

**GARY A. CHRISTENSON**  
University of Minnesota

# Conceptualizing the arts as tools for medicine and public health

## ABSTRACT

*The arts are often neglected in the context of modern medicine. However, they offer opportunities for greater patient understanding, improved patient comfort and treatment results, and enhanced clinical skills, personal enrichment, and resilience in medical practitioners. The application of the arts to medicine can be categorized into five main categories: medical education, prescriptive options, improved patient experience, public health and care for medical personnel.*

## KEYWORDS

arts and health  
arts and healthcare  
arts and medicine  
arts and public health  
healthcare  
environment  
medical education  
patient experience

## INTRODUCTION

During most of the twentieth century the field of medicine can be conceptualized as having been primarily one dimensional with a focus on the patient as a physical entity characterized by mechanical, physiological and biochemical processes paired with pharmaceutical, surgical, and increasingly, technologically treatment options to address illness. Even the field of psychiatry drifted ever more towards the medical model such that a ‘biopsychosocial model’ (Engel 1977) was eventually proposed so as not to ignore the influence of both psychological processes and social influences on an individual’s mental health. The more recent holistic health movement represents a further swing of the pendulum back towards a historical model that recognizes the patient

as more than a machine and includes the additional emphasis on the patient's spiritual beliefs and experiences. Creativity, which would include artistic sense and capability, has often been ignored or considered a mere subset of the psychological dimension. Yet, creative and artistic thought and behaviour permeates nearly every aspect of most people's lives when design, fashion, music preferences, dance, narration and craft activities are considered, not to mention when the fine arts are pursued as hobbies or professions. To be truly holistic, medicine must both recognize and leverage this creative and artistic dimension. The opportunities to do so can be categorized into five major areas: medical education, prescriptive treatments, healing environments, public health and healthcare provider well-being.

### **THE ARTS CAN MAKE MEDICAL AND NURSING STUDENTS BETTER CLINICIANS**

The application of the arts to medical education emerged when the first medical illustrations were drawn on papyrus in Hellenistic Alexandria as early as the late fourth or early third century BC (Branigan 1995). Modern illustrators such as Frank Netter have become celebrated for their medical artwork. Books such as *Netter's Concise Neuroanatomy* even acknowledge the artist's contribution in their title (Rubin and Safdieh 2007). Interactive illustrations, in the form of colouring books for doctors and nurses, have been available for decades to assist aspiring clinicians to master the memorization of complex anatomical and physiological terms and relationships (Diamond and Scheibel 1985). Photography has been employed as a tool for recording medical imagery beginning in the 1840s; although initially applied to imagery viewed under the microscope, it was quickly adapted to record abnormal medical findings of patients (Tobin 2006). Such photos, still prevalent in medical textbooks today, rarely portray the subject as more than their pathology. Recently, photographic imagery is being used to capture more personal dimensions in those afflicted with medical conditions. For example, the fashion photographer Richard Guidotti founded Positive Exposure, an organization centred on photographing children and adults with genetically derived medical abnormalities (Hu 2011; Peota 2008). Although his original aim was not medical education, these photographs have provided more humanistic and empathetic imagery useful for medical education while also providing the participants of photo shoots an opportunity for improved self-esteem. Photography and other arts forms also provide opportunities for patients to educate their healthcare providers about experiences that are otherwise challenging to describe. A prime example is the clinical vignette of a patient who brought a copy of Tommy Pavletic's photograph *Woman Floating under Water in White Gown* to her appointment as it visually captured the feelings of dissociation that she had been having trouble putting into words (Oliveira and Oliveira 2013). A young patient's drawing of a doctor facing away from her in order to use an electronic medical record is revealing in how technology can change the doctor patient dynamic (Toll 2012).

The arts can be employed to improve clinical skills. Researchers at Harvard conducted a randomized prospective controlled study in which medical students received formal instruction in visual thinking strategies, an arts observation skills technique, in addition to their usual medical didactics. The control group of students received only the standard medical instruction. Following eight sessions, those students who were trained in visual thinking

strategies performed better on a test of observation involving both art and clinical images (Naghshineh et al. 2008). A study involving medical students trained to observe art at the Yale Center for British Art revealed greater achieved ability to make observations of photographs of patients with medical disorders compared to two comparison groups (Dolev et al. 2001). Another study demonstrated that training nursing students in music appreciation improved their ability to listen to, and interpret heart, lung and bowel sounds (Pellico 2011).

Literature provides another avenue for medical trainees to appreciate medical experiences from the perspectives of patients, physicians, family and different cultures. Medical humanities programmes are increasingly becoming part of the formal medical school curricula and typically employ discussions around story and film. One approach to medical humanities, 'narrative medicine', aims to return the patient story, along with its unique personal and psychological aspects, to the centre of the provider-patient relationship (Charon 2001; Greenhalgh and Hurwitz 1999). A unique application of medical humanities is 'Hippocrates Café', a programme established by primary care physician Jon Hallberg, which employs non-fictional and fictional literature read by professional actors along with musical selections performed by professional musicians to illustrate various dimensions of medical conditions such as influenza, leprosy and eating disorders (Ledger 2010). These performances have been variously offered to medical students, physicians and the public.

Theatre has also been used by the University of Minnesota medical school to illustrate ethical issues related to human medical experimentation. For seven consecutive years all first-year medical students heard a reading by professional actors of physician David Feldshuh's play, *Ms. Evers Boys* (1998), which dramatizes the Tuskegee syphilis experiments conducted on African American men between 1932 and 1972. Other humanities based programmes feature more active participation. For example, the Mayo Clinic in Rochester, Minnesota has partnered with the Guthrie Theater in Minneapolis to develop a theatre course for medical students; acting techniques are used as tools to better understand patients and tell their stories (Hammer et al. 2011).

Technology has also provided intriguing opportunities for medical education. Taking a lead from video games, a new genre of 'serious games' has emerged in which computer interactions allow students and clinicians to learn new procedures in a virtual environment before they apply these skills to actual patients (Graafland et al. 2012).

The arts also provide unique ways for medical students to explore and express emotions related to their medical education. Cadaveric dissection can be particularly challenging. Sandra Bertman developed 'One Breath Apart: Facing Dissection', a course for first-year medical students that uses the arts to explore this experience. Photos, drawings, paintings, and essays are created by students to reflect their thoughts and feelings associated with dissection (Bertman 2009).

