

Enhancing Multidisciplinary Team Processes in Lung Cancer Care: A Self-Assessment Toolkit and Best Practices

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DISCLOSURES:

P.C. reported being an employee of Vintura and owning Apple, AstraZeneca, GSK, Haeon, and Novartis stock. P.B. reported being an employee of Vintura and owning Ginkgo Bioworks, Caribou Bioscience, Collectis, Ardelyx, and CorMedix stock. M.T.C.P. reported being an employee of AstraZeneca and owning AstraZeneca stock. A.M. reported being an employee of AstraZeneca and owning Pfizer and Moderna stock. S.H.R.N. reported being an employee of AstraZeneca and owning AstraZeneca stock. D.D. reported being an employee of AstraZeneca and owning AstraZeneca, Roche, and Novartis stock. H.M. reported being an employee of AstraZeneca and owning Apple, Amgen, AstraZeneca, Google, Lilly, Sanofi, and Vertex stock.

ABSTRACT: Multidisciplinary teams (MDTs) play a pivotal role in the comprehensive management of cancer. MDT meetings (MDTMs) bring together specialized experts across the entire patient care spectrum, convening regularly to discuss patient cases, select optimal diagnostic strategies, and determine the most appropriate treatment modalities. By fostering cross-disciplinary interaction, MDTs aim to enhance patient outcomes and elevate the collective proficiency within a health care institution, promoting knowledge dissemination and ensuring health care practitioners remain abreast of the latest clinical insights. This study's methods comprised an extensive review of existing literature coupled with interviews involving lung cancer MDTs from 24 medical centers across Europe and Canada. The research focused on elucidating dynamics and variations observed among lung cancer MDTs, outlining an optimal MDT process, identifying variances in the study sample, and introducing a comprehensive self-assessment toolkit for continuous evaluation and improvement. The report discusses how these results should be used to self-optimize hospital MDTs, promote standardization, and encourage increased cross-hospital best practices sharing. With this, MDTs will be better positioned to deliver on the key goal of improved patient outcomes while promoting equality of access to health care.

KEY WORDS: best practices, diagnostics, lung cancer, multidisciplinary teams

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INTRODUCTION

Goal and Purpose of a Multidisciplinary Team

Multidisciplinary teams (MDTs) are a key component of the cancer care pathway. The primary goal of an MDT is to improve patient survival and satisfaction, including quality of life. Indeed, the discussion of patient cases in MDTs is associated with positive improvements to multiple aspects of patient management and patient journeys, including an increase in survival outcomes.^{1,2}

MDT meetings (MDTMs) facilitate this goal by providing different specialists throughout the patient care continuum with the opportunity to communicate, exchange scientific and clinical knowledge, and decide on the most suitable treatment options. As such, MDTs and MDTMs deliver a clear clinical,³⁻⁷ scientific,⁸⁻¹¹ and educational value proposition. Considering this, and the fact that super specialization of health care providers (HCPs) mandates multidisciplinary groups to deliver comprehensive patient care, MDTs have thus become a standard in many regions and are supported by medical guidelines.^{12,13}

This is particularly important when considering the increasing complexity of cancer care, including the shift toward more personalized treatment approaches. This holds true in the case of lung cancer, which ranks second highest in cancer incidence¹⁴ and has made significant strides in recent scientific advancements. This progress can be attributed to a multitude of new biomarkers and complex treatment options that are now validated and available.¹⁵⁻¹⁷

An Optimal MDT Composition

An optimal cancer MDT should represent all HCPs with a role in the patient care pathway.¹⁸ This includes specialists who perform diagnostics, specialists that initiate and oversee treatment, HCPs who provide patient support, and junior HCPs involved with the patient cases during training. Looking to the example of lung cancer MDTs, the specific functions are listed in **Table 1**.¹⁹

An Optimal MDTM Process

There are five key steps in the optimal process followed by an effective MDTM (**Figure 1**):

- 1. Registration
- 2. Preparation
- 3. Discussion
- 4. Reporting
- 5. Patient feedback

Challenges: Why Undertake the Research

To date, there is a lack of standardization in the organization and functioning of MDTs and MDTMs,^{18,20} compounded by the varying circumstances and organizational complexities of different care providers at a global, national, regional, and local level. The resulting variability leads to additional disparity in outcomes and decision-making, which in some situations ultimately leads to suboptimal patient outcomes.^{21,22}

