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Published in:
Journal of Multimorbidity and Comorbidity

DOI:
10.1177/26335565221141745

Publication date:
2022

Document version:
Final published version

Document license:
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Citation for published version (APA):
Henriksen, D. P., Ennis, Z. N., Panou, V., Hangaard, J., Jensen, P. B., Johansson, S. L., Nagarajah, S., Poulsen, M. K., Rothmann, M. J., Schousboe, K., Bugge, S. J., Jessen, L. B., Schneider, I. R., Olsen Zwisler, A. D., Højlund, K., & Damkier, P. (2022). Physician-led in-hospital multidisciplinary team conferences with multiple medical specialties present - A scoping review. Journal of Multimorbidity and Comorbidity, 12, [26335565221141745]. https://doi.org/10.1177/26335565221141745

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Download date: 15. Sep. 2023
Physician-led in-hospital multidisciplinary team conferences with multiple medical specialities present - A scoping review

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Abstract

Introduction: Multidisciplinary Team Conferences (MDTs) are complex interventions in the modern healthcare system and they promote a model of coordinated patient care and management. However, MDTs within chronic diseases are poorly defined. Therefore, the aim of this scoping review was to summarise the current literature on physician-led in-hospital MDTs in chronic non-malignant diseases.

Method: Following the PRISMA-ScR guideline for scoping reviews, a search on MDT interventions in adult patients, with three or more medical specialties represented, was performed.

Results: We identified 2790 studies, from which 8 studies were included. The majority of studies were non-randomised and focused on a single disease entity such as infective endocarditis, atrial fibrillation, IgG4-related disease, or arterial and venous thrombosis. The main reason for referral was confirmation or establishment of a diagnosis, and the MDT members were primarily from medical specialties gathered especially for the MDT. Outcomes of the included studies were grouped into process indicators and outcome indicators. Process indicators included changes in diagnostic confirmation as well as therapeutic strategy and management. All studies reporting process indicators demonstrated significant changes before and after the MDT.

Conclusion: MDTs within chronic diseases appeared highly heterogeneous with respect to structure, reasons for referral, and choice of outcomes. While process indicators, such as change in diagnosis, and treatment management/plan seem improved, such have not been demonstrated through outcome indicators.

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Introduction

Multidisciplinary team conferences (MDTs) are an integrated approach in the modern healthcare system and serve as a forum for consultation among relevant healthcare professionals in a standardised setting. MDTs promote a model of coordinated patient care and management. An MDT brings together the expertise and skills of healthcare professionals, jointly, to manage, assess and plan care for individual patients with complex care needs. In most settings, healthcare practitioners from a variety of medical specialties participate in the MDT conferences, but professionals from family medicine, pharmacy, nurses and other relevant healthcare personnel may also be present. In the oncological setting the MDT approach has been proven beneficial in fields, where management is complex and multifactorial, and thus now considered one of the cornerstones of patient-centered care. MDTs are complex interventions in the modern healthcare system, and the concept has been shown to have several benefits: It facilitates diagnostic decisions and is associated with improved clinical outcomes, overall survival, patient satisfaction, and quality of life, especially among patients with cancer. MDTs promote cooperation as well as educational and research endeavors for the healthcare professionals, and thus, contribute to their training and competence development. While the benefits of MDTs within oncological settings are reasonably well-described, MDTs within the domain of chronic non-malignant diseases are poorly described and evaluated. Previous studies describing MDTs as interventions have described the organisation and process outcomes, evidence-based treatment, quality assurance, multidisciplinary collaboration, communication with primary care practitioners, survival, quality of life, financial cost, and competence development. Most of these studies were non-physician-led studies or studies based on oncological or radiographical MDTs, as well as studies with the main purpose of establishing a diagnosis. In the recent years, however, MDTs have expanded to various fields, including internal medicine, palliative medicine as well as surgery. With an increasing burden and complexity of multimorbidity, the role of MDTs within the domain of chronic diseases is poorly substantiated and not satisfactorily defined. With this scoping review, we want to summarise the current literature on physician-led in-hospital MDTs within the domain of chronic non-malignant disease. In addition, we aim to illuminate the key elements, such as context, healthcare professional practice, patient population, inclusion criteria, and types of outcomes, as well as the clinical impact of such conferences.