Medical education is a lifelong commitment for physicians so it is not surprising that the arts have also been used to educate practicing doctors. When the possible threat of bioterrorism required clinicians to reacquaint themselves with smallpox, a team of physicians wrote and produced *Smallpox: the Musical* rather than use more typical didactics (Maas 2004). Another example of the application of theatre to physician audiences is a play based on the narrative of patients dealing with prostate cancer. Following the performance, clinician attendees reported additional awareness and/or understanding about

issues facing prostate cancer patients, increased empathy, as well as plans to alter their practice to better accommodate the needs of these patients (Gray et al. 2003).

Principles embraced by magicians have recently been proposed as being instructive for teaching medical students about good and bad communication techniques. Magicians regularly employ distraction techniques. Through awareness of their own unintentional distracting gestures and speech, physicians can improve their ability to deliver direct comprehensible information and instructions to patients (Baum and Dooley 2012). In other settings, distraction can be a useful tool, particularly when working with fearful and anxious paediatric patients. Instruction in simple magic tricks in the exam room, hospital or procedural room provides clinicians with another tool for patient engagement and can also be used to illustrate medical concepts through visual metaphors (Reynolds 2010).

'Bodystorming' is a collaborative effort of the University of Minnesota's bioengineering and dance departments. Dancers are instructed on the properties of molecules and then allowed to interact with each other as scientists record their observations. The technique allows for a first text of hypotheses that otherwise would involve complex computer simulations (Flink and Odde 2012).

## **THE ARTS HAVE THERAPEUTIC EFFECTS**

Clinicians are primarily educated about those diagnostic and treatment approaches that they will directly use in treating patients. Less instruction is provided regarding useful ancillary prescriptive and referral services such as nutritional counselling, physical therapy and occupational therapy. Even less exposure is given to arts-based healing approaches such as art therapy, music therapy, dance and movement therapy, and expressive arts therapy. Yet all of these arts-based approaches have a significant literature base, formal degree programmes and professional organizations. Each arose from the recognition that the arts provide an additional manner of expression and therefore an opportunity for psychological exploration and communication. All employ interactive arts-based techniques for psychological healing and, more recently, physical improvement as well. Perhaps one of the best examples of the latter is the use of dance to improve balance and gait in patients diagnosed with Parkinson's disease (Earhart 2009). Research is further refining whether specific dances are more beneficial than others for this disease. One study demonstrated that tango was superior to the foxtrot and waltz (Hackney and Earhart 2009) and another showed improvements in balance and gait for both partnered and non-partnered dance; however, partnered dance was more enjoyable and therefore may have a compliance advantage (Hackney and Earhart 2010). Music therapy combining choral singing, voice exercise, body movements and music creation was shown to improve bradykinesia as well as emotions of patients with Parkinson's disease (Pacchetti et al. 2000). 'Tremble Clefs' is a choral programme with chapters throughout the United States that is open only to patients with Parkinson's (Hval 2011). It has been hypothesized that such engagement would improve speech and posture in patients. There is some research supporting the effectiveness of this kind of approach (Evans et al. 2012). Music therapy is frequently used with positive effect to address aphasia in stroke victims since the ability to sing frequently remains intact despite loss of speech (Schlaug et al. 2010).

The arts provide useful adjunctive techniques for medical procedures, particularly with paediatric populations, as they allow for an enjoyable distraction for an otherwise anxiety producing experience. For example, performing a magic trick prior to a dental procedure has been demonstrated to decrease the time required for dental chair seating and to improve the rate of successful acquisition of radiographs in young 'strong willed' children (Peretz and Gluck 2005). Such improved efficiencies can translate into significant cost savings. This was demonstrated in a study of 166 children requiring computerized tomography scans, electrocardiograms and other diagnostic procedures (DeLoach Walworth 2005). Adding music therapy as a procedural support decreased the need for sedation, reduced procedural times, and reduced the number of staff necessary during the procedures. When the cost savings related to adding music therapy were extrapolated to the number of such procedures conducted throughout the United States, it was estimated that this simple intervention could save 2.25 billion dollars per year (Wood 2008). The sedative and anxiolytic effects of music have been shown to be as effective as the medication midazolam during lithoscopy treatment in both children and adults (Yilmaz et al. 2003). Music also decreases the anxiety and the need for pain medication during laceration repair in emergency rooms (Menegazzi et al. 1991). Self-initiated patient-directed music in adults on ventilatory support for respiratory failure in an intensive care unit was recently reported to decrease anxiety as well as reduce both the frequency and intensity of required sedation compared to care as usual. Decreased frequency of sedation was also reduced compared to a comparison intervention of noise cancelling headphones (Chlan et al. 2013).

Circus arts have been applied to clinical settings. This is best exemplified by the field of therapeutic clowning and clown doctors. Clown doctors do not have medical degrees but are clowns who dress as doctors. Clown doctors entertain and distract patients, often by parodying the medical establishment. They can be differentiated from medical personnel by their red clown nose as well as their humorous antics. They generally avoid loud clothing and excessive make-up in recognition that some children have fears of traditionally clad clowns (ballatrophobia) (Finley et al. 2013). Clown doctors usually work in pairs to encourage each other's creativity, to diminish the patient's pressure to participate, and to offer each other support and feedback. They often work separately from medical personnel (Koller and Gryski 2008).

In contrast to clown doctors, therapeutic clowns generally work individually and are integrated into the health care treatment team (Finlay et al. 2013; Koller and Gryski 2008). Israel's hospital clowning guild, Dream Doctors, is the leading advocate for therapeutic clowns working directly with doctors and nurses (Estrin 2012). Therapeutic clowning is common in Canada (Kollar and Gryski 2008). A survey at the Hospital of Sick Children in Toronto revealed that 76 per cent of staff considered the clowns as part of the health care team. However, only 22 per cent of children's parents considered the clowns role as helping other professionals with their children's medical care (Koller and Gryski 2008). Clown doctors and therapeutic clowns incorporate a variety of arts forms including mime, puppetry, magic and the playing of instruments; humour is central to most activities. Humour itself has been demonstrated to have therapeutic effects for some clinical situations. For example, watching a humorous film was demonstrated to improve response to medication in patients with bronchial asthma when compared to watching a non-humorous film (Kimata 2004). However, a review of studies of humour used with

patients suffering from serious mental illness was less conclusive in regards to its therapeutic benefits (Gelkopf 2011).

Clowning has been demonstrated to be effective in reducing preoperative anxiety related to minor same day surgery in both patients and their parents (Vagnoli et al. 2005). Another study demonstrated positive effects of the presence of a female clown in reducing crying time in girls receiving repeat botulinum toxin injections, most of whom received the treatment for spastic cerebral palsy. However, this effect was not demonstrated for first time injections, or for boys, and there was even a negative effect for boys under the age of 8. More recently, research suggests that the incorporation of medical clowns into treatment can increase pregnancy rates following vitro fertilization and embryo transfers (Friedler et al. 2011).