To ensure consistently optimal decision-making, standardization of MDTs and MDTMs is vital. It will also contribute to health care resilience and facilitate MDTs to overcome the increasing perceived challenges burdening teams.²³ In the

context of lung cancer care, these key challenges include (1) rising patient volumes,^{14,24} (2) high mortality risk among patients with lung cancer,²⁵ (3) the increasing complexity of disease and treatment landscapes,²⁶⁻²⁹ and (4) high costs in time and resources.³⁰⁻³²

METHODS

The blueprint for MDTs developed by RadboudUMC, which is the basis for the Dutch Multidisciplinary Oncology Platform (SONCOS) national standards on MDTMs,¹³ served as a starting reference for an optimal MDT and a way to understand the key elements. Complementing this blueprint, a thorough review of existing literature was conducted to deliver additional insights. A systematic research methodology was followed, including:

- Conducting 100+ semistructured interviews, involving 2-10 HCPs from each of the 24 participating hospitals.
- Forming 14 focused discussion groups with participating hospitals to establish optimal practices and identify areas for improvement within the context of in-hospital and cross-hospital MDTs.
- Establishing an international expert panel comprising 8 MDT chairs. This panel convened to discuss research outcomes, distill key insights, and develop a set of actionable recommendations for improving MDTs.

This comprehensive approach combined the SONCOS guidelines, firsthand insights from interviews, collaborative discussions within hospital settings, and expert perspectives to create a robust framework for improving MDTs.

Table 1. Common Types of HCPs Ideally Present at Lung Cancer MDTMs and Their Roles

Type of Professional	Role	Description
Specialists who perform treatment	Pulmonologist	Diagnoses and treats chest conditions. In some countries also prescribes systemic therapies
	Thoracic surgeon	Performs lung cancer surgery
	Medical oncologist	Provides systemic therapies
	Radiation oncologist	Provides radiation therapy
Specialists who perform diagnostic tests	Radiologist	Performs and interprets imaging scans
	Pathologist	Examines tissue or blood samples to diagnose and characterize cancer, and performs further analyses (eg, NGS)
	Nuclear medicine physician	Performs and interprets PET-CT scans and other imaging consults on nuclear medicine treatment options
	Medical molecular biologist or medical geneticist	Interprets molecular information and NGS results
HCPs who provide patient support	Palliative care physician	Manages symptoms and provides supportive care
	Social worker	Voices the nonclinical aspects of the patient's condition and needs
	Nurse navigator/case manager	Provides support to patients during the whole journey
Junior HCPs who learn	Resident physician	Receives training to work with increasing independence

Abbreviations: HCPs, health care professionals; MDTMs, multidisciplinary team meetings; NGS, next-generation sequencing; PET-CT, positron emission tomography-computed tomography.

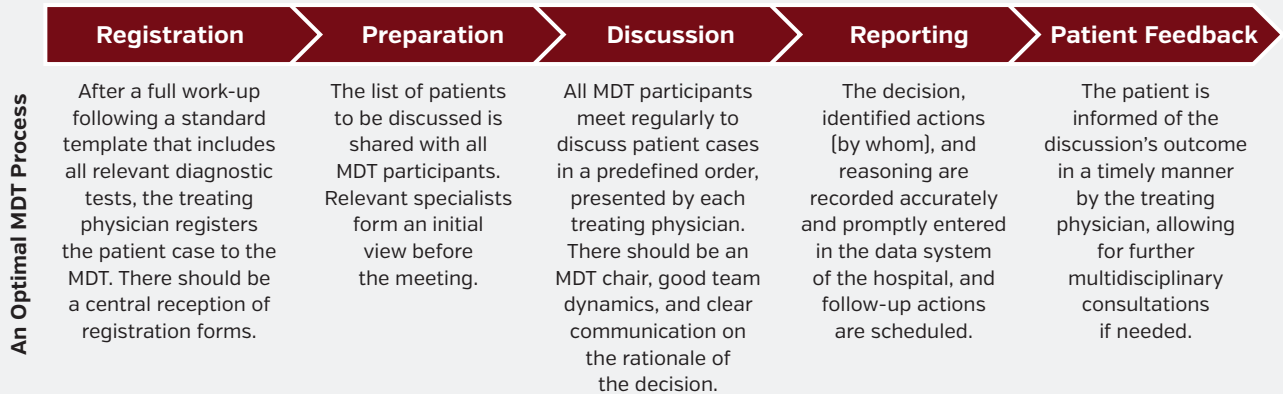


Figure 1. Converged Overview of the Optimal MDTM Process. The majority of MDTMs share this common five-step flow. Abbreviations: MDT, multidisciplinary team; MDTM, multidisciplinary team meeting.

