MDCC | Muscular Dystrophy Coordinating Committee

2025 MDCC Action Plan for the Muscular Dystrophies
Cross-cutting Topics
Draft Priorities

Introduction

During discussions of the working groups on Disease Mechanisms, Preclinical Translation, Clinical and Thriving with Muscular Dystrophies, priorities were identified that are common to multiple areas of research and access to care/services. The priority topics below were recommended as essential for advancing the goals described by the working groups.

Priority Topic 1: Promote further collaborations and partnerships among government agencies, academic/industry researchers, clinicians, non-profits, professional societies and people with lived experience.

Progress in muscular dystrophy research and the development of strategies to improve the lives of affected individuals can be accelerated through additional structured partnerships and dynamic collaborations among stakeholders. Through teamwork involving individuals with synergistic knowledge and expertise, obstacles and critical needs can be better defined, and creative and more efficient strategies developed to address these needs and obstacles.

Input from people with lived experience (PWLE) is key to setting and achieving goals for muscular dystrophy research and ensuring that affected individuals can thrive. It is important to engage PWLE and include their perspective in the design of research studies, data interpretation and reporting to ensure relevance and impact. The development and implementation of policies regarding access to care and services should always incorporate the perspectives of PWLE. While clinical research requires the participation of affected individuals, basic and preclinical translation also benefits from their perspectives. Establishing strategies to mitigate barriers to research study participation increases the likelihood of achieving enrollment targets in a timely manner and ensures that findings from the study are relevant for all affected individuals. Sharing research data with the study participants enhances transparency and promotes retention of participants. During the MDCC meeting in December 2021 strategies were discussed to reduce the burden of clinical study participation. Researchers are encouraged to consider these recommendations when planning and conducting studies.

Partnerships are essential for achieving muscular dystrophy research goals and addressing the needs of PWLE. Partnerships involving academic and industry researchers have demonstrated success in developing therapeutics for DMD, and progress is ongoing for other forms of dystrophy. Such partnerships often benefit from support early in the project from Federal agencies such as the NIH and the Congressionally Directed Medical Research Programs or from private sources such as the Muscular Dystrophy Association and other dystrophy-specific advocacy/funding organizations. Support for early stage therapy development programs can decrease the scientific risk, demonstrate proof-of-concept and attract subsequent support from industry. In addition, venture philanthropy funding models can provide sustainable support for research efforts (see MDA Venture Philanthropy Program as an example). Funding organizations should continue to collaborate to foster innovative projects all long the progression from early-stage pilots, through regulatory approval and measuring the impact on patients' lives.

Partnerships and collaborative efforts are needed to coordinate and share research resources to drive innovation and increase efficiency. A good example is the Duchenne Regulatory Science Consortium (D-

RSC), which is supported by Parent Project Muscular Dystrophy and managed by the Critical Path Institute. D-RSC has created an integrated database of patient-level clinical data from many DMD studies, developed standard terminology to integrate data and produced other resources for the DMD research community. Partnering among industry, academia, government, non-profit and patient advocacy organizations has fueled the success of D-RSC. Other examples of collaborative resource sharing for muscular dystrophy research include the Jackson Lab Muscular Dystrophy Mouse Model Resource and the shared core facilities of the Wellstone Muscular Dystrophy Research Network. The sharing of model systems, biospecimens, services and standardized protocols is essential for comparability and reproducibility of research findings. There continues to be a need for sharing publicly- and privately supported resources for all forms of muscular dystrophy research.

Collaborations and partnerships can also help to ensure access to treatments for all affected individuals. Gene-based therapies have been approved for DMD and are under development for other types of dystrophy. The high cost of development and production for such therapies creates obstacles for access to those who would benefit. Research institutions and funding organizations should promote practices to ensure that therapies arising from research are accessible and affordable to all. Collaborative efforts to establish and share streamlined protocols other resources to accelerate regulatory approval are ongoing, including the Bespoke Gene Therapy Consortium, the Somatic Cell Genome Editing program and the Platform Vector Gene Therapy pilot. While muscular dystrophies are not currently included in these programs, the knowledge gained and regulatory pathways established will benefit a wide range of rare diseases. Best practices in the licensing of intellectual property should also be considered to promote access to therapies (see Kliegman et al., 2024 and MAPGuide). Additional studies are needed to assess comprehensive costs incurred by affected families, which will inform health economics and pricing strategies. Manufacturers and payers should collaborate to consider innovations in pricing and reimbursement such as outcomes-based annuity payments.

Summary points for Topic 1:

- Perspectives of people with lived experience should be included in decision-making for research and policy affecting their lives
- Further partnerships should be developed to support innovative research from early discovery stages to delivery of effective treatments
- Additional collaborative efforts are needed to promote resource sharing
- Ensuring access to treatments for all people living with muscular dystrophies will require partnerships and innovative approaches shared with the broader rare disease communities

Priority topic 2: Promote the harmonization and sharing of data, and the appropriate use of artificial intelligence to advance research and patient care.

The advances in muscular dystrophy research and patient care can be accelerated by collecting and storing data in ways that promote effective sharing and the use of modern approaches for data analysis. By establishing standardized data practices, consolidating data from multiple studies, promoting the sharing of clinical, pre-clinical outcomes and -omics data, and ensuring transparency in reporting, the quality and impact of muscular dystrophy research can be enhanced.

Muscular dystrophy researchers and funding organization are encouraged to continue to align with the NIH Strategic Plan for Data Science (2025-2030), which outlines five overarching goals aimed at facilitating data management and sharing, developing programs to enhance human-derived data for

research, providing new opportunities in software, computational methods and AI, supporting a federated data infrastructure and strengthening the data science community.