Magic has also been utilized for both entertainment and physical rehabilitation. Learning a magic trick can improve manual dexterity and is recognized by the American Occupational Therapy Association as one of many clinically useful strategies (Fisher and Fisher 2007). Magician David Copperfield along with several occupational therapists founded 'Project Magic' to promote magic as an additional rehabilitation tool (Kaufman 2002). Another magician team, Kevin and Cinde Spencer, founded the programme 'Healing of Magic' with a similar aim (Cantrel 2012). Physician and illusionist Lalit Chawla has written a book that illustrates simple magic tricks that physicians can use to facilitate rapport with patients; these tricks also can be used metaphorically to demonstrate medical principles and pathophysiology (2009). Open Heart Magic is a non-profit foundation that supports magician-in-residence programmes in five hospitals in the Chicago metropolitan area (Hart and Walton 2010).

Art therapy is a field with roots in psychology, although it has expanded to include physical health as well. With art therapy, the creative process is used to elicit meaningful imagery, reveal psychological processes, and foster therapeutic relationships (Potash 2012). Art therapy has been utilized for health improvement in inpatient and outpatient settings and has been applied for a multitude of health conditions (Society for the Arts in Healthcare 2009). S. C. Slayton et al. (2010) reviewed outcome studies on the efficacy of art therapy as used in both clinical and non-clinical populations. Statistically significant benefits either emotionally and/or in symptoms of the disorders were reported using a variety of art therapy techniques in patients with conditions including personality disorders, post-traumatic stress disorder, cerebral palsy, learning and development disorders, cancer, and chronic disease in general.

The arts have also been applied for therapeutic effect by artists not trained as art therapists (and therefore limited in some of the therapeutic arts applications) but who receive (or should receive) training on important issues and skills for medical settings such as those associated with infection control, blood borne pathogens, confidentiality and appropriate relational boundaries (Moss and O'Neil 2009). The Arts in Medicine programme at Shands hospital at the University of Florida hosts artists in residence including musicians, painters, actors, writers and dancers (Graham-Pole 2001). A study of artist-directed patients involved in art production, craft making, musical instrument playing, and writing in a long term outpatient dialysis unit at Shands revealed improvements in several quality of life measures and even a few physical measures over the course of six months (Ross et al. 2006). A survey of the hospital membership of the US-based Joint Commission on Accreditation of Healthcare Organizations revealed that 69 per cent of hospitals with arts programming used volunteer artists and 55 per cent reported using paid

artists (Wikoff 2004). Artists were generally used in addition to art therapists although artists reportedly tended to work equally with both patients and staff while the art therapists concentrated primarily on working with patients.

A novel outpatient approach to the arts and health is exemplified in the day treatment programme at 'Interact Center for the Visual and Performing Arts' in Minneapolis (Christenson 2013a). Instead of the typical approach of a medical-based programme that offers some arts programming, Interact begins by hiring artists first and then training them to deal with the medical care required in this setting. All patients are accepted based on their interest in developing skills in either a visual arts programme or theatre. In this case, the arts not only serve a therapeutic function but transforms the participant from their initial identity as patient to an identity as an artist with the accompanying personal enrichment that derives from this occupation. Additional programmes, such as 'Spectrum Arts' in Minneapolis, make studio space and art materials available to those dealing with mental illness and downplay the mental health connection in favour of promoting participants as artists. *Reaching Across with the Arts: a self-help manual for mental health consumers* (Bluebird et al. 2000) encourages those dealing with their own mental health issues to develop their own arts programmes for similar personal development.

Patient education is an important component of comprehensive treatment and can be enhanced by recommending arts-based readings. 'Graphic medicine' is a relatively new field that embraces the use of graphic novels and comics for medical education of both providers and patients (Green and Myers 2010). Pathographies refer to medical narratives written in graphic form and have been proposed to enhance medical student empathy and observational skills. For patients, graphic novels provide another way of learning about their illness and relating to others who have experienced similar circumstances. The combination of visual imagery with text may also prove to increase patient understanding of their illness, although this hypothesis has yet to be confirmed. An example of one such pathography is *Cancer Vixen*, the story of cartoon author Marisa Acocella Marchetto's personal experience with breast cancer (Marchetto 2006). Educational graphic medical works for kids include the 'Superheroes on a Mission' series featuring five main characters with names such as Pump, Gastro and Skinderella, who address different childhood illnesses such as asthma, ADHD, cystic fibrosis or diabetes, as well as illnesses that might affect family members such as Parkinson's disease, breast cancer or multiple sclerosis (Chilman-Blair and Taddeo 2010).

## **ARTS TO EDUCATE ABOUT AND PREVENT DISEASE**

The arts provide substantial opportunities to prevent disease. Both physicians and the press regularly instruct people on the benefits of exercise programmes but such recommendations are often met with resistance. One of the major reasons for lack of commitment to an exercise programme is the perception that exercise is either work or is boring. When public health officials wished to address the increased prevalence of heart disease in Northern England they turned to artists to assist with a public campaign. Not only did artists produce the poster designs but they suggested that the proposed phrase 'Exercise makes the heart grow stronger' would be more effective if worded as 'Dance Makes the Heart Grow Stronger'. Public response to the adaptation of their suggestion confirmed greater acceptance of dance over

exercise despite the close relationship of the two (White 2009). Dancing not only achieves a physical workout but has been shown to correlate with a delay in the cognitive decline associated with Alzheimer's dementia (Verghese et al. 2003). Another example of enhancing exercise through the arts is 'Conductorsise®', a method conceived by orchestra conductor David Dworkin (Christenson 2013a). Dworkin recognized that the intense physical experience of conducting might provide an appealing and fun alternative to other exercise programmes. In Conductorsise®, each participant receives a baton and is instructed in the basics of conducting. They are then sequentially educated about a variety of musical works and lead through a conducting experience to recordings of the works. Variations in the tempo of marches, waltzes and other works provide a broad spectrum of workout intensities as well as opportunities to work the whole body as when participants march about the room while conducting.