The review forms the basis for developing a physician-led in-hospital MDT in chronic non-malignant diseases.

Methods

This scoping review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analysis Extension for Scoping Reviews (PRISMA-ScR).

Eligibility criteria

The inclusion and exclusion criteria were defined prior to database searches. As the term “multidisciplinary” is not a standardised and well-defined concept or entity (ie. a MESH term in Pubmed or alike) within an internal medicine setting, we decided to include studies describing MDTs or MDT-like interventions in adult patients (>= 18 years), where at least three different medical specialties were represented. We included randomised and non-randomised controlled trials as well as observational studies (retrospective or prospective).

We excluded studies describing joint outpatient clinics with only two specialities, such as combined diabetes-renal-clinics or geriatric-renal assessments. We also excluded studies based on in-hospital interdisciplinary rounds and tumor-conferences, as well as non-physician-led MDTs. Furthermore, studies solely describing an initiative without presenting quantitative, or qualitative data or studies focusing on educational or self-management interventions, and studies exclusively focusing on establishing diagnoses of specific diseases were excluded. Paediatric MTDs were excluded as well. We excluded studies on oncology-, surgical-, radiographical-, or pathological-led MDTs as a consequence of our focus on physician-led internal medicine-based MDTs.

Information sources

In December 2021 (cutoff search date: 13.12.2021), we searched the three following databases from inception without language restrictions: MEDLINE PubMed, EMBASE, and the Cochrane Library. Abstracts were excluded. The final search results were exported into Covidence.
Search

Using the boolean operators, AND, OR and NOT, the key words “multidisciplinary team” combined with truncated forms of “meeting” or “conferences” excluding “oncology” and “cancer” were searched on Medline Pubmed. Similar searches were performed at the Cochrane Library and EMBASE respectively (for details see Appendix).

Selection of sources of evidence

Two independent reviewers (DPH and ZNE) participated in all phases of the selection process. Any disagreements between the two reviewers on study selection were resolved by consensus.

In order to increase the consistency of selecting sources of evidence, the two reviewers screened the first 25 publications, discussed the results, and amended the screening manual before screening the remaining publications.

The search was broad initially, only excluding oncology/cancer directly in the search strings. Titles and abstracts were screened based on the eligibility criteria mentioned above. Then, full texts were screened and included in the final selection, and finally we predefined using CoCites to screen the included studies for relevant studies, not captured in the search line. CoCites is a tool that identifies related articles, based on co-citation, assuming that articles with a higher co-citation frequency are more likely to address the same specific topic as the query article (in this case, the included studies).

Data charting process and data items

We predefined four main themes of interest: 1) The type of patients referred to the MDT, 2) The reason for referral, 3) the MDT composition, and 4) The choice of outcomes and main findings of the included studies. One of the reviewers charted the data and all authors contributed after evaluating the included studies.

Results

Selection of sources of evidence

We identified 2790 studies from the three databases. After duplicates were removed (n=171), 2619 studies were screened against title and abstract. We excluded 2565 (98%) of these and assessed 54 studies for full-text eligibility. Of those, 48 were excluded due to either wrong interventions (n=23) (e.g. only one medical speciality, not described in the abstract), wrong study design (n=12) (e.g. an MDT-validated behavioral intervention in ward), wrong setting (n=12) (e.g. bedside MDTs not described in the abstract), or ongoing study (n=1), thus including 6 studies. After using CoCites on these 6 studies 2 further studies were found eligible for inclusion. This led to a total of 8 studies included in the scoping review (Figure 1).

The studies comprised a total of 1200 patients, and 25 health-care providers (17 physicians and 8 nurses).

Synthesis of results

For an overview of the results, please refer to table 1.

Types of studies included. The majority of studies were non-randomised studies (n=7) and one was a non-inferiority randomised clinical trial. One study reported both quantitative and qualitative data, and one study was exclusively qualitative. Two studies presented patient-reported outcomes, either as semi-structured interviews or surveys.

MDT composition. The MDT members were primarily from medical specialties gathered especially for the MDT. An overview of included medical specialties is shown in table 1.

