

NeuroArts Blueprint

Neuroarts Today: The State of an Emerging Field



Key Themes

To consider how best to propel the field of neuroarts forward, it is essential to understand where it stands now. *Neuroarts Today: The State of an Emerging Field* is a point-in-time snapshot that provides that context by documenting the nature and degree of the work under way across many disciplines and sectors in the United States and around the globe.

Neuroarts is the study of how aesthetic experiences and the arts measurably change the brain and body and how this knowledge is translated into practices that advance health and well-being. Affordable, accessible, and immediate, neuroarts promises new opportunities to tackle seemingly intractable societal challenges and nurture the fundamental human capacity to heal and thrive.

Despite the vast and diverse efforts under way in this arena, neither the term “neuroarts” nor the more formal word “neuroaesthetics” have become commonplace. We have chosen to use “neuroarts” here as an important step toward standardizing the field.

The absence of consistent terminology complicates any attempt to provide an overview of the field, but in no way reflects a dearth of interest or lack of productivity. Relevant scholarship has emerged in the disciplines of neuroscience and neurology, education and psychology, medicine and social science, allied health and complementary medicine, pediatrics and gerontology, and elsewhere. Arts-related practices surface in fields as varied as creative arts therapy, arts in health, psychophysiology, affective neuroscience, psychotherapy, rehabilitation science, social work, and community development.

Neuroarts is everywhere—yet nowhere. There is a ferment of activity and vigorous growth in the field, but knowledge, practice, education, policy, and financing are deeply fragmented.

Yet for all the diffusion, there is common cause here—countless academics and clinicians, artists and arts practitioners, community leaders and public policymakers, philanthropists and corporate executives agree on the need to deepen their understanding of the biological mechanism of neuroarts. Regardless of what they call it, they share the goal of applying this knowledge on behalf of human health and well-being.

Neuroarts Today offers a macro-level view of this interdisciplinary field, capturing its evolution in recent years, its current parameters, and its key flex points. Not intended as a systematic or scoping review, it is a status report that includes a mix of data and exemplars to suggest the scale and nature of the many activities that are building knowledge and advancing practice. It is based on findings from extensive

online database searches, reviews of seminal reports and other published analyses, expert interviews, and stakeholder convenings.

The overview presented here captures some of the key themes that have emerged. The bottom line is clear: the intersection of science, technology, and art holds enormous potential to transform health and well-being. But opportunities are being lost because the various strands of the field have not yet been woven into a cohesive whole. By laying out the current status of pathbreaking science, novel technology, innovative practices, and the funding and policy infrastructure, we can begin to design a road map forward.

Research

With evolving technology, the past five years have been an especially ripe time for neuroarts research across many disciplines. Extensive research is available at the molecular level, where perception, neurocognition, the default mode network, and mechanisms of the sensory, stress response, and reward systems are under investigation. Disease-specific work examines mental health issues—such as depression, anxiety, and trauma—and physical health challenges, such as Parkinson’s disease, dementia, mobility limitations, pain, and other chronic symptoms. The relationship of specific arts modalities, such as music, dance, poetry, drama, painting, and crafts, to health is also a rich field of study, as are efforts to understand the role of arts in prevention, quality of life, and community well-being.

The extent of the published research is highlighted by the findings of the [World Health Organization and Health Evidence Network \(HEN\)](#) report (Fancourt & Finn n.d.), which assessed the global academic literature on arts and health in both English and Russian. The synthesis includes more than 900 publications, covering more than 3,000 studies contained in 200-plus reviews, systematic reviews, meta-analyses, and meta-syntheses, as well as an additional 700 individual studies.

An extensive body of neuroarts scholarship has been published, yet researchers in different disciplines rarely have the opportunity to share knowledge. The result is unnecessary duplication, gaps, and barriers to building on what has already been learned.

Here are some key observations on neuroarts research:

The terminology to describe neuroarts-related research is not standardized and the boundaries of the science have not been established. “Neuroaesthetics,” “empirical aesthetics,” “arts therapy,” and “arts in health” are four commonly used terms, an inconsistency that clouds efforts to assess the scope of relevant work.

