

Original Research Article

Advancing Disability Awareness in Medicine: An Interactive Video Learning Module to Promote Disability Competent Care

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Background

In a 2023 press release, the National Institutes of Health identified people with disabilities as a population with health disparities, supported by a plethora of research detailing how individuals with disabilities experience less preventative care and worse health outcomes than those without disabilities. Research into health disparities experienced by persons with disabilities is in its infancy with the majority of literature published after 2010. However, redundant themes contributing to these disparities have already been identified by healthcare providers including both implicit and explicit bias as contributory factors.

Objective

Few, if any, specific educational requirements exist for healthcare providers related to caring for patients with disabilities leading to a lack of knowledge and awareness regarding this patient population. This report describes and evaluates one step to combat health disparities among people with disability through the creation, implementation and evaluation of a virtual asynchronous training module to aid medical students in providing disability competent healthcare.

Methods

An interactive, online video module known as Advancing Disability Awareness in Medicine (ADAM) was developed to deliver critical knowledge relevant to providing equitable healthcare to persons with disabilities. This module includes information on the Americans with Disabilities Act, accommodations, and disability etiquette. The module was made available to first-year medical students as part of their required preparatory work for a clinical learning session where they would interact with persons with disabilities. A pre- and post-module survey, which included a 15-item knowledge test, was administered to all participants.

Results

Thirty-four medical students completed the pre-module survey and thirty-two completed the post-module survey. After completing the module, over 80% of students ($n = 27$) indicated feeling more comfortable for future interactions with a person identifying as having a mobility disability. Scores on the knowledge assessment increased from an average of 66.3% correct (9.94/15, pre-module) to 83.3% (12.50/15, post-module).

Conclusion

The ADAM module is an effective tool to increase student knowledge and comfort when interacting with patients with disabilities, especially those with mobility disabilities. Future iterations will involve distribution of the module to other health professional programs. By advocating for curricular inclusion of student education that combats biases about disability and informs trainees of anti-ableist mindsets, medical schools could make an important contribution to decreasing the health disparities experienced by patients with disabilities as these students develop disability competence and become stronger advocates for their patients with disabilities.

INTRODUCTION

It is estimated that approximately 26% of Americans identify as living with a disability (Varadaraj et al. 2021).

Disability is a highly diverse identity, encompassing a breadth of lived experiences.

A 2019 study of disability prevalence by type reported mobility (13.3%) to be the most common, followed by cognitive or mental (12.1%), independent living (7.2%), hearing

Advocacy Focus and Impact on Health

How does this work impact health? This work highlights the need for awareness of healthcare disparities and bias experienced by persons with disabilities and also prompts a critical response to provide better care for persons with disabilities.

What is the advocacy/action taken? This work advocates for inclusion of educational content in medical education curricula relevant to the care of persons with disabilities, bringing to light skills and knowledge that allow trainees to become better care providers for their patients and advocates for improving the care that all patients receive.

What does this work add to the field? Currently, no formal educational requirements exist for training medical students about how to provide disability competent care, resulting in vast differences in both training received and preparedness to care for this growing population. The developed tool offers an easy to access, interactive educational module that can provide trainees with disability awareness, knowledge, and skills.

Next steps/needed action(s): A crucial next step for change could involve specific educational requirements by national accreditation bodies for disability competent training. Meanwhile, all health professional training programs can integrate this newly developed training module into their curricula as a first step toward achieving health equity for patients with disabilities.

(6.1%), and vision (5.2%) disabilities (Varadaraj et al. 2021). Persons with disabilities (PWD) are now recognized as a disparity population by the National Institutes of Health (National Institutes of Health 2023) and are known to experience barriers to healthcare in metrics of access, quality, and cost (Krahn, Walker, and Correa-De-Araujo 2015; Centers for Disease Control and Prevention 2023; Stransky, Jensen, and Morris 2018). For example, PWDs are less likely to receive screening for various health conditions including but not limited to breast, cervical, lung, and skin cancer (Iezzoni et al. 2021, 2008; Kaundinya et al. 2023). Additionally, PWDs are found to experience higher levels of adverse health outcomes than persons without disabilities including increased rates of cardiovascular disease, diabetes, and being victims of violent crime (Krahn, Walker, and Correa-De-Araujo 2015).