RESULTS

Two key types of results are derived from this research study. Despite numerous publications addressing the importance of and guidelines for effective MDTMs, the first is a description of the key areas in which process variation is seen. The second is a framework and approach to address and reduce this variability. This centers on a comprehensive self-assessment toolkit that was designed to help hospitals identify and optimize areas that fall short of optimal standards. This toolkit features a compilation of best practices designed and curated to assist hospitals in implementing high-quality MDTMs.

Variability in MDTM Processes

The research identified significant variations in the approach taken by different hospitals assessed in the case studies. The differences lead to varying MDTM performance in hospitals, highlighting the opportunity for knowledge sharing and cross-hospital learning. The differences were observed across seven key areas:

1. Patient case selection and referral process
2. Key participants
3. Time investment
4. Quality in process execution
5. Infrastructure and systems
6. Utilization and generation of scientific insights
7. Quality assurance

Patient case selection and referral processes

Our research revealed a notable divergence in patient case selection and referral processes among participating hospitals on a national, regional, and local (hospital) level. At the national level, variations on the mandatory discussion of patient cases within MDTMs were observed in guidelines (Table 2). Regionally, our study highlighted discrepancies in patient access to expert lung cancer knowledge between remote and urban areas, leading to

the emergence of regionally based MDTMs in response. Despite this, inequalities persist due to limited regional ubiquity of this framework. Across hospitals—even those within the same region—unequal patient MDTM access was observed, influenced by diverse inclusion criteria as well as varied clinical decision-making largely due to time and workload constraints. This variation in patient care pathways and MDT discussion points contributed to increased process and outcome disparities.

Key participants

Participation dynamics within lung cancer MDTMs exhibited diversity across essential stakeholders (Table 1). The engagement of HCPs responsible for providing patient support, such as social workers and palliative care physicians, displayed inconsistency, subsequently influencing the integration of the patient's perspective. Despite the indicated desire from all participating MDTs to include these specialties, personnel resource constraints pose challenges in realizing this goal comprehensively.

Time investment

Significant variations in time allocation were observed across different phases of the MDTM process. The study underscored the significance of striking an optimal balance in time investment across various steps. Notably, disparities in preparation time exerted discernible impacts on the quality of discussions during MDTMs. Gaining a comprehensive understanding of time allocation per patient emerged as an important recommendation to guide improvements and optimization of MDTMs.