The disciplines of education and psychology appear prominently in the published literature, regardless of the neuroarts search term with which they are paired. Searches of “neuroaesthetics” and “empirical aesthetics” in online databases also uncover a heavy emphasis on molecular-level mechanisms (neuroscience and neurology are both prominent disciplines among the results) while searches of “arts therapy” and “arts in health” also return online records in nursing and other practice-oriented areas of translational and clinical research.

Mental health is a major research focus. When terms that reflect various dimensions of the health sector (e.g., “mental health,” “physical health,” “public health,” “disease”) are paired with practice-oriented terminology (e.g., “art therapy” and “arts in health”), “mental health” returns the most online records. “Mental health” is less dominant in the basic science arena represented by neuroaesthetics and empirical aesthetics. When paired with the search term “arts,” “anxiety,” and “depression” produce the most research results (Figure 1).

A search for the association between health and the six most widely studied arts modalities returns more than two million online records. The most significant associations are with music, dance, and poetry (Figure 2).

Music emerges as one of the primary arts modalities under study, whether the search terms are broad or narrow. Whether searching various art modalities and health (e.g., “arts and music,” “arts and dance”), specific health conditions (e.g., “anxiety”), or the broader category of prevention, music typically returns the highest number of online records.

Research targets many subgroups. A search of demographic terms helps to identify the populations most often associated with studies of arts and health. Children emerge by far as the most frequent research target, followed in decreasing order by women, the military, minorities, adolescents, and the elderly (Figure 3). Interestingly, the research emphasis on children isn’t associated with more high-profile practice interventions. By contrast, while there is less research on the elderly population, there is a great deal of practice activity around neurodegeneration and healthy aging.

The heterogeneity in how interventions are designed and outcomes measured complicates analyses of evidence. The lack of consistency in methodological approach and evaluation standards, and the sometimes unreliable quality of the analyses, can cloud the ability to compare research results and build on findings. An example is pain, which is measured in so many different ways that the outcomes of a given intervention are likely to be inconsistent.

“Complementary medicine” is a favored term for research on nontraditional clinical practices. The most common term used to study the links between art and healing approaches that are not generally considered part of mainstream practice is “complementary medicine,” very closely followed

RESEARCH INQUIRIES ASSOCIATED WITH "ARTS"

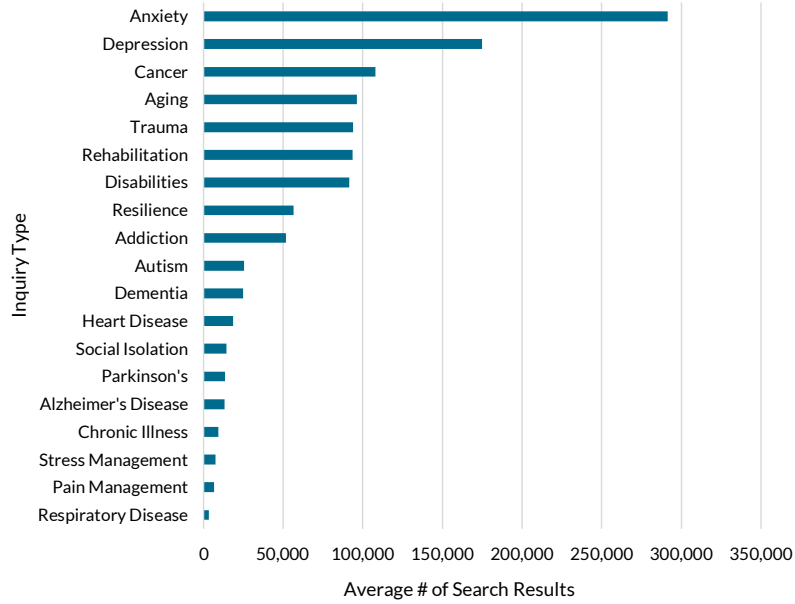


Figure 1 Source: Database searches conducted by the NeuroArts Blueprint initiative staff.