Patients with various disabilities report fear and mistrust in healthcare encounters in addition to challenges obtaining healthcare such as difficulty accessing care and even finding a physician (Stransky, Jensen, and Morris 2018; Steinberg et al. 2006; Wan et al. 2019). While the cause of such disparities is multifactorial, systemic ableism within medicine plays a fundamental role and must be addressed (Valdez and Swenor 2023; Kaundinya and Schroth 2022; Lagu et al. 2022; Iezzoni, Rao, Ressler, et al. 2021). Ableism refers to the belief that certain types of bodies and minds are superior to others wherein the state of “normal” or “abled” is assigned greater value (Kaundinya and Schroth 2022). While ableism may initially stem from an unconscious bias or seemingly harmless thought, it can be observed in situations ranging from inaccessible website design to inappropriate accommodations for learners to lack of wheelchair accessible scales in hospitals to failure to elicit alcohol, tobacco, or sexual histories in PWDs (Lagu et al. 2022; Smith and Meissner 2013; Weber and Recht 2021). Each of these situations can further exacerbate healthcare disparities.

There is a great amount of bias and misinformation among healthcare professionals regarding their knowledge of PWDs (Lagu et al. 2022). Studies have demonstrated that clinicians often believe myths about PWDs including the belief that PWDs have worse quality of life than their nondisabled peers, which is incongruent with PWDs self-

reports (Iezzoni, Rao, Ressler, et al. 2021; Rothwell et al. 1997). Additionally, physicians lack knowledge on the Americans with Disabilities Act (ADA) as 35.8% of surveyed physicians reported knowing little or nothing about their legal responsibilities under the ADA, and 71.2% incorrectly answered a question about who determines the accommodation needs of PWDs (Iezzoni, Rao, Ressler, et al. 2022).

A paucity of training on how to engage clinically with patients living with disabilities may contribute to this bias (Ioerger et al. 2019; Ankam, Bosques, Sauter, et al. 2019). Currently, there are no requirements within national accreditation bodies for training on the provision of disability competent healthcare (Bosques, Ankam, Kasi, et al. 2022). As such, medical schools vary in both the quantity and quality of disability content in their curriculums (Kaundinya and Schroth 2022; Lee et al. 2023; Santoro et al. 2017). While certain medical specialties, such as Physical Medicine and Rehabilitation, undeniably require an increased level of knowledge regarding disability given their patient population, the high prevalence of PWDs within the U.S. should behoove all current and future physicians to learn how best to work with and treat PWD equitably (Varadaraj et al. 2021).

Culturally competent education has been suggested as one method to address disparities in healthcare overall (Brottman et al. 2020; Kripalani et al. 2006; Schilder et al. 2001). Relatedly, specific educational content and strategies can equip existing and future healthcare professionals with tools such as appropriate language or accommodations to help ensure the provision of high quality, equitable care to PWDs while also addressing ableism and bias related to disability (Kaundinya and Schroth 2022; Adams, Schroth, and Kaundinya 2023; National Council on Disability 2022). It is critical not only that such educational content is created, but that we advocate for its inclusion and use within medical education at the national and local level as well as clinical practice. Additionally, the use of a standardized educational approach that is supported by current literature and research helps to ensure “best practices” are taught (Havercamp et al. 2021; Alliance for Disability in Healthcare Education 2019).

This study aimed to create an easy to access, interactive educational module that could provide medical trainees

with knowledge relevant to providing accommodations, such as the use of communication devices or transfer aids, and disability competent medical care to patients (Smeltz, Haverkamp, and Meeks 2024). Secondly, we evaluated the module for its ability to bolster fundamental knowledge on caring for PWDs and increase student comfort in interacting with their patients who have disabilities.

MATERIALS & METHODS

SETTING

The Disability Advocacy Coalition in Medicine (DAC Med) is a national organization of interprofessional healthcare trainees dedicated to combating ableism in medicine (Kaundinya and Adams 2022). Student leadership of DAC Med obtained a grant from the Gold Humanism Society to support the creation of a virtual training module that would present content in an engaging and accessible way.