Quality in process execution

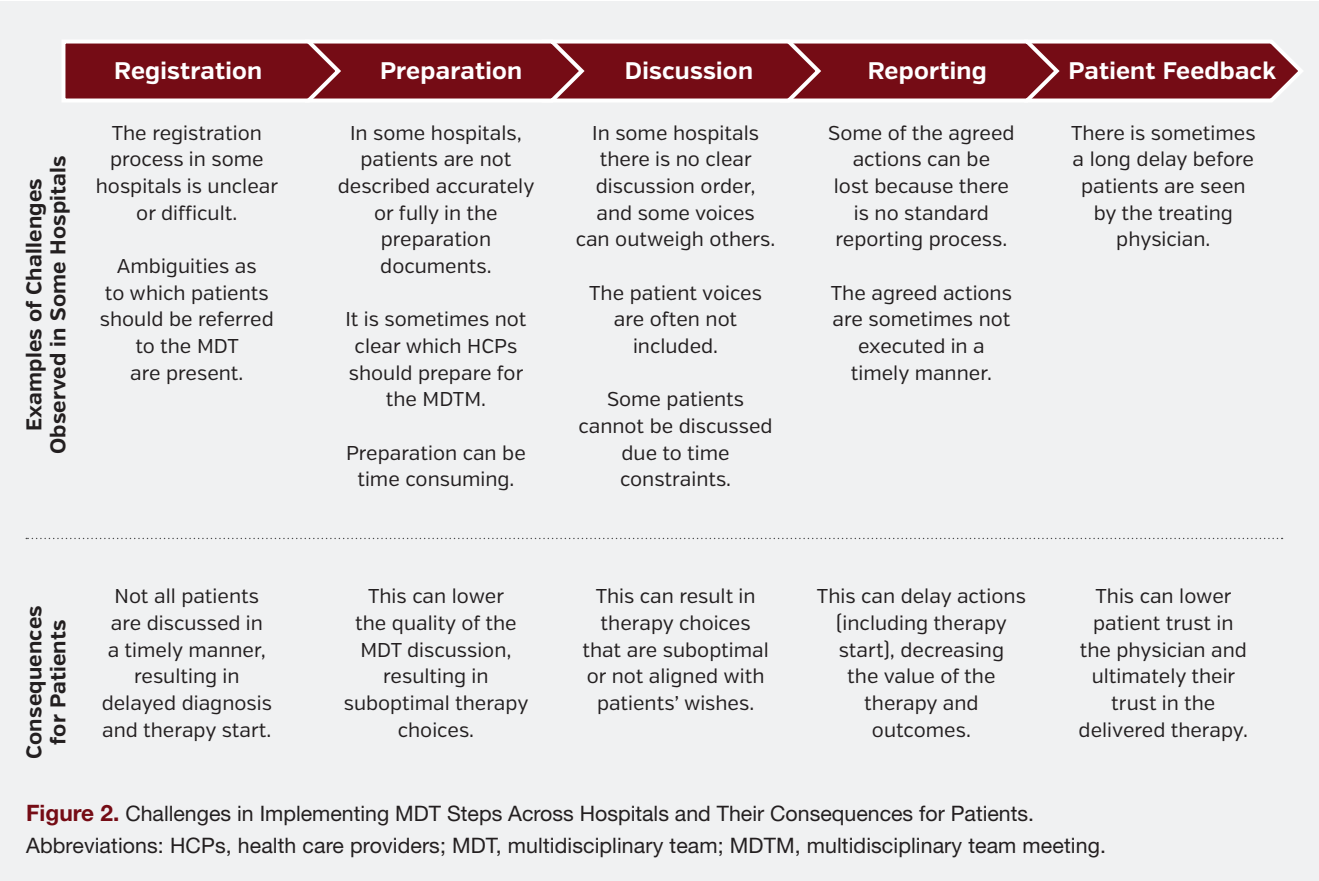
Challenges in MDTM preparation affected outcomes in various hospitals (Figure 2). Five pivotal stages of effective MDTMs were identified: registration, preparation, discussion, reporting, and patient feedback. Differences in data inclusion and format were observed in registration processes. Level of

Table 2. Overview of Country-Specific Guidelines on Mandatory Discussion in MDTMs for Patient Cases Involving Lung Cancer

Germany	Yes, mandatory to discuss all patient cases in order for the center to obtain certification from the German Lung Cancer Society ^{33,34}
France	Yes, mandatory with the goal to ensure that all new patients diagnosed with cancer are presented in MDTMs ³⁵
Denmark	Yes, mandatory to discuss all patient cases in a regional MDTM
Norway	Yes, mandatory to discuss patient cases during the diagnostic phase
Switzerland	Not mandatory, but recommended and done in a majority of hospitals as a necessity for (most) certification from the German Lung Cancer Society
Italy	Yes, but hospitals have not put this into practice yet
Spain	No, but done in most hospitals
Netherlands	Yes, described in the SONCOS guidelines ¹³
UK	Yes, with the exception that patients whose needs can be met by a standard treatment protocol (or standard of care) do not require discussion at the MDTM ^{36,37}
Canada	Not mandatory, as there are no national guidelines. Health care delivery is organized by the provinces and so may vary provincially. Discussion at MDTMs is recommended for all patients, but often only those not met by the standard of care are discussed

Abbreviations: MDTM, multidisciplinary team meeting; SONCOS, Dutch Multidisciplinary Oncology Platform.

preparation showed significant impact on quality of discussion, with discussion effectiveness particularly influenced by preparation adequacy, specialist punctuality, roles and responsibilities, patient case order, and patient representation. Reporting, which acts as a platform for learning among junior HCPs, showcased variability in execution due to differences in responsibilities and templates. Lastly, timing of patient feedback also varied considerably.



