual patient with sarcoma in a detailed and dynamic manner. This digital counterpart is continuously updated with real-time/real-world data from the patient's ongoing treatments and responses. By simulating various treatment scenarios, the digital twin predicts potential outcomes, allowing oncologists to visualize the effects of different treatment paths before they are implemented in the real world.

The creation of a digital twin involves integrating diverse data types, including genetic information, clinical data, and real-time/real-world health monitoring. This model uses predictive algorithms to assess how a patient might respond to different treatment options, considering their unique medical history and current health status. This technology enables healthcare providers to simulate treatment outcomes under various scenarios, providing a risk—benefit analysis that helps in making informed, personalized treatment decisions. This approach is particularly valuable in

planning complex interventions where multiple treatment options are viable.

CML represents a significant evolution from traditional predictive analytics.[61] Unlike standard models that only forecast outcomes based on historical data correlations, CML identifies and understands the causal relationships between treatment actions and outcomes. CML analyzes the potential outcomes of different treatment strategies, weighing the expected benefits against possible adverse effects. For patients with sarcoma, this means that treatment plans can be tailored not just to maximize efficacy but also to minimize side effects, enhancing the overall treatment experience and outcomes.

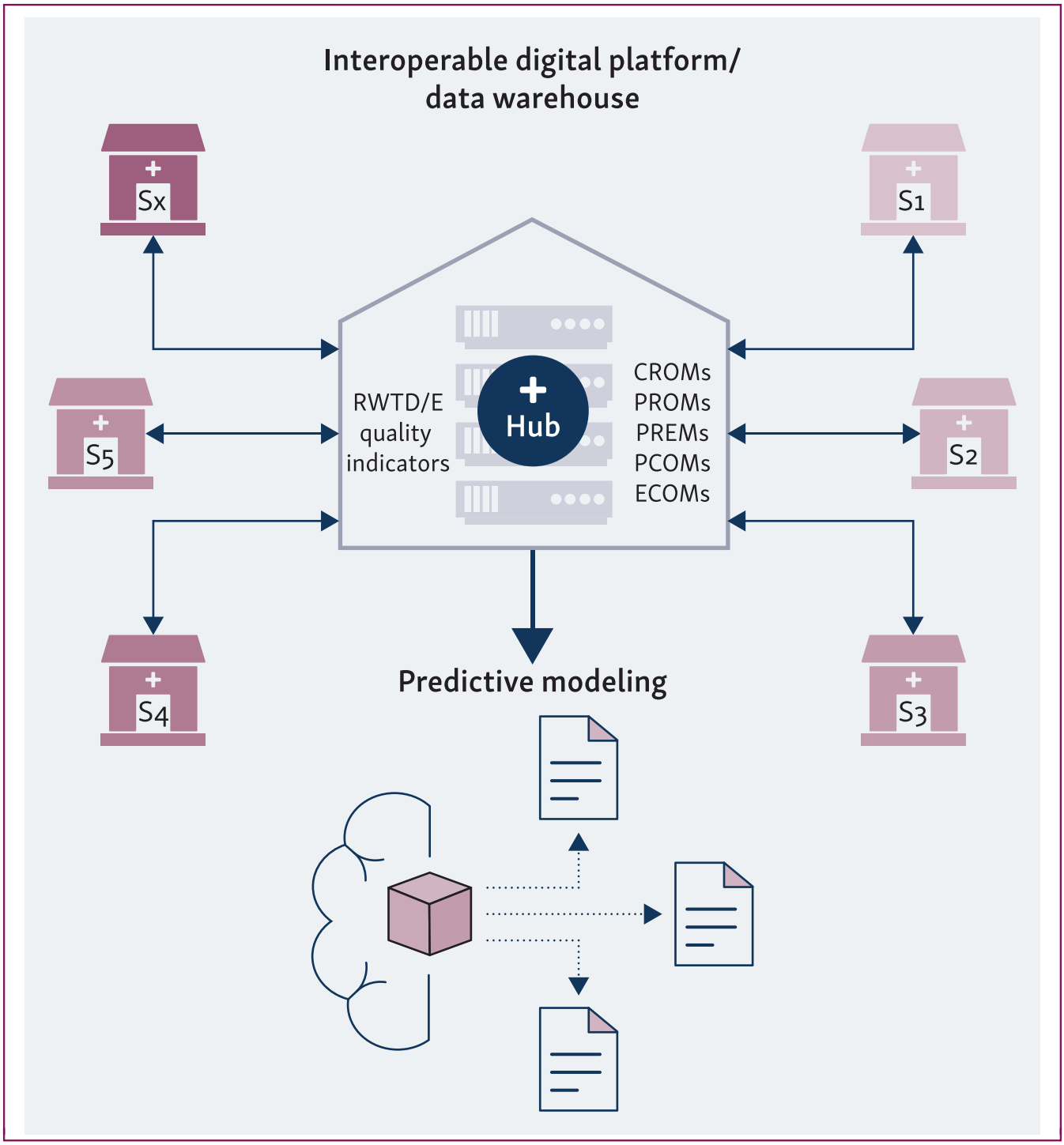

Figure 2. This figure illustrates an interconnected Hub and Spoke Model for sarcoma care, where a central hub coordinates complex case management and predictive modeling, linked to multiple spokes representing regional healthcare centers handling routine diagnostics and treatments. The central interoperable digital platform/data warehouse aggregates and analyzes real-time data from these nodes, integrating clinical-reported outcome measures (CROMs), patient-reported outcome measures (PROMs), patient-reported experience measures (PREMs), economic measures (ECOMs), and patient-centric omics measures (PCOMs) to optimize treatment and resource allocation. This setup facilitates multihub collaboration across geographic locations and continents, enhancing the generation of expansive population data to inform quality metrics and establish global sarcoma care standards. RWTD/E, real-world-time data and evidence.

In sarcoma care, CML can predict the balance between positive outcomes (such as gain in life years) and potential side-effects or toxicities. This predictive capability is crucial in decision-making processes where the trade-offs between aggressive treatment and quality of life are complex and critical.