MODULE DEVELOPMENT

The Advancing Disability Awareness in Medicine (ADAM) module was developed by medical students, medical school faculty, and residents who currently practice in the field of physical medicine and rehabilitation at Northwestern University Feinberg School of Medicine (NU FSM) and Shirley Ryan Ability Lab in Chicago. Video-based modules are known to be effective learning tools in medical education and allow for easy access by many users in a variety of locations (Hurtubise et al. 2013). The ADAM module utilized a video recorded clinical vignette of a PWD and their experience while attending an appointment with their physician. The [ADAM module](#) can be accessed through Northwestern University. Interspersed throughout this video vignette, details relevant to the patient's situation were shared by voiceover and corresponding text slides before returning to the clinical visit vignette.

To identify the most critical content for module inclusion, module developers performed a review of recently published literature and current recommendations including those of a systematically evaluated set of disability competencies for health care education created by the National Council on Disability (Centers for Disease Control and Prevention 2023; National Council on Disability 2022; Alliance for Disability in Healthcare Education 2019; Centers for Disease Control and Prevention 2020; United Spinal Association 2024; ADA.gov US Department and Justice Civil Rights Division 2020). Developers also consulted with multiple persons who identified as having a disability to learn about their experiences in healthcare (Ankam, Bosques, Sauter, et al. 2019). Notably, most of these consultants had a mobility-related disability. The learning objectives for the module are detailed in [Table 1](#). The module "script" was written and reviewed by consultants, module creators, and an instructional design team who coordinated and recorded the module.

The final ADAM module script told a story of an individual who recently moved to a large city and utilizes a

Table 1. Learning Objectives for Advancing Disability Awareness in Medicine Module

Learning Objectives	
1	Define terms used to elicit and communicate disability status
2	Identify tools to effectively and respectfully communicate with people with disabilities
3	Discuss systemic and structural barriers to healthcare experienced by people disabilities
4	Identify resources to improve accessibility

wheelchair. The patient is attempting to find a new primary care physician for themselves and their family. The story unfolds with realistic situations, such as an "out of order" elevator at the subway station that delays the patient's arrival, lack of a wheelchair accessible scale to obtain patient weight, and failure to take a complete patient history including topics on sexual activity or alcohol use. Additional information is provided regarding what the ADA is and how this does and does not apply to specific situations in healthcare (ADA.gov US Department and Justice Civil Rights Division 2020). For example, is a wheelchair accessible restroom legally required by the ADA or who is legally required to provide patient assistance in the instance of transferring to an examination table or changing into a patient gown?

Various types of accommodation are also shown and described, including transfer aids such as a slide board or patient lift (ADA.gov US Department and Justice Civil Rights Division 2020) and communication tools such as large print, pocket talker, or communication boards. Additionally, disability etiquette such as deciding when to use person-first versus identity-first language and speaking to the patient instead of a caregiver or interpreter, are discussed (United Spinal Association 2024; District of Columbia Office of Disability Rights 2006; Agaronnik et al. 2019; Best et al. 2022). A standardized patient who identifies as a quadriplegic and utilizes a power wheelchair fulltime acted as the main character of the module, serving as the medical educator of their own lived experience (Minihan, Bradshaw, Long, et al. 2004). Scenes were recorded within NU FSM Outpatient Simulation Center.

While participating in the ADAM module, students could assess the learning through interactive activities such as multiple-choice, free response, and matching questions related to the content presented. Feedback on correct or incorrect answers followed each self-assessment activity.

MODULE IMPLEMENTATION

Between April and May 2023, the approximately 40-minute ADAM module was made available as required pre-work to all first-year medical students (M1) via a link on their student schedule for a required session during their musculoskeletal (MSK) curricular block. Because the MSK curriculum at NU FSM contains lectures related to disability, including lectures on universal design and adaptive sport,

curricular leaders decided it was a suitable curricular block to deliver the ADAM content. The module was required preparatory work for all M1 students prior to a clinical education session in which students would speak with PWDs and learn about their experiences in healthcare and life (Ankam, Bosques, Sauter, et al. 2019; Minihan, Bradshaw, Long, et al. 2004).

OUTCOME MEASURES AND ANALYSES

All students were asked to complete an anonymous pre- and post-module survey (Supplementary Materials) to assess student baseline knowledge, assess utility in increasing student knowledge and comfort in interacting with persons with disabilities, and obtain feedback on the content included in the module. Part of the pre- and post-module surveys included a 15-item knowledge test to objectively measure student understanding of the ADAM module's content (Supplementary Materials). Additional questions assessed subjective comfort and familiarity with the needs and concerns of PWDs.