One study had a core group, where visiting specialists could differ, another study did not predefine the MDT group members as they were selected depending on the patient at hand.

Types of patients referred. The majority of studies focused on a single disease entity such as infective endocarditis, atrial fibrillation, IgG4-related disease, or arterial and venous thrombosis, whereas other studies focused on patients with a predefined combination of diseases (kidney, diabetes, cardiovascular). One study did not predefine the type of disease, but instead “patients with complex medical conditions” were included.

Reasons for referral. The main reasons for referral to the MDT were: Confirmation or establishment of a diagnosis, assessment and management of a treatment plan or strategy. Other studies included all patients admitted to a hospital department with a specific disease.

The choice of outcomes, and main findings. The choice of outcomes were grouped into process indicators and outcome indicators. The process indicators included changes in diagnostic confirmation, as well as therapeutic strategy and management. All studies reporting process indicators demonstrated significant changes before and after the MDT (Table 1). The outcome indicators were composite measures of complications rates (e.g. unexpected or prolonged critical care admission or renal replacement therapy in relation to the main disease), morbidity (newly emerged diseases in relation to the main disease), and/or hospitalisation rates. The two studies including outcome indicators found no statistically significant changes.
Qualitative indicators included overall clinical satisfaction, clinicians understanding of person-centered care, and alignment of clinical practice with theoretical understanding. Patients accentuated the coordination as positive sides of the MDT, emphasised a coordinated care plan, mutually agreed upon plan by their specialists, emphasised less blood work, and most importantly, less time attending different multiple specialist clinics; all while achieving the same clinical outcomes.

**Discussion**

In this scoping review on physician-led in-hospital MDTs with multiple medical specialties represented, we identified 8 studies including at total of 1200 patients. Our findings showed a pronounced heterogeneity in the MDT structure, reasons for referral, and choice of outcomes.

Despite the heterogeneity, some trends were observed. The reasons for referral were multifaceted, but most often due to a need for confirmation or establishment of a diagnosis or assessment and management of a treatment plan or strategy. This is in line with MDTs in other settings, such as in oncology and cancer care.

What surprised us was the approach of some of the studies in regards to the MDT composition. Although the majority of the included studies reported fixed/standing MDT-members, one study reported that the MDT was assembled dependent on the patient at hand. The benefits of
Table 1. Details of the included studies in the scoping review.