The future of sarcoma care lies in the ability to not only react to conditions as they occur but also to anticipate and plan treatments in a manner that is precisely tailored to each patient's specific situation. As Sarcoma HASM networks evolve, the integration of Sarcoma Digital Twins and CML will revolutionize how care is delivered, moving toward a truly personalized approach that is predictive, proactive, and patient-centered. The potential to significantly improve patient outcomes by precisely balancing treatment efficacy against side-effects represents a transformative step forward in oncology (Figure 2).

CONCLUSION

The transformation of sarcoma care through the adoption of the Hub and Spoke Model marks a pivotal shift in how we approach complex and rare diseases. This model promises a future where integrated care is the standard, supported by advanced digital platforms that ensure all patients, regardless of geographic location, have access to the best possible treatments and outcomes. Through continued collaboration and innovation, this model aims to improve global health outcomes, leveraging cutting-edge technology and collaborative expertise to create a health system that is adaptable, responsive, and just.

The Sarcoma HASM network not only streamlines resource utilization but also enhances patient care and bolsters research capabilities. By centralizing strategic decision-making and expertise while decentralizing routine care, we can achieve a more efficient, effective, and patient-centered healthcare system. Healthcare providers, policymakers, and stakeholders are urged to support the integration of this model into their national health systems. This integration will facilitate the optimal use of technological innovations such as digital twins and CML, enhancing the ability to deliver personalized care based on predictive analytics.

Looking forward, the Sarcoma HASM network sets a template that could be adapted for all rare and complex diseases, potentially redefining healthcare practices worldwide. This model promises a future where integrated care is the standard, supported by advanced digital platforms that ensure all patients, regardless of geographic location, have access to the best possible treatments and outcomes. Through continued collaboration and innovation, we can expand this model to create a global health network that not only addresses the needs of patients with sarcoma but also serves as a beacon for treating various rare conditions.

Our vision extends beyond immediate clinical needs to encompass a healthcare ecosystem that leverages cutting-edge technology and collaborative expertise to improve global health outcomes. By embracing this model, we can ensure that every patient receives care that is not only timely and effective but also tailored to their unique health context.

As we move forward, let us commit to a future where technology and human expertise converge to create a health system that is more adaptable, responsive, and just. The Sarcoma HASM network exemplifies how structured, data-driven approaches can revolutionize medical treatment, making the promise of precision medicine a reality for sarcoma and beyond.

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