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REVIEW

MedShr: improving patient care through clinical case discussion

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ABSTRACT

Case discussion is an essential part of clinical practice and medical education, and as part of patient care takes place both informally between medical staff and formally in case conferences and other meetings. Case presentations are often the most popular sessions at medical congresses and increasingly have moved to digital channels and social media. MedShr was developed to help doctors improve patient care: to empower doctors to use their own smartphones to share and discuss clinical cases, whilst protecting patient privacy and confidentiality. In this manuscript, we review the current climate of digital and social media networks used for clinical case discussion, and outline the importance of moving to a dedicated digital platform. We discuss the common drivers for digital case discussions which include multidisciplinary team groups, diagnostic doubt, new techniques, clinical equipoise and debate and case discussion amongst professionals from different training levels and specialties. One key observation is that if clinical guidelines and published evidence tell doctors what to do, case discussion shows them how to do it in terms of drugs, devices, procedures, techniques, and applying the evidence to individuals or patient groups. We explore how MedShr works and the range of features which promote professional compliance, protect privacy and enable case-based education. We also discuss example cases, case series and discussion themes from MedShr. In summary, the MedShr platform provides a trusted, secure environment for clinicians that uses state of the art social network technology to support case discussion whilst protecting patient privacy and confidentiality.

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Case discussion is an essential part of clinical practice and medical education, and as part of patient care takes place both informally between medical staff and formally in case conferences, tumor boards and other multi-disciplinary meetings. Case presentations are often the most popular sessions at medical congresses and increasingly this has moved to digital channels and social media. MedShr was developed to help doctors to improve patient care: to empower doctors to use their own smartphones to share and discuss clinical cases, whilst protecting patient privacy and confidentiality.

Why is clinical case discussion important?

As part of their everyday practice clinicians discuss cases with their colleagues, teams and juniors, as well as other healthcare professionals. It is an essential part of multidisciplinary decision making, education and continued professional development, and a central component of good patient care. Given the importance of case discussion it has been natural for this to extend into new communication channels as they have become available.

In the UK, post-graduate medical and surgical training programs have used case discussions for formative and summative training assessments, as well as evidence for clinical and procedural competencies. Current online training portfolios handle case discussions as ticketed work-based assessments, where a trainee creates a case on their dedicated training platform and sends it directly to their supervisor who validates it and adds comments or feedback. This then stays as record on their portfolio for training appraisal.¹⁻⁴

These online training portfolios serve as private log of case discussions that occurred offline, with reflections on the learning event. However, once submitted the discussion is no longer active and serves primarily as a record, which are often regarded to be more like tick-box exercises over the formative purpose for which they were designed.^{1, 5-7} MedShr cases, unlike portfolio cases, can remain live on the platform for ongoing discussion, with alerts and notifications to users when new comments are added, which promotes user interactions and encourages the discussion to develop.

Digital case discussion

Digital platforms and social media networks are often considered to be the realm of “digital-natives” or millennials, those who grew up using digital technology, while “digital-immigrants”, individuals who had to learn and adopt the new technology in the current climate, are less likely to be engaged and consume less information via online sources.⁸ However, with the ubiquitous use of digital technology as part of our daily lives, a clear divide between groups no longer exists.

Published papers now show that digital content and social media networks have strongly complemented education and serve as a repository for both official and informally compiled content. With regards to open access medical education, over the last decade, medical and surgical specialties have been active in developing digital content, for both post-graduate and undergraduate audiences.⁹⁻¹² Social media networks with their theme and user-identification functions, via “hashtag” and “mentions”, have facilitated the rapid dissemination of information and gener-

ated open discussions.^{12, 13} For example, the Free Open Access Medical Education (FOAMed) community have developed their digital presence through their website, resource directories and their hashtag #FOAMed.^{12, 14, 15} In cardiology, #Cardiology and #CardioTwitter are popular and frequently used hashtags to identify specialty-themed content, which is accessible in the public domain of social media networks.

Utilization and contribution has not been limited to individuals in the medical community, but uptake of dedicated hashtags have also been increasingly used in cardiology and other medical conferences, and by professional and academic organizations, to engage the community of followers in live updates and discussion.¹⁶⁻¹⁹ #ORBITA is an example of an interventional cardiology trial that received exponential digital attention and discussion within days of the results being presented at a conference.^{18, 20} Therefore, the presence of specialist communities and organizational use of digital and social media would suggest that their audience has stretched beyond the millennial generation.