| Study et al., 2018 | Type of study | Number of participants | Setting | Study period | MDT composition | Who could be referred | Reason for referral | Choice of outcomes | Findings |
|-------------------|---------------|------------------------|---------|--------------|----------------|----------------------|-------------------|-------------------|---------|
| Aston et al.,     | Descriptive    | 25 patients (2 gave    | Tertiary | June 2016 to  | Dependent of the patient at | Patients with   | -Lacked a confirmed  | -Clinician feedback, | -Clinicians: overall |
|                   | pilot study (both| patient feedback)-9    | hospitals| June 2017    | hand          | complex medical conditions | diagnosis and    | -Patient feedback   |         | satisfaction with the |
|                   | quantitative    | clinicians             |         |              |               | treatment plan       | treatment plan    |                  |         | MDT setup. Patients: |
|                   | and qualitative)|                       |         |              |               | -Required a          |       |                  |         | accentuated the      |
|                   |               |                        |         |              |               | coordinated plan     |       |                  |         | coordination and     |
|                   |               |                        |         |              |               | for investigation-    |       |                  |         | positive sides of the |
|                   |               |                        |         |              |               | Discharge planning    |       |                  |         | MDT.                  |
|                   |               |                        |         |              |               | of follow-up-        |       |                  |         |                      |
|                   |               |                        |         |              |               | Complex diagnostic or |       |                  |         |                      |
|                   |               |                        |         |              |               | therapeutic dilemma   |       |                  |         |                      |
| Camou et al.,     | Prospective    | 493 patients           | Teaching | January 2013 to | Cardiologists, infectious | Patients with  | -Diagnostic           | -Confirmation or rule- | -30% of “undocumented” |
| 2019              | follow-up      |                        | hospitals, | June 2017     | disease specialists,   | infective endocarditis | confirmation of    | -rule-out of diagnosis- | cases were ruled-out- |
|                   | study          |                        | regional  |              | cardiac surgeons,      |                         | cases-Proposal of   | Change in anti-    | -90% of all anti-     |
|                   |               |                        | hospitals |              | microbiologist, imaging|                         | a therapeutic       | infective treatment | infective treatments | infective treatments |
|                   |               |                        | and clinics|              | specialists and ICU    |                         | strategy-Prospective |       | were modified or    |
|                   |               |                        |         |              | specialists            |                         | follow-up           |       | adjusted           |
| Chahal et al.,    | Non-randomised | 154 patients discussed | Primary  | April 2016 to  | Cardiologist, haematologist, | Complex patients | -Optimisation of      | -Four possible       | AF resolved n=61 (40%), |
| 2019              | intervention   | at the MDT meeting     | care and | April 2017    | general practitioner, clinical | with atrial        | therapy-Complexity of | outcomes from the | exception report n=30 (19%), anticoagulated |
|                   |               |                        | local    |              | pharmacist              | fibrillation         | patients              | MDTs were used;    | n=16 (10%), further | n=47 (31%).          |
|                   |               |                        | national  |              |                         |                     |                     | atrial fibrillation  | investigation required|                          |
|                   |               |                        | health    |              |                         |                     |                     | resolved, exception  |                  |                      |
|                   |               |                        | service   |              |                         |                     |                     | report where the risk |                  |                      |
|                   |               |                        | hospitals |              |                         |                     |                     | of anticoagulation    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     | outweighed the       |                  |                      |
|                   |               |                        |         |              |                         |                     |                     | benefit, anticoagulate|                  |                      |
|                   |               |                        |         |              |                         |                     |                     | further investigation |                  |                      |
|                   |               |                        |         |              |                         |                     |                     | required              |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
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|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
|                   |               |                        |         |              |                         |                     |                     |                    |                  |                      |
| Evén et al.,      | Qualitative    | 31 patients-8 physicians | University | February 2016 to | Endocrinologists, nephrologists, | Patients with combined | -The paper does not | -Themes in the | -Themes in the interviews: Who is the patient sitting in front of me?, |
| 2019              | study          | -8 nurses               | hospital | October 2016   | cardiologists           | cardiovascular disease, impaired | state the reason for | Clinicians understanding of | transformed healthcare professional roles during the |
|                   |               |                        |         |              |                         | kidney function, and diabetes. | referral other than | person-centered care, clinical practice | transformed meetings", |
|                   |               |                        |         |              |                         |                      | the patients had a    |       | aligned with         | "healthcare professionals as |
|                   |               |                        |         |              |                         |                      | combination of        |       | theoretical         | "coaches", and        |
|                   |               |                        |         |              |                         |                      | cardiovascular        |       | understanding       | "engaging relatives"  |
|                   |               |                        |         |              |                         |                      | disease, impaired      |       |                   |                      |
|                   |               |                        |         |              |                         |                      | kidney disease, and    |       |                   |                      |
|                   |               |                        |         |              |                         |                      | diabetes.              |       |                   |                      |