RESULTS

PRE-MODULE FINDINGS

A total of 34 students (11 males, 21 females, 2 who preferred not to answer) completed the pre-module survey with the majority (94.1%, $n = 32$) of students reporting being 21-25 years of age and not identifying as disabled (97.1%, $n = 33$) as detailed in [Table 2](#) below.

Many students indicated having had prior experiences interacting with PWDs, including in a medical setting (39.6%, $n = 19$), a non-medical volunteer setting (29.2%, $n = 14$) or with a family member (16.7%, $n = 8$). Importantly, almost half (47.1%, $n = 16$) of student respondents “agreed” or “strongly agreed” that they have interacted with patients who have a disability in a clinical experience, indicating the relevance of the training module to students. When asked about comfort in interacting with individuals with various types of disabilities (physical, communication, intellectual, psychiatric, visual, and auditory), students reported that prior experience with PWDs mitigated some anxiety. Other students commented on a lack of knowledge and experience with various types of disabilities.

Students also spoke about feeling underprepared and fearful of saying or doing the wrong thing. One student commented, “I don’t know that much about those disabilities and would be afraid that I would say or do something to make the patient feel worse about themselves.” On the 15-point multiple choice assessment (Supplementary Materials) to evaluate students’ baseline knowledge of the learning objectives before completing the ADAM module, students scored an average of 9.94/15 points (66.3% correct). Student pre-module scores ranged from 3/15 (20%) to 14/15 (93.3%).

Table 2. Age, Gender, Race, Ethnicity, and Disability Experience Demographic Characteristics of Medical Students Who Participated in Survey

Variable*	Participants (N = 34)
Age, no. (%)	
21-25	32 (94.1)
26-30	2 (5.9)
Gender, no. (%)	
Female	21 (61.8)
Male	11 (32.4)
Prefer not to answer	2 (5.9)
Race, no (%)	
Asian	9 (26.5)
Black or African American	1 (2.9)
Hispanic	3 (8.8)
Multiple	2 (5.9)
White	16 (47.1)
Prefer not to answer	3 (8.8)
Ethnicity, no. (%)	
Hispanic or Latino	4 (11.8)
Not Hispanic or Latino	28 (82.4)
Prefer not to answer	2 (5.9)
Identify as Disabled, no. (%)	
No	33 (97.1)
Yes	1 (2.9)
Previous experiences with PWDs, no. (%)	
Family member	8 (16.7)
Medical Setting	19 (39.6)
Non-medical volunteer	14 (29.2)
Other	2 (4.2)
Identify as disabled	1 (2.1)
None	4 (8.3)

*All variables were self-reported.

POST-MODULE FINDINGS

After completing the ADAM module, students were directed to the anonymous post-module survey which 32 students (94%) completed (Supplementary Materials). There was an increase in correct answers on the 15-point knowledge assessment (average score of 12.50, 83.3% correct) in addition to increases in both the minimum (pre-module: $\min = 3$; post-module: $\min = 7$) and maximum (pre-module: $\max = 14$; post-module: $\max = 15$) score achieved by students. The lowest scoring question in both the pre- and post-module asked students to select examples of identify first language ([Table 3](#), Question 8) and select the themes that contribute to the presence of increased health disparities among PWDs ([Table 3](#), Question 12).

After completing the ADAM module, 84.4% ($n = 27$) of students reported that they felt more comfortable for future

Table 3. Pre- and Post- Test Knowledge Assessment Scores

Question Number: Topic*	Pre-Module % Correct†	Post-Module % Correct
1. Prevalence	91.2	100
2. Definition	61.8	84.4
3. Equitable care of PWDs	85.3	96.9
4. Equitable care of PWDs	85.3	87.5
5. Definition	61.8	84.4
6. Advocacy	85.3	96.9
7. Americans with Disabilities Act	85.3	93.8
8. Disability cultural sensitivity	26.5	50
9. Disability cultural sensitivity	55.9	68.6
10. Disability cultural sensitivity	93.8	96.9
11. Disability cultural sensitivity	79.4	78.1
12. Disparities	2.90	43.8
13. Accommodations	67.6	100
14. Accommodations	35.3	68.8
15. Accommodations	70.6	93.8