ART MODALITIES MOST ASSOCIATED WITH HEALTH (BASED ON AVERAGE # OF SEARCH RESULTS)

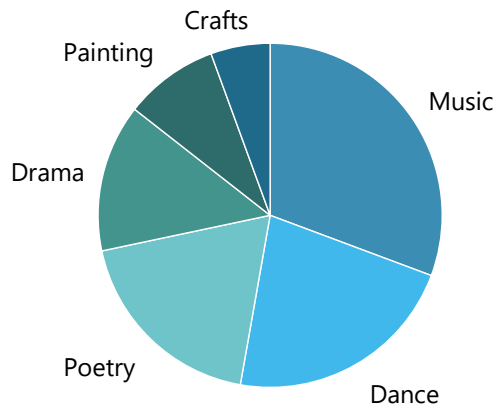


Figure 2 Source: Database searches conducted by the NeuroArts Blueprint initiative staff.

POPULATIONS ASSOCIATED WITH STUDIES OF "ARTS" AND "HEALTH"

(BASED ON AVERAGE # OF SEARCH RESULTS)

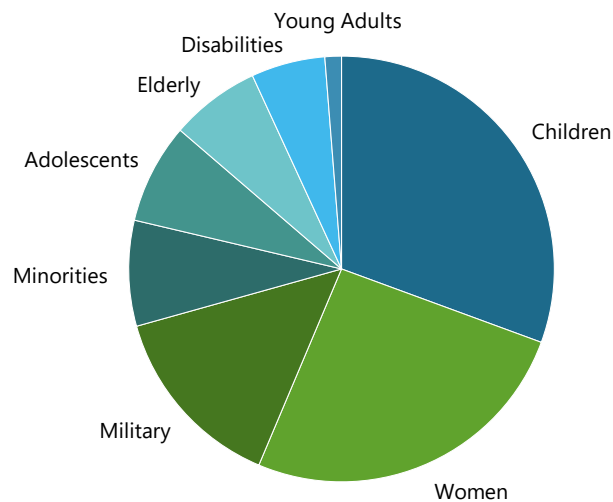


Figure 3 Source: Database searches conducted by the NeuroArts Blueprint initiative staff.

by “allied health.” “Integrative health” and “complementary health” appear much less frequently in the literature.

Findings are not systematically shared across research or practice disciplines. Despite the tremendous vibrancy in the field, opportunities to learn from others and build on what has already been done are getting lost. Professional associations and journals have limited cross-disciplinary reach, and other potential opportunities for sharing are not well developed. The result: a great deal of knowledge but little convergence, both within and across basic science and practice-oriented research.

Researchers and practitioners sometimes seem to operate in parallel universes. Basic scientists may study the mechanisms by which the arts are perceived or executed in the brain, but they often don’t consider the implications for individual health. Arts practitioners may have an intuitive sense of their work’s impact on well-being but no quantitative or mechanistic knowledge of what is actually happening.

The traditional hierarchies in which research operates don’t provide the structures needed for team scientists and arts practitioners. The neuroarts field as it currently stands is not aligned with

the incentives most valued in an academic setting, such as publications, funding, promotions, and awards. Practical challenges relating to research and publication norms are also barriers to putting arts practitioners on an equal footing with other researchers. Power dynamics further complicate these relationships, as do tensions around whose approach to inquiry can be considered most valid.

Despite the absence of a strong ecosystem to reduce fragmentation, there are many encouraging exemplars of collaboration. Models of cross-sector partnerships are emerging that bring together, in various combinations and in a variety of settings, researchers, clinicians, artists, industry, cultural arts and community organizations, and the public sector. For example, the [Interagency Task Force on the Arts and Human Development](#), convened by the National Endowment for the Arts (NEA), brings together multiple federal agencies to catalyze arts and health research and encourage knowledge sharing. Participants include the US Department of Health and Human Services, the National Institutes of Health (NIH), the National Science Foundation, and the US Department of Education.