Issues with digital content and social media networks

Although digital content and social media networks have been used by clinicians across different training grades, there are conflicting opinions on what is considered valuable for digital content. Purdy *et al.*,¹¹ surveyed emergency medicine trainees and senior clinicians (program directors) in Canada on their consumption of free digital content. They found that although use of digital material was prevalent in both groups, trainees and senior clinicians had different approaches and behaviors towards digital content. Trainees were more likely than their seniors to use information sites with user generated content, such as wikis, file-sharing sites, podcasts and online textbooks. In terms of selecting resources, senior clinicians over trainees were more likely to value the peer-review status of content more than media quality and engagement level. Nevertheless, both clinician groups increased their uptake of peer-reviewed content through accessing publicly available material.

This calls into question the validity of content and the credibility of digital content. Clinicians and undergraduate medical students frequently access digital medical content for the purpose of education.^{11, 15, 21, 22} However, this is not yet formally incorporated into training schemes or undergraduate curriculum, and the source and veracity of content is not confirmed.

Quality indicators for digital content have been explored in current literature.^{10, 23} MedShr has been designed to address and overcome common issues faced by digital content which will be discussed in more detail later in this review.

How MedShr works

MedShr allows doctors to share and discuss clinical cases within a private professional network. MedShr incorporates the familiarity of some of the look and feel of a social media platform, but has been developed with professional values at its core meaning an array of unique but essential features. The intuitive nature of the platform make it simple to incorporate into the everyday schedule of a healthcare professional. The MedShr platform can be accessed via the website and is also available as a mobile App for both android and iOS platforms.

Membership

Unlike open social media platforms, membership of MedShr is restricted to doctors, medical students and registered healthcare professionals, to provide a secure space and trusted environment for clinical discussions. Users must provide key information and their status is verified before they are able to access clinical cases or create and comment on them.

Professional profiles

Similar to a social media platform, members can curate their online profile to include an image and biography, and they can connect directly with colleagues and join relevant groups. The MedShr profile is divided neatly into relevant subheadings of key professional information and included are details about institutional workplace and medical and surgical specialty interests. The individual's posts are stored in an easily acces-

sible manner designed specifically for case sharing and contact details can be shared with colleagues.

Viewing cases

MedShr cases display in a visually appealing case feed with the most recent, relevant and engaging cases being displayed. Members are able to scroll through, seeing the title and image of cases, and select those which interest them to view in further detail. The cases shown will change based on what has been of interest.

A key feature supporting case discussion is the ability to search cases by specialty, key words or disease by entering the relevant term into the search function, addressing widely acknowledged issues of identifying cases through social media platforms.²⁰

On MedShr's website, users can select 'latest cases' to view the most recently shared cases, exclusively filtered by time. Members can roam the entire platform on web or App and see what developments are occurring in other specialties by selecting any specialty and viewing the case feed for that area.

Posting cases and images on MedShr

Members can share posts about clinical cases with colleagues easily and securely within the MedShr platform. In-built features support compliance with professional standards, which are not available on social media platforms.

To share, members simply add an anonymized image or video - for example, an echocardiogram or angiogram footage. Images and videos can be uploaded to the App however, a unique feature is to securely capture within the App which prevents insecure storage on devices. All data is stored in the MedShr encrypted cloud.

Use of the de-identification tool within the App protects patient privacy allowing blurring out of any identifying features; for example the patient's name on any documentation, or patient's eyes on facial photography.

Recording consent status is simple, helping clinician's keep appropriate records. Consent can be marked as already taken, not required, or clinicians can consent within the App. For in-App consent, the patient or representative signs

by touching the phone screen and will be provided with an email confirmation. Patients can withdraw their consent at any point in the future through this email.

A detailed anonymized case description is added, along with a clinically relevant title. Tags are selected to connect the post with all the pertinent specialties.

Further, there are different layers of sharing available through determining visibility of the case; to be shared with all MedShr members, with a private group or selected individual(s).

Cases can be saved as a draft at any stage if the author would prefer not to publish them yet.