The visual arts provide additional opportunities for health promotion. For example, 'Sidewalks Saving Lives' was a collaboration effort of the University of Minnesota's Center for Urban and Regional Affairs, Kwanzaa Community Church, and 'Juxtaposition Arts' in North Minneapolis. Between 2008 and 2009, sidewalks were painted with art and messages about safe sex, HIV and the importance of being tested (Christenson 2011a). Similarly, rural clinics in Rwanda paint the outside walls with messages on the importance of clean water for health (Christenson 2011b). The visual arts have also been used for single day events such as the project 'Don't Sit in Silence', an installation work by students at the University of Minnesota. Don't Sit in Silence consisted of the placement of 1100 chairs in the lawn in front of the University's student union to raise awareness of the approximately 1100 US students that commit suicide each year (Tabbert 2012). The installation was accompanied by a performance of spoken word artists who addressed mental health issues as well as tables providing information regarding stress reduction and mental health counseling and other services on campus. Another study demonstrated how the use of art therapy in the form of production of visual art, either individually or in a group format, statistically decreased anxiety in college students compared to a control group assigned to completing puzzles (Aaron et al. 2011).

Theatre provides additional opportunities to educate communities regarding important health issues. The rate of breast cancer mortality among African American women is higher than any other ethnic group. The play *Stealing Clouds* was written and staged to educate 448 African American women about breast cancer (Livingston et al. 2009). Pre- and post-assessments revealed an increase in awareness and knowledge of breast cancer in the audience including the importance of mammogram screening. The audience also indicated an increased intention to perform breast examinations on themselves, share this knowledge with others, and volunteer time and/or donate money to assist to further increase community awareness.

The circus arts have also been employed in the promotion of healthy communities around the world. Since the 1990s, circuses in Ethiopia, using traditional circus arts together with indigenous art forms, have disseminated messages about social and health issues including HIV/AIDS (Niederstadt 2009).

An interactive exercise frequently employed by circus arts entertainers is instruction in the balancing of a peacock feather on a finger. This was recently used at the University of Minnesota during welcome week for incoming first year students as a metaphor for achieving balance in their college lives (Christenson 2013b; Largent 2013). The theme of balance was later



combined with the theme of juggling college and personal responsibilities for a second event towards the end of the school year. The programme, titled 'Cirque De-Stress', featured seven 30-minute circus performances held during the course of a day with acts specifically tailored to illustrate the themes of balancing college life and juggling responsibilities. Between shows, attendees visited peripheral stations sponsored by various stress reduction and mental health services on campus. A post-event survey revealed that attendance was primarily driven by curiosity, an enjoyment of circuses, and a desire to have fun, and less by interest in learning about mental health or stress reduction. However, 83% of attendees left having acquired a new strategy for stress reduction, 61% reported having felt less stressed at the event itself, 85% indicated that they were more likely to use one of the campus services if needed, and 87% felt that such events helped decrease the stigma around mental health (Christenson 2013b). These findings were consistent with the planners' notion that the arts provide unique approaches to communicate health information that might otherwise be ignored if delivered by conventional methods such as e-mail, brochures and posters in college populations.

The circus arts are but only one of the many performance arts that have been utilized for public health messaging. Public puppet shows have been used to teach about and reduce the health consequences of significant illnesses including eye disease in rural Australia (Nacchomedia 2013), and HIV/AIDS in South Africa (Skinner et al. 1991).

The visual arts are also frequently employed to raise awareness of public health issues. In South Africa, the 'Siyazama' project employs traditional beading and doll making by native women to bring them together and introduce discussions on AIDS and safe sex (Wells et al. 2004). The 'Western Desert Kidney Health Project' in Australia uses traditional aboriginal sand painting to educate about and decrease excessive sugar in the diet and address the high rate of diabetes in the Aboriginal population (Jeffries-Stokes and Stokes 2012). Photographer and physician David Parker uses photographs to raise awareness of the abuses related to child labour throughout the world (2008). The emotional and psychological toll experienced by victims of crime is illustrated through exhibitions of the 'Art of Recovery' programme in Minnesota (Christenson 2011b). The art exhibit *Awake* not only allowed college students to raise their awareness about their mental health but also provided an opportunity for self-exploration and enhancement of self-esteem (Johnson 2009). Occasionally, artists may not even realize the public health messaging opportunities that their work embraces. For example, artist Clark Wittington repurposes old cigarette machines to create 'Art-O-Mats' that dispense a variety of artworks packaged in the size of cigarette packs. Placement of one of his machines in a college health service was used to both promote smoking cessation as well as the healing power of the arts (Kiser 2010).

In addition to the positive effects of arts related activities targeting specific health issues, there is evidence to suggest that general engagement in the arts has health benefits. S. E. Johansson et al. (2001) interviewed 3793 Swedish adults about their perceived health as well as engagement in reading books, singing or playing an instrument, and attendance to cultural events (visits to the cinema, theatre, concerts, music performances, museums, and art exhibits), on two occasions eight years apart. They found that those who were either inactive or who had low engagement with the arts reported a perceived 65 percent increase in health risk compared to those who were actively

engaged in arts events at both interviews. However, those who changed from low activity with the arts to active engagement had the same level of perceived health as those with sustained activity in the arts between both interviews. This study suggests that both active and passive engagement with the arts may be important for achieving and maintaining health. However, it is possible that the correlation between health and engagement with the arts is related to the influence of poor health on the ability to engage in the arts. Additional studies regarding the general health benefits of the arts are needed to clarify any causal relationship.

### **THE ARTS IMPROVE THE PATIENT EXPERIENCE**

The patient experience, particularly in the hospital setting, is frequently uncomfortable and threatening. Removed from familiar and comfortable surroundings, the patient is asked to surrender to unfamiliar spaces, schedules and authority. Anxiety is common and pain is unfortunately the result of either illness or the procedures required to treat it. Medicine provides some tools to address these experiences such as anxiolytic and pain medications but these do not get at the heart of the significant environmental and cultural discrepancies between the healthcare setting and the patient's usual surroundings and routines. The arts can play a significant role in addressing these issues.

Hospital and clinic design has become a whole discipline in itself. Once primarily focused on more technical issues such as sterility, workflow efficiency, and the application of new technology, design is increasingly emphasizing the improved aesthetics of the hospital environment. Hospital rooms are becoming more inviting with greater privacy, patient controlled lighting, and furniture to promote relaxed visits and social interactions. Research has demonstrated that views of nature are associated with less anxiety, decreased need for pain medication, and shorter hospital stays (Ulrich 1984; Ulrich et al. 1991). Subsequently, when possible, new facilities are being built to provide patients with more natural views through their windows. It has also been suggested that similar benefits can be associated with representational artwork with landscape themes and that such themes are preferable to more abstract art (Ulrich et al. 1993). Although there are studies as well as theoretical arguments to support this view, there is considerable variation in patients' personal preferences in artwork in general, and within any specific genre, in particular (Nanda and Hathorn 2011).