Active community involvement is a powerful tool to advance research, but its role in neuroarts research has not yet been fully defined. As one study in [Health Expectations](#) observed, “Community engagement is increasingly recognized as a valuable tool in clinical and translational research; however, the impact of engagement is not fully understood. No standard nomenclature yet exists to clearly define how research changes when community stakeholders are engaged across the research spectrum” (Stallings SC et al. 2019).

Practice

Long before imaging technology and biomarkers were widely available, the use of the arts to generate health and well-being was primarily the provenance of disparate, but dedicated, practitioners. Now that scientists have scans and data to document what happens in the brain and body, new opportunities are emerging for partnerships that can propel innovative programs, interventions, and problem-solving approaches. These are bidirectional relationships, with practitioners eager to use science to inform their interventions and researchers gaining insights from the field to create new knowledge.

The many forms of art practice take place across an array of settings, engage practitioners with different kinds of training and background, and serve a wide range of populations. Whether these interventions are offered in the clinic or the community, they are evaluated with varying degrees of rigor, or none at all, and if the results are published they tend to appear in discipline-specific journals that seldom reach beyond narrowly targeted audiences.

A dominant finding, then, is that neuroarts practices are often fragmented and rarely standardized—

formidable barriers to taking full advantage of their potential. At the same time, a ferment of activity and myriad exemplars point to a broad and diverse scope of work that is advancing this evidence-based field.

There is more anecdotal information about how neuroarts is practiced than data documenting the optimal dose and duration of arts as a health intervention. But arts practitioners play a pivotal role in the field, translating new knowledge into on-the-ground treatments and drawing on experience to demonstrate what works.

Here are some key observations on neuroarts practice:

Many kinds of practitioners use art modalities in their work. Practitioners of neuroarts hold degrees and certifications in varied fields, including arts, arts in health, creative arts therapy, social work, counseling, psychology, psychiatry, neurology, physical therapy, recreational therapy, occupational therapy, public health, neuroaesthetics, kinesiology, psychobiology, and rehabilitation sciences. Some use art as their primary therapeutic tool; others draw on it as one among many resources available to them.

Art is used to cultivate health and well-being in many settings. Those include health-care institutions, community centers, recreational facilities, assisted living and nursing home facilities, schools, educational and cultural organizations, and workplaces. The National Coalition of Creative Arts Therapies Associations alone lists 18 different types of settings in which those practitioners work (NCCATA n.d.) (Figure 4).

Exemplary practices are everywhere. While counting the number of programs that put neuroarts into practice is impossible, the breadth of the field is suggested by the many categories into which those activities can be sorted—by setting, populations served, geographic locations, institutional home, disciplines involved, professionals engaged, and participating partners, among others. Grassroots programs percolate up from local communities, top-down initiatives are being developed with national and international support, and along that continuum lie numerous other examples of regional and state-level initiatives.

A dynamic ecosystem of organizations and associations supports neuroarts practice. Some professional associations—such as the National Organization for Arts and Health and the Art Therapy Alliance—are exclusively dedicated to showcasing the links between art and health. Other organizations with much broader health-related missions—such as the American Medical Association and the American Psychological Association—have dedicated divisions or staff particularly interested in the role of arts and health as it relates to their constituents. Similarly, the Academy of Neuroscience

ART CULTIVATES HEALTH AND WELL-BEING IN MANY SETTINGS

Adult day treatment centers	Hospices
Community mental health centers	Neonatal nurseries
Community residences and halfway houses	Nursing homes
Correctional and forensic facilities	Outpatient clinics
Disaster relief centers	Psychiatric units and hospitals
Drug and alcohol programs	Rehabilitative facilities
Early intervention programs	Senior centers
General hospitals	Schools
Home health agencies	Wellness centers

Figure 4 Source: [The National Coalition of Creative Arts Therapies Associations](#).

and Architecture is dedicated to expanding knowledge of how the built environment can be designed to promote physical and mental health. And other partners without a clinical mission—such as the American Alliance of Museums and the National Education Association—increasingly see health and well-being as part of their work.