Once published, cases can be exported as a Portable Document Format (PDF) to include within a portfolio or case notes. The case author can also request recognition of 30 minutes of Continuing Professional Development (CPD), addressing the current lack of accreditation on social media platforms.

Review of posted cases

One of the principles of members posting and discussing cases is that cases are not reviewed or screened prior to posting and the onus is primarily on the member. It is easy for members to report cases or comments that are of concern to the MedShr team and for staff members to review the cases and content on the platform systematically. The incidence of issues is very low and reflects the professional nature of the environment that has developed, which is certainly helped by the identity of every member being clearly visible.

Status of clinical advice

MedShr provides a platform to doctors to learn from one another in the same way that conferences and other learning environments do. The ultimate responsibility for how a doctor manages a patient rests with that clinician, and MedShr makes it clear that they are not responsible for the advice that members offer to one another on the platform.

Sharing off MedShr

Links to MedShr cases can easily be sent to colleagues via email, WhatsApp and social media.

Privacy will still be protected as only the case title will be visible and the rest of the data will be securely stored on MedShr.

Connecting with colleagues

MedShr members are able to connect with colleagues in many different ways on the platform. They can send and receive requests to “connect” with those known from professional life or from MedShr platform discussions. This allows users to grow their professional network across geographical boundaries.

The option to “search for members in your field” helps to find suggested connections. Additionally, the presence of institutional pages means it is easy to look for members based on workplace.

It is possible to follow a colleague’s case and receive notifications of updates on the case. Discussions take place below the case in comments. Case views can be seen giving an indication of engagement with the material.

Like social media platforms there is also the function to directly message colleagues to have further discussions. Colleagues can also connect through MedShr groups. There are public groups, available and open to all MedShr members, as well as private groups run by organisations and clinical groups which require approval to join.

Connectivity is a powerful tool for clinicians; allowing for research collaborations, multi-centre and international communication, and networking for training fellowships and opportunities. With already busy schedules, clinicians value time-saving measures in order to maximise their productivity. With rapid advances in digital communication, the innovation of “you’ve got mail” has mostly worn off and been surpassed by instant messaging and social media networks. Therefore MedShr capabilities have been designed to meet the demand of rapid and spontaneous communication, while creating a private and professional network for collaboration.

MedShr as a platform

Health Education England

MedShr has an established partnership with Health Education England (HEE) the body re-

sponsible for education for NHS staff in England. A key part of the partnership has been the joint appointment of MedShr-HEE fellows — doctors and dentists in training with an interest in medical education and technology enhanced learning.

The role of the fellows is to develop educational materials on the MedShr platform, undertake projects within medical education with MedShr and HEE, and to develop the role of digital case discussion within formal training of doctors, medical students and healthcare professionals.

Partners within UK training

As a London-based organization, MedShr is working with a range of partners to help support formal training of UK healthcare professionals. Projects range from formal programs with deaneries (groups of institutions in a defined geographical area) to informal programs with individual hospitals or hospital departmental teams.

MedShr supports educational discussions by providing private groups which are moderated and tailored towards the needs of the trainees. An automated sign-up process is offered helping to on-board trainees as easily as possible.

Deanery-wide programs allow whole cohorts of trainees to connect across their region and share learning which would have otherwise been kept privately, with colleagues of the same training level and meet their training needs.

Projects with individual hospitals can include furthering the institutions priorities, for example improving learning from patient safety by disseminating key learning from cases.

Departmental projects aim to connect colleagues and facilitate discussions they need to have, such as groups of consultants sharing unusual cases.

Individual trainees can use the platform to improve their own experience and CV. Trainees have hosted their own teaching groups for medical students or become a “clinical tutor,” sharing teaching cases and receiving detailed feedback on engagements.

Societies

MedShr works with national and specialist societies to provide educational discussion groups to connect their members. For example, in cardiol-

ogy there are partnerships with 14 national cardiac societies and many specialist societies. In the UK in cardiology there are active partnerships with the British Society for Heart Failure, British Cardiovascular Society, British Junior Cardiologists Association, British Cardiovascular Intervention Society, British Heart Valve Society, Arrhythmia Alliance and London Arrhythmia Summit.

There is a longstanding partnership with Cardiovascular Research Foundation and TCT Conference, CTO Summit and Structural Summit. Ahead of and throughout CRF’s Chronic Total Occlusion (CTO) Summit, angiograms for the live cases were shared to engage in discussion around the management of these complex CTO cases. Case competitions aligned with these conferences engage delegates with faculty before, during and after the meetings.