Key to the FAIR (findable, accessible, interoperable, reusable) guiding principles for scientific data management and stewardship is the ability to replicate and integrate with other data for analysis, storage and processing. The muscular dystrophy field needs to continue to develop and implement standardized operating procedures for data collection and analysis, common data elements and repositories for the data and metadata. Examples of success in these areas include the TREAT-NMD SOP Library for animal model studies and the NINDS Common Data Elements for clinical studies. The TREAT-NMD library includes protocols for maintenance, outcome measures and biomarkers for some commonly used animal models for DMD and CMD. Standard operating procedures for other muscular dystrophy models are needed to enhance uniformity in research methodologies across the field. The NINDS CDE catalog includes elements for DBMD, CMD, FSHD and DM, along with resources to develop case report forms. Use of these CDEs for harmonizing clinical data collection is encouraged along with the development of CDEs for other forms of dystrophy to facilitate the integration, comparison and effective use of clinical research findings globally. Effective strategies for data consolidation, such as tokenization and the use of Global Unique Identifiers (GUID), are essential for integrating data from diverse studies. Partnerships with organizations like the Critical Path Institute can drive collaborative efforts and innovative data mining strategies, enhancing the robustness and utility of shared data.

The promotion of -omics data sharing through established databases is crucial for accelerating research. Working group members recommended appropriate databases for sharing -omics data within the muscular dystrophy research community and with other research areas.

Gene expression and epigenomics - https://www.ncbi.nlm.nih.gov/geo/
Metabolomics - -https://www.ebi.ac.uk/metabolights/
Large genomic dataset analysis - https://anvilproject.org/overview
Genotypes and phenotypes - https://www.ncbi.nlm.nih.gov/gap/
Gene/variant curation - https://clinicalgenome.org/ and https://www.ncbi.nlm.nih.gov/clinvar/

Ensuring transparency in data reporting is fundamental for reproducibility and credibility in research. Implementing good practices in methods reporting and encouraging the sharing of code on platforms like GitHub are essential steps in this direction. These practices foster a collaborative and open scientific environment, ultimately leading to more reliable and impactful research outcomes.

In summary, the harmonization and sharing of data, along with the strategic application of AI/ML, are central to advancing muscular dystrophy research and patient care. By standardizing data collection, consolidating diverse datasets, promoting -omics data sharing, and ensuring transparency, we can drive meaningful progress in the field. These efforts will lead to more efficient and effective research, ultimately benefiting patients and advancing our understanding of muscular dystrophy.

Summary points for Topic 2:

- Continue to promote the goals of the NIH Strategic Plan for Data Science
- Continue to develop and implement standardized operating procedures for data collection and analysis, common data elements and repositories for the data and metadata
- Promote the use of established repositories for sharing muscular dystrophy -omics data
- Promote transparency and reproducibility through the sharing of experimental methods and code

Priority topic 3: Promote training and career development for research and patient care workforces.

The field of muscular dystrophy research and patient care is evolving, necessitating a well-trained workforce. To meet this demand, it is imperative to advance workforce development initiatives that anticipate future needs. Training and career development programs should continue to expand early engagement, enhance recruitment, and promote comprehensive training to build a robust workforce equipped to tackle the challenges of current and future muscular dystrophy research and patient care.

Early engagement with students and trainees is key to fostering interest and expertise in muscular dystrophy research and patient care. Additional activities are needed to connect undergraduates, medical students and graduate students with PWLE, seasoned researchers and experienced clinicians. These interactions can ignite passion and encourage long-term commitment to the field.

To bridge the gap between basic, translational, and clinical research, it is essential to promote a comprehensive understanding of research principles and practices. Exposing lab researchers to clinical research methodologies and vice versa enhances interdisciplinary collaboration and innovation, ultimately leading to more effective research outcomes. A researcher that focuses on disease mechanisms can more effectively pass on their discoveries or collaborate with a researcher focused on therapy development or clinical studies if they share an understanding of the language and standards of practice in each other's fields. Training programs in the muscular dystrophies should continue to promote this shared understanding.

Rapid advances in AI/ML along with investments in large data repositories increase the need for researchers with expertise in these disciplines and their integration into basic, translational and clinical research teams. Examples of current research include deep learning and other machine learning for the development of diagnostic, prognostic and monitoring biomarkers, drug discovery and development, and developing personalized treatment plans. Implementing AI/ML for muscular dystrophy research and patient care will also require attention to ethical considerations, data privacy/security and a focus on avoiding biases in data sets, algorithms and models. Training, collaborations and coordination with other disease communities are needed to enable the muscular dystrophy community to further leverage powerful AI tools to accelerate research and improve patient care.

Training programs should also help researchers develop skills in community engagement and two-way communications with affected individuals. Effectively communicating scientific topics to PWLE and lay audiences contributes to better understanding of discoveries and appreciation for the pace of research advances, leading to more realistic expectations of affected individuals, willingness to participate in projects and increased support for research. Training programs should continue to focus on equipping researchers with the skills to listen to the concerns of affected individuals, respond to their questions, convey complex scientific concepts in accessible ways, foster public understanding and support for muscular dystrophy research initiatives.

Summary points for Topic 3:

- Create opportunities for students to learn about the muscular dystrophies from PWLE, researchers and clinicians to inform their career directions
- Promote cross training for all researchers in basic, translational and clinical research
- Promote training in AI/ML and collaborations to integrate this expertise into research and clinical care teams

- Promote training of researchers in two-way communications with PWLE to foster public understanding of muscular dystrophy research and promote patient-centered research