The siloed nature of practice disciplines diminishes the opportunity for cross-fertilization and shared learning. Many of the journals that cover neuroarts practice are modality- or discipline-specific and attract very different audiences (e.g., *Drama Therapy Review* and *Creative Arts in Education Therapy*). Likewise, many associations with broader missions (e.g., the American Psychological Association and the American Public Health Association) have professional journals that occasionally dedicate special sections to neuroarts-related topics. Without the connective tissue of interdisciplinary conversations and convenings, there are few opportunities to share these resources.

The roles and responsibilities of practitioners across disciplines are not well described. No clear guidelines have been established to link specific forms of practice to specific interventions and settings—that is, we don't always know when or why creative arts therapy or psychiatry, social work, or occupational therapy might work best. In some circumstances, practice disciplines may be interchangeable as therapeutic pathways while in others discrete training is essential. Without a

consensus understanding of who should be engaged and when, there is a risk that the level of practice expertise may be mismatched to the purpose.

Art practitioners as a group lack racial, ethnic, and gender diversity, echoing a pattern that is also seen in research. For example, as of 2016 almost 88 percent of respondents to a membership survey by the American Art Therapy Association were white, and 93 percent were female.

No consensus exists on how best to measure the evidence that supports practice. Well-defined goals and outcome measures are lacking for many practices, making it difficult to determine their value. In part, this reflects the limits of standard measurement tools and somewhat narrow views of what “counts.” While randomized controlled trials and other quantitative approaches help to translate information to certain audiences, they are not the only way to establish a scientific foundation for neuroarts. Storytelling, narratives, and other qualitative approaches are other “ways of knowing” that can broaden the body of knowledge.

Practitioners are rarely trained in the science of how art influences the brain or body. While they often have direct experience with the ways in which art can promote health and well-being, the underlying neurobiology has rarely been included in their curricula. Many practitioners hunger for that information, seeing it as both a way to strengthen their own practices and as a tool for articulating the power of art with funders and other institutions. But there is a countervailing perspective, with some practitioners resistant to a framework that suggests art only has value when the scientific mechanisms can be delineated.

The scientific world is not structured to appreciate the contribution of arts practitioners to the neuroarts field. Differing training, techniques, and goals create a chasm between research and practice. As more interdisciplinary programs emerge, however, the sharply defined boundaries of traditional academic frameworks may begin to soften.

Practitioners sometimes feel overshadowed by researchers. Practice has been something of a stepchild to science, which generally has more funding and greater prominence. The low pay in professions that use neuroarts in their practices—the annual salary for art therapists averages between \$45,000 and \$65,000—suggests a hierarchy that disadvantages practitioners.

A tension exists between the need for uniformity in practice and the risk of building exclusionary barriers. While stakeholders across disciplines need to speak a common language in order to understand one another, too much standardization has historically limited the conversation and excluded some of those with insights and experience to offer. Where language has not been sufficiently broad, some stakeholders feel that they have had to fight their way into conversations or have never become part of them.

Practitioners often have the trust of a community that researchers lack. Many historically disenfranchised communities have a sense that researchers have long extracted knowledge or resources and then departed to publish their papers without leaving anything of value behind. Practitioners often have deeper ties to communities and different professional motivations, which may put them in a better position to collect data at the same time they provide clinical services.

Financial Resources and Policy

Funding and policies are essential to institutionalize a field—that is, to ensure that neuroarts research and practice are not scattershot efforts by individual scientists, artists, and clinicians but rather reflect well-resourced strategies that can be applied more broadly. For purposes of this overview, we define “policy” as public sector regulations, legislation, and programmatic decisions and private sector actions that advance or deter the evolution of neuroarts.

In the United States, neuroarts research and practice activities tend to be funded piecemeal, with public dollars from local, state, and federal sources and with private funds from philanthropies, health-care institutions, and academic research centers. Insurance mechanisms also cover some of the therapeutic dimensions of neuroarts. Globally, some systematic models of government-driven efforts marry arts and health through policies, partnerships, and funding, although the level of commitment varies.