Working with industry

MedShr provides a unique mechanism to provide independent medical education at scale to the relevant doctors and healthcare professionals. To maintain the integrity of clinical case discussions and to ensure informational governance requirements are met, industry employees are not allowed access to MedShr cases, members or discussions. Educational Groups and Featured Educational Cases on MedShr support specific educational objectives in a disease area. Featured Educational Cases on MedShr are curated by experts in the field and key opinion leaders, MedShr Editors and/or MedShr’s Clinical Team. Sponsoring educational Groups and Featured Cases on MedShr is the equivalent to sponsoring lectures, conferences and other educational activities.

Range of digital case discussion

Healthcare professionals use case discussion for a vast array of purposes within clinical practice and medical education. Some of the key uses of MedShr digital case discussion are explored below.

Multidisciplinary team discussions

The purpose of a multidisciplinary team (MDT) is to draw on the knowledge-base and skills of different professionals and specialties, to col-

laborate and improve the quality of a patient's care. This is inherently a type of clinical case discussion, and therefore is in line with the vision and utility of MedShr. An MDT-approach is also utilized in education and training, to prepare healthcare professionals for real-world scenarios and interactions, for example in the form of inter-professional teaching sessions, forums and simulation training.^{24, 25} Interventions and systems that improve communication between medical disciplines are known to improve participation and reduce errors in clinical practice.²⁶ Therefore there is a role for taking MDT discussions and education into the digital world.

Digital case discussion on MedShr can help facilitate MDT discussions for patient care. For example, within the area of Infective Endocarditis, current European Society of Cardiology guidelines recommend management of patients in reference centers by specialized "Endocarditis Teams."²⁷ Patients with complicated infective endocarditis (IE) should be evaluated and managed at an early stage in a reference center, and those with non-complicated IE can be managed in non-reference centers provided there is early and regular communication with the reference center. The referral pathway of a patient with IE may involve medical and surgical teams, stroke clinicians, emergency physicians, microbiologists and more. Provision of highest quality care therefore may necessitate communication between clinicians from different centers, from multiple specialties across geographical barriers.

Internal analysis of existing IE referral processes found that there was a need for improvement of liaison between tertiary centers and referring hospitals. Referrals were done on an ad-hoc multi-modal basis meaning time spent searching for clinical details of referrals in various places. There were also delays in receiving echocardiography imaging to be reviewed. It was identified that what was required was a means for on-the-go communication to allow rapid responses, sharing of imaging and microbiology results. A digital IE MDT was piloted on MedShr to allow discussions between clinicians from three hospital sites; two referring district general hospitals and a central tertiary reference center.

Review of the digital MDT found cases were

TABLE I.—Time from digital case sharing to first view and first comment from MedShr infective endocarditis MDT group on platform.

Time (hours)	First view	First comment
Median	0.5	6.75
Mean	3	12.75
Range	0-18	0-45

posted regularly across the pilot period. Discussions were held between clinicians from different specialties and training levels; from microbiologists to cardiothoracic surgeons, and consultants to first year doctors. Cases ranged from those providing a routine general update on the patient's condition, to those leading to urgent requirement for inter-hospital transfer. Details of the time from sharing of a case in the MDT group to first view of the case and first comment on the case can be seen in Table I. There were an average of 2.5 comments per case. Records of the discussions held were exported as a PDF file using an in-built tool within the App, then stored in the patient's medical notes.

There is potential for wider application of MDTs on the MedShr platform within other areas of cardiology and other medical and surgical specialties. For example, within trauma and orthopedics MDT discussion groups host active discussions between senior specialists seeking advice on operative and non-operative management of complex cases. Through the MedShr platform, colleagues from different centers can connect to share and discuss cases with associated imaging, gaining expert consensus to provide the best care for their patients.

Diagnostic doubt

Case reports about rare or challenging diagnoses have been key to sharing medical knowledge since the beginning of modern medicine.²⁸ However, digital case discussions on MedShr offer a more rapid, flexible, "bite-size" form of the traditional case report. Cases can be shared in minutes, allowing knowledge to be shared even when the time commitment to create a formal journal publication cannot be afforded. Professionals of all seniority can share and discuss cases, making case discussion more accessible. Digital case

discussions are not static, and can be documented in real-time, allowing other clinicians to follow along as things change and progress without the influence of hindsight. Further, MedShr provides space for discussion of unusual cases where a conclusion has not yet been reached.