* Full questions and correct answers are located in Supplementary Materials

† % Correct indicates percentage of correct responses among participants

interactions with a person who identifies as having a mobility disability. The remaining responses (n=5, 15.6%) indicated that these students felt they had the same level of comfort for these interactions as before completing the module, which may indicate these students had a higher level of comfort before beginning the module. While over half of students indicated they felt that they would be more comfortable in future interactions with individuals who have a visual (56.3%, n = 18) or auditory (56.3%, n = 18) disability, many fewer students felt more comfortable interacting with those who identify as having an intellectual (25.0%, n = 8) or psychiatric (21.9%, n = 7) disability after completing the ADAM module.

DISCUSSION

Our findings suggest the ADAM module is a simple and effective way to deliver important knowledge related to disability etiquette, accommodations, and delivering equitable care to PWDs. Importantly, learners indicated the module was most effective in increasing their comfort for interactions with persons who have a mobility disability, the disability discussed most frequently during the ADAM module. Additionally, there was a quantifiable increase from baseline knowledge on topics of disability etiquette, health disparities among PWDs, and accommodations for PWDs. Questions most commonly answered incorrectly on the

pre-module assessment remained difficult for students in the post-module assessment; however, there was a substantial increase in correct responses (Table 3). Notably, both of these questions required the selection of multiple answers in order to be counted as correct which may have played a role in the difficulty. However, to improve their understanding and subsequent application of the topics, it is also possible students need additional exposure to these topics including differentiation between person first versus identity first language and identification of contributors to the presence of increased health disparities among PWDs.

While the ADAM module featured an individual with a mobility-related disability and its success is encouraging, future iterations of similar video modules should focus on other forms of disability with direct input from individuals who have that particular disability identity. In particular, students indicated limited knowledge and comfort with intellectual and psychiatric disabilities. It also is important to acknowledge that issues related to ableism and bias are not necessarily unique to the disability population as systemically “ignored” groups (PWDs, pediatric patients, patients with potentially stigmatizing illness, patients with image altering conditions) may face similar depersonalization that requires related educational focus and advocacy.

Additionally, while this module was made available to M1 students, the relative dearth of medical education in this area encourages us to consider implementation and utilization of the ADAM module with additional clinic-facing populations including currently practicing physicians. For example, the module was shared with all teaching faculty at NU FSM. The content of the ADAM module is relevant to many roles within healthcare, and we aspire to share this work with other health professional training programs such as nursing, physician assistant, occupational and physical therapy to supplement current training on the provision of disability competent care.

As has been stated, the high prevalence of persons with disabilities within the United States should hasten medical schools and healthcare professional training programs to evaluate how and why such content is or is not currently being taught within their curricula (Varadaraj et al. 2021). A consensus statement of core competencies on disability for health care education was developed by the Alliance for Disability in Health Care Education in partnership with the Ohio Disability and Health Program and published in 2019 (Havercamp et al. 2021; Alliance for Disability in Healthcare Education 2019). These competencies include 1) Contextual and conceptual frameworks on disability; 2) Professionalism and patient-centered care (this includes mitigating ableism, implicit bias against people with disabilities); 3) Legal obligations and responsibilities for caring for patients with disabilities; 4) Teams and systems-based practice; 5) Clinical assessment; and 6) Clinical care over the lifespan and during transitions. It will be critical for national governing bodies of medical education to take steps to evaluate and move towards acceptance of well-developed consensus statements and ultimately require inclusion of disability related content within medical curriculum. Of note, the ADAM module provides content that

aligns with multiple competencies identified by these groups and could serve as a valuable tool to help deliver this material.

Numerous methods for the teaching of disability-related content have been reported with wide variations in adoption and inclusion of such content by individual medical schools (Santoro et al. 2017). A few examples of alternative methods include didactics, use of standardized patients with disabilities, and required time spent in clinics that treat patient populations with disabilities (Santoro et al. 2017; Brown et al. 2010). The value of such experiences cannot be understated, and yet such exposure may not be available to all students due to logistical, financial, or other constraints. However, the ADAM module could be used to deliver such content as a standalone curriculum or as a supplement for students engaging in the aforementioned learning experiences.