(continued)
| Study                           | Type of study          | Number of participants | Setting                      | Study period     | MDT composition                                                                                     | Who could be referred                                    | Reason for referral                                                                 | Choice of outcomes                                                                 | Findings                                                                                                                                 |
|--------------------------------|------------------------|------------------------|------------------------------|------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Goodchild et al., 2020<sup>26</sup> | Prospective follow-up study | -156 patients          | Two tertiary hospitals       | 2016 to 2019     | Radiologists, histopathologists, gastroenterologists/ hepatologists, rheumatologists, and general physicians with an interest in the disease. Visiting specialists included from a wide range of medical specialties | Patients with possible IgG4-RD. | -Establishing a diagnosis-Agreeing on a management plan-Assessment of treatment response and disease course. Recruitment of patients into clinical and translational research | -Establishing a diagnosis-Agreement of management plan | -62% were given a diagnosis 38% did not meet diagnostic criteria-Management changed in 74% of all patients. Primarily treatment escalation |
| Tan et al., 2018<sup>14</sup>    | Quasi-experimental before-and after study | -80 patients           | Tertiary hospital            | October 2013 to November 2017 | Cardiologists, cardiac surgeons, critical care physicians, infectious disease specialists, neurologists | Patients with infective endocarditis | -All patients admitted with a definitive diagnosis of infective endocarditis or a probable diagnosis with strong clinical suspicion were referred | -Primary outcome: Composite measure of complications that were new or worse from admission and assessed up to 90 days after hospital discharge-Secondary outcomes: mortality, readmission, relapse of infective endocarditis, total length of hospital stay | -No difference in complication rates (40.0% vs. 51.5%, p = 0.13)-No difference in mortality up to 90 days after hospital discharge (26.3% vs. 17.5%, p = 0.20). |
| Mauger et al. 2020<sup>13</sup>  | Single center retrospective followup | -142 patients          | University hospital          | February 2015 to May 2017 | Haemostasis, internal medicine, oncology, geriary, vascular medicine and radiology | Patients with arterial and venous thrombosis | -Diagnostic and therapeutic management-Indication of therapy-Duration of therapy | -Three main categories of therapeutic decisions were made type-, choice-, and duration of anticoagulation | -Significant difference between the initial treatment and the one suggested in the MDT meetings, and a significant difference in the duration of anticoagulation. No significant difference between the choice of anticoagulant before and after the MDT meeting |
Table 1. (continued)

| Study                  | Type of study | Number of participants | Setting        | Study period        | MDT composition                      | Who could be referred                                                                 | Reason for referral                                                                 | Choice of outcomes                                                                 | Findings                                                                                                                                 |
|------------------------|---------------|------------------------|----------------|---------------------|--------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Weber et al. 2011[^12] | Non-inferiority RCT | 139 patients          | Tertiary hospital | April 2005 to July 2005 | Endocrinologists, nephrologists, cardiologists | Patients attending a kidney care clinic and at least one other speciality clinic of interest (diabetes or cardiovascular disease) | -Patients attending a kidney care clinic and at least one of the other specialties of interest: diabetes- or cardiovascular clinic were eligible for referral | -Primary outcome: Hospitalisation rates - Secondary outcomes: GP visits, achievement of target lab and clinical values, and symptoms as well as estimated costs - Patient perspectives - Cost analysis | -Hospitalisation rates were not different (95% CI for the difference: 0.013 – 0.207; P = 0.03). - Similar proportions in each group achieved clinical and laboratory targets. - Mortality (13%) and dialysis (32%) rates were the same between groups. - Differences in the cost of clinic visits alone were $86400 in favor of the combined clinic - Patients perceived a coordinated care plan, mutually agreed upon plan by their specialists, less blood work and most importantly, they spend less time attending different multiple specialist clinics, all while achieving the same clinical outcomes. |
this approach is the possibility of gathering the most competent physicians tailored to the need relevant to the specific patient problem. However, as the authors pointed out, the disadvantage of this approach is of more logistical character such as identifying and agreeing on a suitable date for the meeting and identifying a suitable clinician within each specialty to participate.

Some of the included studies reported a compromise, where the MDT consisted of predefined core members with the possibility of drawing in visiting specialists, depending on the patient at hand.29,31

One of the included studies described the setup and logistics of the MDT as well as the coordination, conduction, and leadership of the meetings on a more “meta-level”25. The authors emphasised that the referring clinicians restricted participation to essential members in order to facilitate timely scheduling, as well as a need for active engagement of the lead clinician in facilitating planning and running the MDT. Similar thoughts have also been reported in a palliative setting, using an ethnographic setup.33 The authors of this study found that a predetermined structure, an agreed format, and prescribed timings help convey expectations ensuring that the meeting will not be overrun. Furthermore, the authors reported that the space where the meeting is held often matters more than may be realised. Other studies have presented determinants of treatment plan implementations in cancer- and chronic diseases MDT conferences reporting reduced likelihood of implementation with additional professional groups represented, and increased likelihood of implementation when a clear goal and process is present at the MDT.34