The impacts of medical uncertainty on physician stress and burn-out are well-described, with some authors arguing for a need for changes to medical education and ethos.²⁹ A key trend identified in the use of the MedShr platform has been that clinicians are sharing and discussing diagnostic uncertainty. The platform has provided a space to explore doubt with colleagues for medical education and reflection. Sharing with colleagues is an integral part of managing uncertainty in the medical community, and the opportunity to do this accessibly and digitally via smart phone on MedShr has been utilized by MedShr members.

Colleagues within primary care propose that coping mechanisms for diagnostic ambiguity are essential within formal training.³⁰ With the beginning of integration of MedShr case discussions into formal UK training, further work in this key focus of medical education becomes possible.

Despite being regularly confronted, with known effects on clinical safety, healthcare expenditure and healthcare use, more research is required to evaluate diagnostic uncertainty.³¹ There is potential for anonymized trends in cases shared on MedShr to help researchers further appreciate ambiguity in clinical practice and develop strategies to mitigate its effect on patients and clinicians.

New techniques

The value of dissemination of expertise about novel techniques amongst interventional cardiologists using online platforms has been widely recognized.^{32, 33} and was exemplified by trends in discussion about the transradial approach (#RadialFirst) and left distal coronary access (#IdTRA).²⁰ However, many authors caution the risks of sharing on public-access platforms.²⁰ MedShr members are sharing practical tips and novel approaches, doing so on a platform which is for verified healthcare professionals only and benefiting from additional professionalism and security than social media platforms.

Clinical equipoise and debate

Even in the era of evidence-based medicine (EBM), published data can remain incomplete and there can be a gulf between the trial and the ward, necessitating a role for debate and experience-informed opinion.^{34, 35}

MedShr provides a space where real patients are discussed in relation to available evidence, and clinicians debate how this informs potential diagnoses and care options. Many authors have pointed out the necessity for reasoning and judgement when translating EBM into clinical practice of patient-centered medicine.³⁵ In cases of clinical equipoise and debate on platform, clinicians collectively explore decision making. The core tools observed in-use on MedShr have been identified in the literature as key pillars of clinical judgement; evidence, experience, reasoning, patient factors and resource factors.³⁶

Digital case discussion can also offer insights into the changing landscape of clinical practice within a context of an evolving evidence base. An example was a case shared by the senior author, AQ, in July 2015. The case-initiated discussion surrounding an otherwise healthy 74-year-old with distal left main stem stenosis, multi-vessel critical block and ischemic burden largely from left circumflex. Debate ensued about the application of CABG or PCI. Discussion covered the complex range of factors to consider, from practicalities such as predicted amenability for CABG, varying approaches to PCI in the context of the patient's anatomy, consideration of patient and team views and of course the evidence base. The open availability of this discussion over several years gave a longitudinal perspective on the development of the debate surrounding evidence from key trials such as NOBLE and EXCEL and ISCHAEMIA.^{37, 38}

Case discussion amongst a range of professionals

The MedShr platform supports a variety of user interactions. Apart from the private message, connect and follow functions mentioned earlier, MedShr interactions can benefit the user on multiple levels; supervisor to junior, peer to peer and generalist to specialist.

By adjusting the visibility of a case, users can choose to share it with a private group or particular individuals, without it being released to all MedShr users. This benefits students and trainees by allowing supervisors to moderate and curate discussions. Therefore, limited and private visibility settings allow users to create safe learning environments on platform. This digital environment creates a virtual classroom for supervisor to junior interactions. On platform, users have utilized private groups moderated by designated senior clinicians to discuss cases within their local department. This allows for asynchronous participation and feedback, even if supervisor and junior schedules do not match up. Aware of the importance of addressing current training requirements in the UK, the MedShr platform can easily export the discussion thread for upload to the trainee’s online portfolio, therefore avoiding the duplication of work.