Some hospitals have developed art carts that bring artworks to the patient so that they can choose what images will grace their walls (Christenson 2012). A major benefit of such an approach is the restoration of some sense of control to the patient. Hospitals and clinics are increasingly paying more attention to artwork in their lobbies, waiting areas, and hallways. Artwork is even being added to ceilings in situations in which a patient is likely to be supine, such as during medical and dental examinations and radiological procedures. Artwork on walls has become recognized as a solution to the 'way finding' challenges of large medical facilities that have traditionally depended on posted signs and maps to guide visitors from one location to another. For example, Johns Hopkins Children's Hospital features a large distinct and recognizable artwork on the wall adjacent to the elevators on each floor. Video screens inside the elevator at both adult and children's height indicate the floor with pictures of the corresponding artwork (Christenson 2013a). Children's

hospital of Minneapolis has taken this idea one step further by designating each floor by a specific arts genre such as literature, theatre, visual arts, and music (Ledger 2010). Artwork can also be functional such as the flowing bronze sculpture along one of the hallways in Laguna Honda Hospital in San Francisco (Christenson 2013a). The sculpture is actually a handrail that serves a vital and necessary purpose while at the same time serving an aesthetically decorative function.

Live music performances have become regular features of some hospital arts programmes such as the one at Mayo Clinic in Rochester, Minnesota (Ledger 2010). More typical is the appearance of musicians at patient bedsides either in the capacity of a music therapist or as a visiting musician. Live music has also been used in outpatient clinic waiting rooms. One study demonstrated improved satisfaction with check-in and greater likelihood of recommending the clinic to others for those patients who experience live music in the waiting room compared to a control group without exposure to live musical performance. Staff working at the check-in desk also reported positive impressions of the live music and did not find that it interfered with their professional duties (Silverman et al. 2012).

Another aspect of the arts that can be of benefit to medicine is clothing design. The traditional hospital gown was designed primarily with the provider in mind with easy access and durability to endure many washings. In the course of one hospital system's initiative to improve patient satisfaction it was noted that a common theme of patient focus groups was the lack of modesty and poor comfort associated with hospital gowns. In response to this feedback they sponsored a hospital gown design competition, 'Project Better Gown', which was open to college students throughout the country (Frisch 2012). The winning entry featured a wrap around design, with openings for clinicians to easily access a patient's back or front. Ties allowed for adjustment to the size of the patient and a kangaroo pouch in the front allowed for someplace to put one's hands or personal items. The design allowed for far greater privacy without compromising access for treatment.

## **ARTS CAN PROMOTE PROVIDER WELL-BEING**

A final strength of the arts is the ability to promote the well-being of the medical provider. Most medical students already engage in or have an interest in engaging in one arts form or another. Both medical school and a career in medicine are fast paced and challenging. Matriculation into formal medical education is frequently associated with the abandonment of participation in the arts and loss of the potential balance that the arts can provide in dealing with the stress associated with such challenges. However, many medical schools are beginning to recognize the value of encouraging artistic endeavours in their students. For example, the Wayne State University School of Medicine Writing Workshop and Wayne State University School of Medicine Gold Humanism Honor Society (2010) has published *Brain Candy*, an arts journal with short stories, essays, poetry, photos and art produced by medical students, medical school staff and representatives of the University's Arts, English and Pharmacy departments. The editors share their philosophy in the preface to the second edition; physicians need to be broadly trained and their promotion of the arts is 'not as a diversion from our busy lives, but as part of our responsibility to be complete and conscientious practitioners of the healing arts'. In a similar vane, the artist and physician Robert

Fisch has promoted arts in medical practitioners by establishing the 'Fisch Arts of Medicine Awards' at the University of Minnesota Medical School (Kiser 2011; Peota 2008). Medical students submit proposals for an arts-focused activity that could include classes, individual instruction, and/or the acquisition of materials. Submissions are reviewed by a jury of physicians with arts interests and students are awarded grants of up to \$5000 to pursue their interests. Grants have been awarded for a diverse range of activities including instruction in ceramics, drums, piano, painting, drawing, opera, dance, aerial arts, general circus arts, clothing design and studio recording. The aim is for these budding physicians to remain connected to the arts both during medical school and during their careers.

Opportunities for continued engagement in the arts is provided by such programmes as the *Michigan Life Sciences Orchestra*, the *Longwood Symphony Orchestra* and the University of Minnesota's *Health Sciences Orchestra*. Similar orchestras perform in Germany, Switzerland, Austria, Australia, Japan, Spain, Romania, Taiwan and Finland. A *World Doctors Orchestra* has even been established (Rosenberg 2008). Other examples of the use of the arts by practicing medical professionals include the musical production *Hey Florence*, which not only portrays both the challenging and rewarding experiences of nurses but is performed by an all-nurse cast (Stamper 2009). The Royal Society of Physicians in the United Kingdom holds an annual art exhibition of their members' work (Sewell 2008). Although the benefits of medical professionals' participation in the arts have not yet been systematically investigated, it is difficult to imagine that they would be much different to those observed in patients and the general population. One study demonstrated that art therapy was helpful in reducing provider burnout as evidenced in ratings of emotional exhaustion, cognitive and emotional distancing from patients, and sense of personal achievement in both doctors and nurses working in a child oncology unit. The research described techniques used including psychodrama and 'play therapy' as well as training in relaxation techniques and techniques to support children during painful procedures (Italia et al. 2008).

## CONCLUSIONS

It is difficult to predict how the medical field will continue to develop. However, it is likely to become more complex as investigators delve further into the genetic, chemical and physiological processes of the human body, the intricate workings of the mind, and the diversity in which spirit is experienced. Investigators are likely to gain improved understanding of the effects of environment and society on human well-being, as well. What must not be lost in this process is an awareness of the creative nature that defines us all. Leveraging the artistic and creative aspects of human nature provides an additional avenue for achieving wellness in patients, communities and clinicians.

## REFERENCES

- Aaron, R., Rinehart, K. and Ceballos, N. (2011), 'Arts-based interventions to reduce anxiety levels', *Arts & Health*, 3: 1, pp. 27–38.
- Baum, N. and Dooley, R. (2012), 'Doctors and magicians. What we can learn from wizards', *Journal of Medical Practice Management*, 28: 3, pp. 200–02.
- Bertman, S. (2009), *One Breath Apart: Facing Dissection*, New York, NY: Baywood Publishing Co.