The majority of the included studies in the current scoping review included patients with a single disease entity like infective endocarditis26,30 or single chronic disease like atrial fibrillation.27 Multidisciplinary care is, however, widespread in other specific chronic medical diseases, like chronic kidney disease. A recent scoping review found a potential beneficial impact on patients with chronic kidney disease, but because of the heterogeneity of team compositions and processes with inadequate reporting, the authors found it difficult to determine which of the specific elements that were associated with improved patient outcomes.35

Two of the included studies targeted multimorbid patients with a predefined combination of diabetes, kidney disease, and cardiovascular disease.28,32 Interestingly, multidisciplinary care clinics handling multimorbidity are emerging. The impact of patient-centered care for these patients with a combination of diabetes, renal, and cardiovascular disease is currently being evaluated in a randomised controlled setting.36 One of the included studies in the present scoping review was based on the same patient population as mentioned above.28

The initial findings of this trial showed no statistical significant differences in healthcare utilisation in a 6 month period before and after the intervention. The authors emphasised the difficulties in obtaining significant clinical findings for patients with multiple chronic conditions in such a setup.37

Overall, the findings in the included studies showed significant changes in the patients’ treatment-course in regards to diagnosis and medical treatment. However, only a few studies coupled these process indicators to outcome indicators like hospitalisation rates, morbidity, and mortality, showing no significant differences. These studies were, however, not designed to assess superiority.30,32

These tendencies have been reported in oncology-based MDTs where the meetings have shown to have an impact on patient assessment and management practices. According to some authors, only little evidence indicates improvement in clinical outcomes.3 The authors call for future research assessing the impact on patient satisfaction and quality of life. Regarding patient satisfaction, this was addressed in two of the studies included in the present scoping review. In both studies, the patients were satisfied and accentuated the coordination as positive sides of the MDT.25,32

We believe that MDT care for patients with multimorbidity without a predefined combination of diseases could positively impact the course of treatment, but the literature is scarce. MDTs for fixed disease combinations have, on the other hand, been found to change the course of treatment, but the effect of this change, is only sparsely reported.

Limitations

The main limitation was the lack of a standardised definition of MDT as a concept and consequently, a poorly defined search terminology. We wanted to explore the physician-led MDTs with multiple medical specialties present, and due to this, not all studies meeting our definition were necessarily captured by our search lines. We used CoCites to account for this limitation, which also increased the number of included studies by 25%.

The included studies were heterogeneous and could only be compared narratively. We chose to include studies describing physician-led MDT interventions, where three or more medical specialties were present, thus focusing more on the intervention and framework rather than specific combination of diseases. This could, likely, have excluded potentially relevant studies. Studies focusing on educational or self-management interventions, and studies exclusively focusing on establishing diagnoses of specific diseases were excluded, potentially impacting our results.

Conclusions

Within the domain of non-malignant disease, MDTs with more than two medical specialties represented appear highly
heterogeneous with respect to structure, reasons for referral, and choice of outcomes. While process indicators, such as change in diagnosis and treatment management/plan seem improved, this has not been demonstrated for outcome indicators. Conceptually MDTs are poorly defined as is the accompanying terminology. The effect with respect to outcome indicators is insufficiently substantiated. We suggest concerted international efforts be made to define MDTs for chronic non-malignant diseases with respect to concept and terminology with future research focusing on outcome indicators to justify the approach.

Acknowledgements
The authors would like to express our sincere gratitude and appreciation to Camilla Hansen for her tremendous work in coordinating the group activities and for her dedication to the project.

Declaration of conflicting interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was initiated by Steno Diabetes Center Odense as a part of a large scale project regarding multidisciplinary team conferences in diabetes, respiratory, cardiovascular, and renal diseases. This project was funded by The Novo Nordisk Foundation.

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Supplemental Material
Supplemental material for this article is available online.

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**Appendix**

**MEDLINE**

(multidisciplinary team AND (meeting* OR conference*)) NOT (oncology OR cancer) [All Fields]

**Cochrane library**

(multidisciplinary team AND (meeting* OR conference*)) NOT (oncology OR cancer)

All text, trials only

**EMBASE**

1. multidisciplinary team conference.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]

2. multidisciplinary team meeting.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]

3. (cancer or oncology).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]

4. (1 or 2) not 3