A recent platform review on MedShr also revealed that clinical cases written from more senior clinicians often generate discussion and comments from junior clinicians and students. Cases also receive views and comments across different specialties and disciplines, supporting generalist to specialist interactions. This is largely due to the ability to include a variety of associated specialty tags to a case, and the ability to share a case to multiple interest groups to generate engagement. We found that cases with multiple specialty tags and multimodal image and resource uploads are more likely to be trending on platform.

Open discussion on platform supports informal and ad-hoc supervision and the potential for mentorship, which would otherwise be difficult to achieve in a ward or clinic. Although users from different levels of experience utilise MedShr, the platform has created an approachable and accessible environment that bridges specialty, seniority and disciplinary barriers.

Why do doctors discuss cardiology cases online?

In 2019, we reviewed 50 consecutive cardiology cases posted on the MedShr platform to review user activity and interactions. Data was collected on the authors’ professional seniority, type of case and case-image modality for analysis. Our results

revealed that of these 50 cases, consultants posted the most cases (62%), followed by specialty registrars (14%), fellows (12%) and junior specialty trainees and interns (12%) (Figure 1). The most featured image-upload on cases was of coronary angiography (48%), followed by echocardiogram clips (26%) and ECG images (20%). 6% of cases had other forms of images uploaded to a case, such as medical photography of examination findings or other associated investigations (Figure 2).

This bias towards angiography images does reflect the most active section of MedShr cardiology membership and this pattern is also seen in open social media such as Twitter. It is of note the senior doctors are sharing the majority of cases and are the most active and engaged MedShr members.

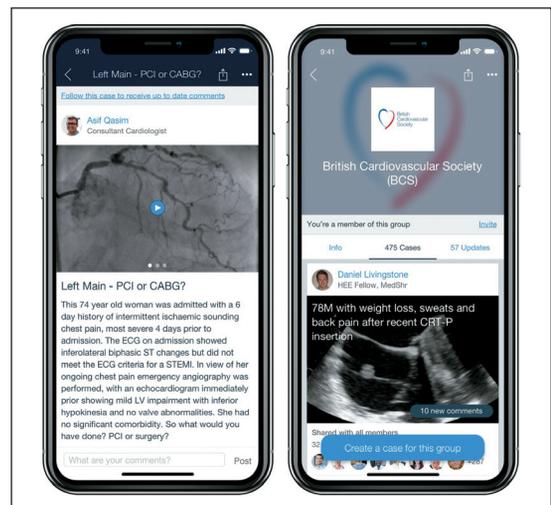


Figure 1.—MedShr enables doctors to share and discuss clinical cases and connect using social network technology.

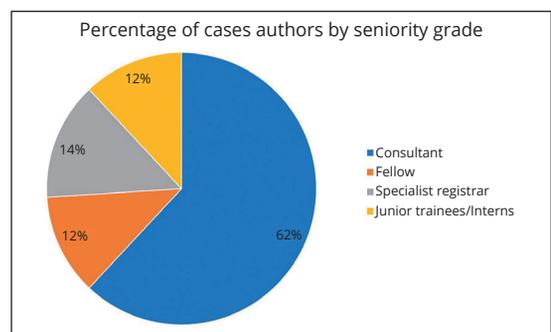


Figure 2.—Distribution of cases by author seniority.

Reviewing the content of cardiology cases in this series, the broad types of case discussions can be summarized into the following categories: complex or challenging; classic presentation; rare or unusual; reflection on outcome; novel technique of device. The most common type of case discussion was on complex and challenging cases (46%), followed by classic case presentations (22%) and rare or unusual presentations (16%) (Figure 3). This distribution suggests that the MedShr cardiology community are interested in featuring diagnostic doubt, MDT-content and clinical debate. The high number of classic presentation cases also reflect the use of case discussion for education, and cross-specialty education, especially through senior to junior user interactions. Although they had less representation in this series, new techniques and devices were still featured in 12%, while reflection on outcome featured in 4% of cases. In summary, our results support the use of cardiology case discussion in education communication to improve patient care (Figure 4).