- Bluebird, G., Schell, B. J. and Pazicky, E. (2000), *Reaching Across with the Arts: A Self-Help Manual for Mental Health Consumers*, Rockville, MD: Center for Mental Health Services.
- Branigan, A. (1995), 'History of medical illustration', in R. Demarest (ed.), *History of the Association of Medical Illustrators 1945–1995*, Atlanta: American Medical Illustrators, <http://www.ami.org/medical-illustration/history-of-medical-illustration.html>. Accessed 4 June 2013.
- Cantrell, M. (2012), 'Bag of tricks', *Today in OT*, 28 May, n.p., <http://news.TodayInOT.com/article/20120528/TODAYINOT010302/305280018>. Accessed 4 June 2013.
- Charon, R. (2001), 'Narrative medicine. A model for empathy, reflection, profession, and trust', *Journal of the American Medical Association*, 286: 15, pp. 1897–902.
- Chawla, L. K. (2009), *Unlocking the Secrets of Magic and Illusions in a Clinical Setting*, Chatham, Ontario: Magic and Medicine.
- Chilman-Blair, K. and Taddeo, J. (2010), *Superheroes on a Medical Mission. What's Up With Ella?: Medikidz Explain Diabetes*, New York, NY: Rosen Publishing Group.
- Chlan, L. L., Weinert, C. R., Heiderscheid, A., Tracy, M. F., Skaar, D. J., Guttormson, J. L. and Savik, K. (2013), 'Effects of patient-directed music intervention on anxiety and sedation exposure in critically ill patients receiving mechanical ventilatory support, a randomized clinical trial', *Journal of the American Medical Association*, 309: 22, pp. 2335–44.
- Christenson, G. (2011a), 'Why we need the arts in medicine', *Minnesota Medicine*, 94: 7, pp. 49–51.
- (2011b), 'Five reasons why we need the arts in medicine', presentation at *The Annual Conference of Arts and Health Australia*, Canberra, Australia, 16 November.
- (2012), 'Five things to consider when selecting art for your facility', *Minnesota Medicine*, 95: 7, pp. 38–42.
- (2013a), 'Why we need the arts in medicine and public health', presented at *The Arch of Art in Health*, Technion Israel Institute of Technology, Haifa, Israel, 18 March.
- (2013b), 'Cirque De-Stress', *Minnesota Medicine*, 96: 7, pp. 42–44.
- DeLoach Walworth, D. (2005), 'Procedural-support music therapy in the healthcare setting: A cost-effectiveness analysis', *Journal of Pediatric Nursing*, 20: 4, pp. 276–84.
- Diamond, M. and Scheibel, A. (1985), *The Human Brain Coloring Book*, New York, NY: Harper Perennial.
- Dolev, J., Friedlaender, L. and Braverman, I. (2001), 'Use of fine art to enhance visual diagnostic skills', *Journal of the American Medical Association*, 280: 9, pp. 1020–21.
- Earhart, G. (2009), 'Dance as therapy for individuals with Parkinson's disease', *European Journal of Physical Rehabilitation Medicine*, 45: 2, pp. 231–38.
- Engel, G. (1977), 'The need for a new medical model: A challenge for biomedicine', *Science*, 196: 4286, pp. 129–36.
- Estrin, D. (2012), 'Israeli clowns pioneer new medical treatments', Associated Press, 21 August, n.p., <http://bigstory.ap.org/article/israeli-clowns-pioneer-new-medical-treatments>. Accessed 30 July 2013.
- Evans, C., Canavan, M., Foy, C., Langford, R. and Proctor, R. (2012), 'Can group singing provide effective speech therapy for people with Parkinson's disease?', *Arts & Health*, 4: 1, pp. 83–95.

- Feldshuh, D. (1998), *Miss Ever's Boys*, New York, NY: Dramatists Play Service inc.
- Finley, F., Baverstock, A. and Lenton, S. (2013), 'Therapeutic clowning in paediatric practice', *Clinical Child Psychology and Psychiatry*, July, pp 1–10.
- Fisher, D. and Fisher, C. (2007), 'Magic touch: Rehabracadabra', *ADVANCE for Occupational Therapy Practitioners*, 23: 15, pp. 15–18.
- Flink, C. and Odde, D. (2012), 'Science+dance=bodystorming', *Trends in Cell Biology*, 22: 12, pp. 613–16.
- Friedler, S., Glasser, S., Azani, L., Freedman, L., Raziell, A., Strassburger, D., Ron-El, R. and Lerner-Geva, L. (2011), 'The effect of medical clowning on pregnancy rates after in vitro fertilization and embryo transfer', *Fertility and Sterility*, 95:6, pp. 2127–30.
- Frisch, S. (2012), 'Project Better Gown: Park Nicollet aims to give the dreaded hospital cover-up an extreme makeover', *Minnesota Medicine*, 95: 4, pp. 8–10.
- Gelkopf, M. (2011), 'The use of humor in serious mental illness: A review', *Evidence-Based Complementary and Alternative Medicine*, Article ID 342837, 8 pages.
- Graafland, M., Schraagen, J. and Schijvin, M. (2012), 'Systematic review of serious games for medical education and surgical skills training', *British Journal of Surgery*, 99: 10, pp. 1322–30.
- Graham-Pole, J. R. (2001), 'The marriage of art and science in health care', *Yale Journal of Biology and Medicine*, 74: 1, pp. 12–27.
- Gray, R., Fitch, M., Labrecque, M. and Greenberg, M. (2003), 'Reactions of health professionals to a research-based theatre production', *Journal of Cancer Education*, 18: 4, pp. 223–29.
- Greenhalgh, T. and Hurwitz, B. (1999), 'Narrative based medicine: Why study narrative?', *British Medical Journal*, 318: 7175 pp. 48–50.
- Green, M. and Myers, K. (2010), 'Graphic medicine: Use of comics in medical education and patient care', *British Medical Journal*, 340: c863, pp. 574–77.
- Hackney, M. and Earhart, G. (2009), 'Effects of dance on movement control in Parkinson's disease: A comparison of Argentine tango and American ballroom', *Journal of Rehabilitation Medicine*, 41: 6, pp. 475–81.
- (2010), 'Effects of dance on gait and balance in Parkinson disease: A comparison of partnered and non-partnered dance movement', *Neurorehabilitation and Neural Repair*, 24: 4, pp. 384–92.
- Hammer, R., Rian J., Gregory, J., Bostwick, J., Birk, C. Chalfant, L., Scanlon, P. and Hall-Flavin, D. (2011), 'Telling the patient's story: Using theatre training to improve case presentation skills', *Journal of Medical Ethics; Medical Humanities*, 37: 1, pp. 18–22.
- Hart, R. and Walton, M. (2010), 'Magic as a therapeutic intervention to promote coping in hospitalized pediatric patients', *Pediatric Nursing*, 36: 1, pp. 11–16.
- Hu, W. (2011), 'Learning empathy by looking beyond disabilities', *New York Times*, 21 June, n.p., [http://www.nytimes.com/2011/06/22/nyregion/at-nj-school-learning-not-to-look-away-from-the-disabled.html?\\_r=0](http://www.nytimes.com/2011/06/22/nyregion/at-nj-school-learning-not-to-look-away-from-the-disabled.html?_r=0). Accessed 4 June 2013.
- Hval, C. (2011), 'Singing helps keep Parkinson's effects at bay: Tremble Clefs helps members preserve voice, find support', *The Spokesman-Review*, 7 April, n.p., <http://www.spokesman.com/stories/2011/apr/07/singing-helps-keep-parkinsons-effects-at-bay/>. Accessed 4 June 2013.