Limitations. We acknowledge that while the entire M1 class at NU FSM was required to complete the ADAM module, we only received pre- and post-module survey responses from a proportion of these students. Relatedly, while the ADAM module provides information relevant to many disabilities, given the clinical vignette's focus on an individual with quadriplegia, a substantial proportion of the information shared was more relevant to those with mobility-related disabilities. We infer that this is reflected in students' post-survey responses. Additionally, while we observed increases in subjective student comfort and knowledge of disability-related content after completing the ADAM module, we did not assess if students retained this knowledge over time. Future studies using the ADAM module should include a more detailed follow-up exploration to assess knowledge retention and the module's influence on tangible metrics of patient care for PWDs such as hospital readmission rates, performance of routine screening, and patient satisfaction.

Years of research have recorded quantifiable healthcare inequities experienced by PWDs, finally culminating in the recent recognition of disability as a disparity population by the NIH (National Institutes of Health 2023; Iezzoni et al. 2021). This decision has been long awaited and advocated for by many, and the cause of this delay is likely multifactorial. However, the authors hypothesize systemic ableism serves as a key contributing factor (Kaundinya and Schroth 2022; Swenor 2021). It is critical that medical education responds to this long-awaited acknowledgement and requires disability-related content within medical curricula to combat these health disparities. This has been further emphasized by the National Council on Disability's Framework to End Health Disparities of People with Disabilities, in which one of the five core components is the requirement of disability clinical care curricula in all US medical, nursing, and other healthcare professional schools (Supplementary Materials) (National Council on Disability 2022). Now is the time for increased advocacy—to finally ensure that these changes happen before PWD endure another decade of health disparities.

While the ADAM module does not provide all necessary knowledge for such a curriculum, it does serve as an ef-

ficient and readily available tool to introduce important concepts including effective communication, advocacy, and legal obligations for equitable care of PWDs as indicated by improvements in post module knowledge assessments (Table 3). Additionally, the ADAM module is a simple tool created in a way that allows for broad implementation and use within other health professional training programs and schools throughout the country.

It is crucial for medical students, as future physicians responsible for caring for the aging population of the United States, are well-trained, comfortable, and confident in their ability to provide disability competent care. This module, by nature of its ease of use and availability, serves as a great starting point for inclusion within medical curricula as we continue to work towards the provision of equitable health-care for PWDs and elimination of health disparities.

While we wait for formal disability competent care curricula to be required by accreditation bodies, the creation of the ADAM module is an exemplary model of how medical students advocate for their patients and themselves.

ABBREVIATIONS

ADAM, Advancing Disability Awareness in Medicine; PWD, persons with disabilities; ADA, Americans with Disabilities Act; NU FSM Northwestern University Feinberg School of Medicine; M1, 1st year medical student; MSK, musculoskeletal

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OTHER DISCLOSURES

None reported.

ETHICS APPROVAL

The Northwestern University IRB reviewed this project and determined it to be of no or minimal risk to study participants and exempt from most requirements of the Federal Policy for the Protection of Human Subjects (STU00210378).

PREVIOUS PRESENTATIONS

Portions of these findings were presented at the Northwestern University Feinberg's Academy of Medical Educators (FAME) Medical Education Day, September 27, 2023 in Chicago, IL, and at the American Association of Medical Colleges annual Learn Serve Lead meeting, October 3-7, 2023, in Seattle, WA.

AUTHOR CONTRIBUTIONS

TK, EJA, RA identified the need and developed the conceptual framework for the project; SLS, TK, EJA, RA assessed current literature and identified content necessary for in-

clusion in the module; JM, CL, AK, LR reviewed content and provided edits and suggestions to conceptual framework; SLS, TK, EJA, JM, CL, JB, AK, LR drafted, reviewed, and edited the module script; SLS, TK, EJA, CL, JB, AK, LR recorded, edited, provided feedback, and prepared modules for use; SLS, TK, EJA, JM, CL developed the pre- and post-module survey; SLS, TK, EJA analyzed and interpreted survey results; SLS drafted the manuscript and designed all figures; all authors reviewed the final manuscript for publication.



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SUPPLEMENTARY MATERIALS

Supplementary Materials

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