Significant financial commitments to brain science have made neuroarts ripe for development, but arts-related health research and practice has not become a funding or policy priority in the United States. That work is more robust in other countries.

Some key observations on financial resources and policy are as follows:

Funding for basic science in the United States has been an essential driver of neuroarts. With a 2019 budget of \$424 million, the BRAIN Initiative (Brain Research through Advancing Innovative Neurotechnologies) is a massive public-private effort to accelerate neuroscience research.

Other federal investments in basic and translational biomedical and behavioral research and new technologies have added to the storehouse of knowledge that is elevating neuroarts.

The vast basic science investments in the United States that have been so essential to neuroarts have not been accompanied by supportive policies. To the extent that policy conversations about neuroarts occur at all, they typically take place in a scattered fashion. The value proposition of the arts

to American society remains underrecognized, hobbled in part by the lack of return-on-investment data or a compelling economic model. Funding gaps outside basic science, as well as policy gaps, also reflect the absence of a clearly articulated narrative about the power of art to promote health and well-being and the limited dissemination of persuasive and accessible scientific information.

More attention is paid at the global level to developing a funding and policy landscape for neuroarts. In some countries, a national commitment to population-level health strategies and the differing financial incentives that accompany public systems of health care lift up policies that support neuroarts. The World Health Organization is a leading advocate here, recommending that nations incorporate arts interventions in budget priorities, research, and education.

Social prescribing is gaining momentum as a strategy for health-care workers to link patients with arts activities. The United Kingdom and Canada are especially committed to this pioneering approach, which involves referrals to nonmedical resources that help to address health and well-being challenges.

The majority of US public funding for research relevant to arts and health comes from the National Institutes of Health and the National Endowment for the Arts. Augmenting its foundational brain research, music is the dominant modality the NIH has studied, both in terms of dedicated dollar amounts and the number of projects funded (Figure 5). The Sound Health initiative, a partnership between NIH and the John F. Kennedy Center for the Performing Arts, in association with the NEA, is one groundbreaking exemplar, dedicated to expanding knowledge of how music can harness the brain's intricate circuitry to advance health and wellness and to treat neurological disorders.

The [NEA Research Labs](#) provides grants to interdisciplinary academic teams across the country to support research into a wide range of issues related to arts, health, and neuroscience (National Endowment for the Arts [n.d.a.]). These awards are generally sorted into two broad topic areas: “arts, health, and social/emotional well-being” and the “arts, creativity, cognition and learning.” Additional funding opportunities are available through the NEA's [Research Grants in the Arts](#) program, which supports investigation into the value and impact of the arts (National Endowment for the Arts [n.d.b]).

Private funding can push forward research and practice. A growing pool of private dollars is being invested in biomedical research labs, providing an increasingly robust alternative to federal funding. Notably, some of these investments are being directed at innovative or high-risk research that may be able to seed later partnerships with public sources.

Payment models for practitioners are inconsistent. Some practitioners, notably creative arts therapists, have been able to secure reimbursement through Medicare, the Affordable Care Act (ACA), or other insurance mechanisms. The ACA's emphasis on mental health, which is one of the 10 “essential health benefits” that must be covered by certified health plans, also provides a framework

FEDERAL FUNDING FOR ART MODALITIES AND HEALTH RESEARCH

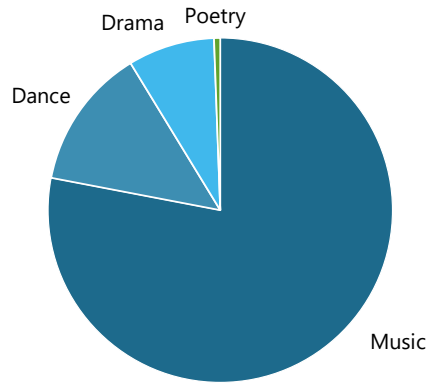


Figure 5 Source: Database searches conducted by the NeuroArts Blueprint initiative staff.

within which to reimburse for arts therapies that are effective in treating conditions such as posttraumatic stress disorder (PTSD). Many other arts practitioners, however, depend on private pay, grants, or philanthropic gifts to their institutions, sources that are tenuous and sometimes irregular.