- Italia, S., Favara-Scacco, C., Di Cataldo, A. and Russo, G. (2008), 'Evaluation and art therapy treatment of the burnout syndrome in oncology units', *Psycho-Oncology*, 17: 7, pp. 676–80.
- Jeffries-Stokes, C. and Stokes, A. (2012), 'The western desert kidney health project', presentation at *The Annual Conference of Arts and Health Australia*, Freemantle, Australia, 29 November.
- Johansson, S. E., Konlaan, B. B. and Bygren, L. O. (2001), 'Sustaining habits of attending cultural events and maintenance of health: a longitudinal study', *Health Promotion International*, 16: 3, pp. 229–34.
- Johnson, T. (2009), 'Healing through art at Boynton', *Minnesota Daily*, 6 May, n.p., <http://www.mndaily.com/2009/05/06/healing-through-art-boynton>. Assessed 4 June 2013.
- Kaufman, R. (2002), *David Copperfield's Project Magic Handbook*, Canada: David Copperfield's Project Magic Fund.
- Kimata, H. (2004), 'Effect of viewing a humorous vs. nonhumorous film on bronchial responsiveness in patients with bronchial asthma', *Physiology & Behavior*, 81:4, pp. 681–684.
- Kiser, K. (2010), 'Out with cigarettes, in with Art', *Minnesota Medicine*, 93: 6, p. 60.
- (2011), 'Study break: Medical students use art of medicine awards to explore their creative side', *Minnesota Medicine*, 94: 7, pp. 20–22.
- Koller, S. and Gryski, C. (2008), 'The life threatened child and the life enhancing clown: Towards a model of therapeutic clowning', *Evidence-Based Complementary and Alternative Medicine*, 5: 1, pp. 17–25.
- Largent, B. (2013), 'Cirque De-stressing students', *Minnesota Daily*, 3 April, n.p., <http://www.mndaily.com/news/campus/2013/04/04/cirque-de-stressing-students>. Assessed 4 June 2013.
- Ledger, K. (2010), 'More than pretty pictures', *Minnesota Medicine*, 93: 7, pp. 40–44.
- Livingston, J., Smith, N., Mills, C., Singleton, D., Dacons-Brock, K., Richardson, R., Grant, D., Craft, H. and Harewood, K. (2009), 'Theater as a tool to educate African Americans about breast cancer', *Journal of Cancer Education*, 24: 4, pp. 1–4.
- Maas, S. (2004), 'St. Cloud physician creates musical comedy about smallpox', *Minnesota Medicine*, 87: 7, p. 12.
- Marchetto, M. (2006), *Cancer Vixen: A True Story*, New York, NY: Alfred A Knopf.
- Menegazzi, J., Paris, P., Kersteen, C., Flynn, B. and Trautman, D. (1991), 'A randomized, controlled trial of the use of music during laceration repair', *Annals of Emergency Medicine*, 20: 4, pp. 348–50.
- Moss, H. and O'Neill, D. (2009), 'What training do artists need to work in healthcare settings?', *Journal of Medical Ethics; Medical Humanities*, 35: 2, pp. 101–05.
- Nacchomedia (2013), 'Looking good. Puppet film promotes eye health in remote Aboriginal communities', *NACCHO Eye Health News*, 25 March, n.p., <http://nacchocommunique.com/2013/03/25/naccho-eye-health-news-looking-goodpuppet-film-promotes-eye-health-in-remote-in-aboriginal-communities/>. Accessed 4 June 2013.
- Naghshineh, S., Hafler, J., Miller, A., Blanco, M., Lipsitz S., Dubroff R., Khoshbin S. and Katz, J. T. (2008), 'Formal art observation training improves medical students' visual diagnostic skills', *Journal of General Internal Medicine*, 23: 7, pp. 991–97.

- Nanda, U. and Hathorn, K. (2011), 'Nature vs. abstract art in healthcare: What we know, what we don't know & what we really should find out', presented at the Society for the Arts in Healthcare 22nd Annual Conference, Burlingame, California, 14 April.
- Nanda, U., Eisen, S. and Baladandayuthapani, V. (2008), 'Undertaking an art survey to compare patient versus student art preferences', *Environment and Behavior*, 40: 2, pp. 269–301.
- Niederstadt, L. (2009), 'Fighting HIV with juggling clubs. An introduction to Ethiopia's Circuses', *African Arts*, 42: 1, Spring, pp. 76–87.
- Oliveira, J. and Oliveira, M. (2013), 'Depicting depersonalization disorder', *American Journal of Psychiatry*, 170: 3, pp. 263–64.
- Pacchetti, C., Mancini, F., Aglieri, R., Glieri, R., Fundaro, C., Martignoni, E. and Nappi, G. (2000), 'Active music therapy in parkinson's disease: an integrative method for motor and emotional rehabilitation', *Psychosomatic Medicine*, 62: 3, pp. 386–93.
- Parker, D. (2008), 'Before their time: Child labor around the world', *American Educator*, 32: 1, Spring, pp. 38–43.
- Pellico, L. (2011), 'Looking is not seeing & listening is not hearing: using art and music to improve nurses perceptual abilities', paper presented at the 22nd Annual Conference of the Society for the Arts in Healthcare, Burlingame, CA, 14 April.
- Peota, C. (2008), 'Beautiful People', *Minnesota Medicine*, 91: 7, pp. 12–13.
- (2009), 'The year of living creatively', *Minnesota medicine*, 92: 7, pp. 16–18.
- Peretz, B. and Gluck, G. (2005), 'Magic trick: A behavioural strategy for the management of strong-willed children', *International Journal of Paediatric Dentistry*, 15: 6, pp. 429–36.
- Potash, J. (2010), 'Guided relational viewing: Art therapy for empathy and social change to increase understanding of people living with mental illness', unpublished doctoral dissertation, University of Hong Kong, Hong Kong.
- (2012), *Guided Relational Viewing: An Art Therapy Model for Social Change*, Hong Kong: Centre on Behavioral Change, p. 2.
- Rosenberg, D. (2008), 'Cleveland to introduce world doctors orchestra to America', *The Plain Dealer*, 17 October, n.p., [http://www.cleveland.com/musicdance/index.ssf/2008/10/courtesy\\_of\\_the\\_world\\_doctors.html](http://www.cleveland.com/musicdance/index.ssf/2008/10/courtesy_of_the_world_doctors.html). Accessed 4 June 2013.
- Ross, E. A, Tracy, L., Hollen, T. L. and Fitzgerald, B. M. (2006), 'Observational study of an arts-in-medicine program in an outpatient hemodialysis unit', *American Journal of Kidney Diseases*, 47: 3, pp. 462–68.
- Reynolds, M. (2010), 'Making medicine magical', *The Medical Post*, 6 April, p. 16.
- Rubin, M. and Safdieh, J. (2007), *Netter's Concise Neuroanatomy*, Philadelphia, PA: Elsevier.
- Sewell, B. (2008), 'Doctors and artists, made from the same mold', *London Evening Standard*, 25 July, n.p., <http://www.standard.co.uk/news/doctors-and-artists-made-from-the-same-mould-6828341.html>. Accessed 4 June 2012.
- Schlaug, G., Norton, A., Marchina, S., Zipse, L. and Wan, C. (2010), 'From singing to speaking: Facilitating recovery from nonfluent aphasia', *Future Neurology*, 5: 5, pp. 657–65.
- Silverman, M., Christenson, G., Golden, D. and Chatput-McGovern, J. (2012), 'Effects of live music on patient satisfaction of students waiting for treatment in a university health clinic', *Music Therapy Perspectives*, 30: 1, pp. 43–48.