Infrastructure and systems

Establishing robust infrastructure and interconnected systems was identified as a pivotal enabler for the optimization and future of MDTMs. During the study, infrastructure components, including electronic medical records (EMRs), specialty-specific systems, and the integration of artificial intelligence (AI) tools, emerged as crucial elements in facilitating efficient and coordinated care. However, challenges surrounding issues of interoperability, variable functionality, and limited accessibility were noted and linked to inefficiencies in data sharing. Although study participants acknowledged the potential of AI and decision-making tools to revolutionize diagnosis and treatment planning, concerns relating to awareness, development status, and funding hinders their full-scale implementation.

Usage and generation of scientific insights

MDTs use scientific knowledge for patient-centered decisions, but variations exist in staying updated, selecting patients for trials, and institutionalizing expertise. Successful MDTs hold regular knowledge-sharing sessions. Patient trial selection methods vary, with some hospitals automatically starting this process upon patient registration, while others delegate patient recruitment to the specialist running the trial or rely on ad-hoc matching by the MDT. To institutionalize expertise, MDTs should learn from their decisions, especially in data-limited cases, and consider databases for outcomes. To this end, some of the hospitals studied in this research are working to develop centralized tools using MDT data for improved decision-making.

Quality assurance

Assessing the quality of decision-making within MDTMs proved challenging, as it is intricately linked to the knowledge of participating physicians, process adherence, and the level of preparation. Initiatives aimed at ensuring high-quality MDTM outcomes were identified, such as outcomes reporting in Denmark's national system to enable cross-center comparisons, and studies comparing simulated patient cases across MDTMs. In the Netherlands, SONCOS has developed guidelines outlining the recommended process for an effective MDTM.¹³ However, some centers show difficulties fully implementing these guidelines due to limited time and resources.

Self-Assessment Toolkit for Implementing High-Quality MDTMs in Lung Cancer

While the importance of MDTMs is well documented, the tools available for improving these meetings often lack universal applicability due to their specificity to particular regions or health care organizations. Different health care institutions have unique structures, processes, and practices, which necessitates the tailoring of improvement tools to suit the distinct context and requirements.

To address this challenge, a comprehensive toolkit has been developed through a collaborative effort involving 24 hospitals and MDTs. The aim of this toolkit is to provide a

universally applicable resource that assists any MDT seeking to enhance its practices by learning from the best practices of other MDTs. This approach encourages increased collaboration and knowledge sharing across hospitals and even international borders. Although the toolkit's case studies primarily focused on MDTMs in the context of lung cancer, the principles and methodologies outlined in the toolkit can be applied to MDTMs across various medical specialties.

The toolkit is structured around three key components:

1. **Self-Assessment Model:** This component revolves around a well-defined framework designed to assess the maturity level of an MDT. It covers a spectrum of elements grouped into three categories: patient access to the MDT, three hard factors of MDTs (processes, technology, and quality assurance), and two soft factors of MDTs (culture and capabilities). Within each of these categories, the self-assessment model defines the ideal characteristics of a mature MDT and outlines steps to achieve this vision. This framework enables hospitals to evaluate their current MDT practices, with a total of 17 elements assessed across the 6 factors. Each element is scored on a scale from 1 to 4, where 4 signifies a fully mature MDT and 1 indicates an immature MDT. The self-assessment model offers MDTs the ability to identify areas for improvement and tailor their approach to patient care through MDTMs.
2. **Best Practices:** Given the variability in MDTM practices among hospitals, this component focuses on sharing successful practices across the full range of MDT-related elements. The repository of good practices corresponds to the elements of the self-assessment tool, thereby allowing hospitals to learn from each other's experiences and strategies. This sharing of knowledge encourages the adoption of effective practices and fosters a culture of continuous learning and improvement.
3. **MDTM Toolkit Templates:** Building on the insights gained from the study and case study interviews, three standardized templates have been developed. These templates are intended to serve as sources of inspiration for hospitals seeking to enhance their MDTs. They are most effective when integrated into EMR systems, as this integration streamlines the population of relevant information. The three templates are as follows:
 - **Referral template:** A tool for referring physicians to clearly communicate patient information and specific questions to the MDT.
 - **Patient case presentation template:** Prefilled before the MDTM to enhance efficiency during case presentations.
 - **Reporting template:** Populated during the MDTM and used for patient feedback, discussion guidance, and data extraction for analysis.