Systematic public or private sector approaches to using the arts as a component of clinical interventions are limited. While there are many individual neuroarts-related programs and practices within health-care settings, the absence of broad-based institutional commitments or a coherent policy framework keeps them siloed. The National Center for Complementary and Integrative Health, a center within the NIH, is one place that has structural capacity to advance a more cohesive approach.

The trend toward patient-centered care is positioned to be a major driver of neuroarts policy. The Institute of Medicine defines “patient-centered care” as “providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions” and includes patient-centered care as one of six domains of health-care quality. The ACA’s reimbursement framework, as well as patient preferences, also creates incentives to use art as a tool to humanize health services.

Policies have tended to be crafted on the basis of readily measurable clinical outcomes rather than through the less-precise lens of well-being. The use of crisply defined clinical criteria to evaluate impact and promote scaling reflects existing norms and the reality that they are easier to

measure. But as equity, community inclusion, racial justice, and social determinants of health rise as societal priorities, a more holistic view of what allows people to flourish may shift the approach.

The evidence for the social and economic benefits of neuroarts has not been well explored.

Measures of how art can influence the social determinants of health are poorly developed, and there is no consensus about the potential cost savings involved. Measures of art as a job creator are also lacking. Thinking more broadly about return on investment—not as something that can be measured in a one-to-one equation (i.e., invest x, recoup y), but rather put in the context of broader individual, institutional, and societal goals—may strengthen interest in arts-related policies and resource allocations.

Social isolation, a growing American challenge with significant health consequences, is ripe for policy solutions. The hunger for community and a deeper sense of connection that is palpable in the United States is a potential springboard for policies designed to integrate arts more fully in health-care systems, schools, neighborhoods, workplaces, and elsewhere. Arts are also a tool for building cultural understanding at a divisive time.

Structures and strategies for bringing more attention to the social determinants of health are already in place. Public sector initiatives within the Centers for Disease Control and Prevention and the Medicare and Medicaid Innovation Center, hospital mandates to provide community benefits, philanthropic commitments, and insurance reimbursement structures all provide mechanisms that encourage health-related approaches that go beyond traditional medical care.

The arts as a tool to promote health and well-being have penetrated numerous community settings. As suggested in the practice section, the arts are being used not only to treat specific physical and mental health challenges outside clinic settings, but also to further health literacy, press for equity, foster resilience, and address trauma. For example, Creative Forces, an initiative of the National Endowment for the Arts in partnership with the US Departments of Defense and Veterans Affairs, places creative arts therapists in clinical settings to promote health and wellness for military service members, veterans, and their families. That initiative and many other community-based activities offer baseline insights that can inform broader policies.

The use of art is gaining traction in the workplace. Although there is no central repository of information about art in public sector organizations or private companies, anecdotal information suggests that a number of projects are primed to scale. For example, hospitals have been developing art projects to combat physician burnout, and Walmart has designed a Community Mural Program that is engaging artists in some 1,000 communities to create murals to hang in local stores. Workplace policies are positioned to advance the field.

Conclusion

Whether considering research, practice, funding, or policy, this state-of-the-field overview reveals neuroarts as a highly decentralized enterprise, abundant in informal programs but lacking systems to formalize the work. Inconsistencies in vocabulary and research standards abound, and there is little in the way of shared professional development strategies or avenues for communication among stakeholders. Moreover, the United States lags its global counterparts in making a commitment to neuroarts.

Yet with research increasingly providing rigorous evidence for the benefits of art, powerful synergies are possible. Indeed, they are evident in significant numbers of arts, health, and well-being programs. Institutional commitments and culture change are necessary to give the field of neuroarts a center of gravity that can bring it into wider use and take full advantage of its capacity for transformation.

The institutional conventions of academic science, the norms of clinical medicine, the intuition of artists, and the public's thirst for health and wellness are often out of sync. Developing and funding formal science-based pathways to foster health and well-being through arts practices would be a transformative step.

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