- Skinner, D., Metcalf, C. A., Seager, J., De Swardt, J. and Laubsher, J. (1991), 'An evaluation of an education programme on HIV infection using puppetry and street theatre', *AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV*, 3: 3, pp. 317–29.
- Slayton, S. C., D'Archer, J. and Kaplan, F. (2010), 'Outcome studies on the efficacy of art therapy: A review of findings', *Art Therapy*, 27: 3, pp. 108–11.
- Society for the Arts in Healthcare (2009), *State of the Field Committee State of the Field Report: Arts in Healthcare*, Washington, DC: Society for the Arts in Healthcare.
- Stamper, J. (2009), 'Hey Florence', *Nashville Arts Magazine*, 2 October, n.p., <http://nashvillearts.com/2009/10/02/hey-florence/>. Accessed 4 June 2013.
- Tabbert, N. (2012), 'U students to raise awareness about mental health issues', *Minnesota Daily*, 25 April, n.p., <http://www.mndaily.com/blogs/newsstand/2012/04/25/u-students-raise-awareness-about-mental-health-issues>. Accessed 4 June 2013.
- Tobin, W. (2006), 'Alfred Donné and Léon Foucault: The first applications of electricity and photography to medical illustration', *Journal of Visual Communication in Medicine*, 29: 1, pp. 6–13.
- Toll, E. (2012), 'The cost of technology', *Journal of the American Medical Association*, 307: 23, pp. 2497–98.
- Ulrich, R. (1984), 'View through a window may influence recovery from surgery', *Science*, 224: 4647, pp. 420–21.
- Ulrich, R., Lunden, O. and Eltinge, J. (1993), 'Effects of exposure to nature and abstract pictures on patients recovering from open heart surgery', *Journal of the Society for Psychophysiological Research*, 30 (suppl 1), S7.
- Ulrich, R., Simons, R., Losito, B., Fiorito, E., Miles, M. and Zelson, M. (1991), 'Stress recovery during exposure to natural and urban environments', *Journal of Environmental Psychology*, 11: 3, pp. 201–30.
- Vagnoli, L., Caprilli, S., Arianna Robiglio, A. and Messeri, A. (2005), 'Clown doctors as a treatment for preoperative anxiety in children: a randomized, prospective study', *Pediatrics*, 116: 4, pp. 563–67.
- Verghese, J., Lipton, R., Katz, M., Hall, C., Derby, C., Kuslansky, G., Ambrose, A., Sliwinski, M. and Buschke, H. (2003), 'Leisure activities and the risk of dementia in the elderly', *New England Journal of Medicine*, 348: 25, pp. 2508–16.
- Wayne State University School of Medicine Writing Workshop and Wayne State University School of Medicine Gold Humanism Honor Society (2010), *Brain Candy. Wayne State University School of Medicine Journal of Art and Literature*, 2nd ed., Detroit, MI: Gold Humanism Honor Society.
- Wells, K., Sienaert, E., Conolly, J., Ngema, F., Nzama Njoyeza, C., Ximba, B. and Ndlovu, B. (2004), 'The "Siyazama" project: A traditional beadwork and AIDS intervention program', *Design Issues*, 20: 2, pp. 73–89.
- White, M. (2009), *Arts Development in Community Health: a Social Tonic*, Oxford, UK: Radcliffe, p. 24.
- Wikoff, N. (2004), *Cultures of Care: A Study of Arts Programs in U. S. Hospitals*, Washington, DC: Americans for the Arts.
- Wood, B. (2008), 'CT scans and radiation exposure', *AAP Grand Rounds*, 19: 3, pp. 28–29.
- Wynn, K. and Elson, L. (2001), *The Anatomy Coloring Book*, 3rd ed., San Francisco, CA: Benjamin Cummings.
- Wynn, K., Macey, R. and Meisami, E. (1999), *The Physiology Coloring Book*, 2nd ed., San Francisco, CA: Benjamin Cummings.

Yilmaz, E., Ozcan, S., Baser, M., Basar, H., Batislam, E. and Ferhat, M. (2003), 'Music decreases anxiety and provides sedation in extracorporeal shock wave lithotripsy', *Urology*, 61: 2, pp. 282–86.

### **SUGGESTED CITATION**

Christenson, G. A. (2013), 'Conceptualizing the arts as tools for medicine and public health', *Journal of Applied Arts & Health* 4: 3, pp. 247–264, doi: 10.1386/jaah.4.3.247\_1

### **CONTRIBUTOR DETAILS**

Gary Christenson (M.D.) is Chief Medical Officer at Boynton Health Service, University of Minnesota.

Contact: Boynton Health Service, University of Minnesota, 410 Church St. SE, Minneapolis, MN 55455, USA.

E-mail: gchristenson@bhs.umn.edu

Gary A. Christenson has asserted his right under the Copyright, Designs and Patents Act, 1988, to be identified as the author of this work in the format that was submitted to Intellect Ltd.

---