In summary, the toolkit provides a comprehensive approach to improving MDTMs. It encompasses self-assessment, shared best practices, and practical templates, all aimed at empowering MDTs to evaluate their performance, enhance collaboration and communication, and optimize patient care through well-structured and informed MDTMs.

DISCUSSION

Study Results: Leveraging for Maximized Impact

Our research study yields two key results: (1) a description of variances observed among participating hospitals and (2) a self-assessment toolkit to evaluate MDT performance and identify areas for optimization. To maximize the impact of these results, it is important to first define how they can be optimally leveraged and to understand the extent of their potential impact.

The toolkit offers a structured approach for hospital and MDT improvement, incorporating a self-assessment model, shared best practices, and standardized practical templates. We maintained a keen awareness of the toolkit's intended wide-ranging relevance and essential adaptability during its design and development to accommodate the inherent differences among end users.

To maximize the benefits and ensure equality of health care, all hospitals should utilize this toolkit to pinpoint areas of weakness in lung cancer MDTs and incorporate learnings from other real-world examples. These learnings include (1) feasible optimizations for specific processes; (2) the responsibilities, ownership, and resources to effect this change; and (3) indicators of successful implementation. We suggest hospitals implement these self-assessment and optimization cycles on a regular schedule (eg, quarterly reviews) to embed a culture of continuous improvement within MDTs. Our findings also underscore the potential for continued best practice sharing and enhanced collaboration among hospitals to navigate the future landscape of health care.

Effective and widescale leverage of these study results will help hospitals optimize internal MDT performance and unlock the full value proposition across the three domains of scientific advancement, clinical efficacy, and educational enrichment. In turn, MDTs will be better positioned to deliver on the key goal of improved patient outcomes while promoting equality of access to health care.

Study Result Limitations

This research provides valuable insights into MDT variations and optimization opportunities. However, it's crucial to acknowledge limitations, categorized into study design and result validation.

Study design

The study focused exclusively on lung cancer MDTs, which introduces bias and limits the generalizability of findings to other MDT types; for instance, those caused by the differing importance of professional roles in other disease MDTs. Geographical limitations stem from the research only being conducted within Europe and Canada and not including other

global perspectives. At the same time, only two hospitals were selected per country, targeting leading academic or high-performing centers open and willing to engage in process-sharing and improvement. As such, the results may not offer a comprehensive reflection of MDTs in each of the studied countries. The research was primarily driven by interviews and workshops, which are inherently subjective methods and possibly not representative of actual real-world performance. Additionally, the research offers a physician-centric perspective that may not align with other important stakeholders, including hospital managers or patients. Lastly, this research was conducted in 2022/2023 and given rapidly changing dynamics may not be relevant by, for example, 2030.

Result validation

Beyond the study design limitations, we still need to evaluate the long-term impact of implementing the best practices to understand whether they result in improvements to MDT performance and access.

Next Steps For This Research

The next steps for the project should consider the aforementioned limitations and aim to address them. Toward this, the study sponsors have planned and initiated expansion of lung cancer MDT research in other geographies and are exploring potential for additional research in other MDT disease types. Hospitals are encouraged to utilize the self-assessment toolkit, implement the best practices, and monitor the long-term impact on their MDTs to enable validation of the results. While it would be invaluable to establish a correlation between best practice MDTMs and improved patient outcomes such as survival and quality of life, we acknowledge that undertaking such investigations may require significant financial resources. In our ongoing research, we are actively exploring viable and cost-efficient methodologies to bridge this gap and evaluate the potential impact of best practices on patient outcomes.

The authors would like to highlight that the full self-assessment toolkit, templates, and best practices mentioned in this report will be published in early 2024 in a comprehensive white paper titled, "Good practices in lung cancer MDTs: An optimal process of MDT meetings (MDTMs), evaluation of MDTMs in practice, and a toolkit for implementation." Periodic updates to the research should be undertaken to account for changes in future care delivery and ensure relevance of the results in years to come. ♦

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