Digital media for contemporary scholarship

A well-known mantra of a clinician in the UK is to “make the care of your patient your first concern and provide a good standard of practice and care” which comes from “the duties of a doctor” from the General Medical Council (GMC),³⁹ specific to maintaining a good standard of care, the GMC guidance requires clinicians to keep professional knowledge and skills up to date. Traditionally, this would involve being engaged with teaching and research.⁴⁰ Despite the popularity of digital media, clinicians who take time out of their personal schedule to create high quality digital content often do not get academic recognition for their contributions which may diminish their enthusiasm and motivation in the future.⁴¹⁻⁴³

Scholarship has traditionally represented a single channel, the route to discovery.^{42, 44, 45} In 1990 Boyer *et al.*⁴⁴ suggested an update to incorporate the different avenues of intellectual pursuit, with four main and overlapping groups; discovery, integration, application and teaching. These categories complement the motivations of a doctor who desires to be up to date with the latest developments and maintain excellence in their standard of care.

Thoma *et al.* applied Boyer’s framework to current digital products, to identify their potential for the medical community. They found that the majority of digital sources were in the category of teaching (85.4%), with the top sources being web- and computer-based assisted learning, online courses, blogs, online repositories and Wikis. They categorized fewer sources for integration (7.6%), application (5.5%) and discovery (1.5%). Digital products often fell into more than one category. For example, from their classification, a social network, online repository, and blog would all involve the scholarship of teaching, application and integration, and an open access journal would involve discovery, integration and teaching. Wikis, which are built from crowd-sourced content were categorized solely under the scholarship of teaching.

MedShr is a unique platform that functions like a social network centered on case sharing

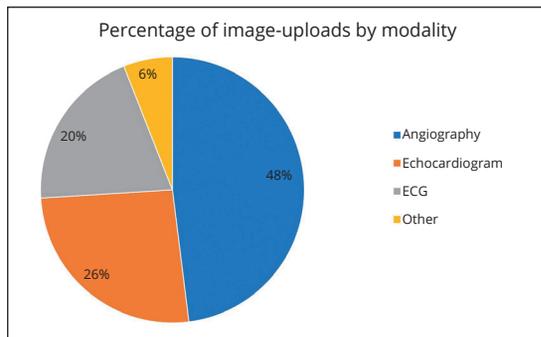


Figure 3.—Distribution of image-uploads.

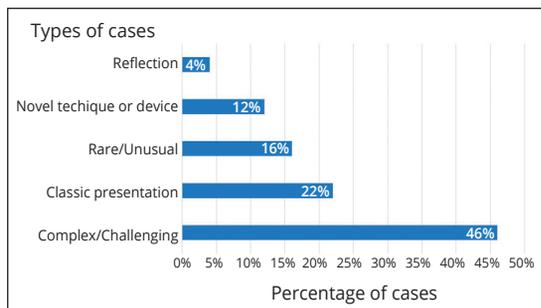


Figure 4.—Distribution of cardiology case discussion by case type.

and open discussion between users. It generates a multimodal form of scholarship through user engagement with different types of cases. Therefore, it can support teaching, integration and application of knowledge, and hosts the capability to disseminate information on new discoveries. Therefore, the dynamic nature of MedShr is suitable for the contemporary scholar. Table II demonstrates how features on MedShr parallel traditional teaching resources and the examples quoted by Thoma *et al.*²³

Digital media quality indicators for MedShr

It is now recognized that digital media has educational and functional value, however with the varying styles and platforms available, scholarly appraisal becomes complicated.^{12, 41, 46} Currently, in the medical community, there isn't a univer-

sally consistent way of assessing the value of digital media content and their impact on clinical activity. Traditional methods of critical appraisal for peer-reviewed publications may not fully encompass the dynamic connections and influence digital and social media have on the user.^{10, 15, 23} Therefore, using such methods, though helpful for benchmarking, may not represent the true value of digital media.

Lin *et al.* have developed 13 quality indicators (QI) for social media content. Considering the capabilities and functions of the MedShr platform, Table III shows how MedShr capabilities match up to these QIs.

Landscape of medical apps

Many journals accept Case Reports that usually relate to rare or complex cases, or unusual presentations. The same is true of many

TABLE II.—How MedShr features parallel traditional and digital teaching and learning resources.

Types of teaching and learning resources	Examples of traditional products	Examples of digital products	MedShr features
Interactive resources	<ul style="list-style-type: none"> • Small groups • Workshops 	<ul style="list-style-type: none"> • Online discussion board • Social network • Wiki 	<ul style="list-style-type: none"> • Case comment thread • “Connect” requests for notifications on user updates • “Follow” requests for notifications on case discussion activity and updates • “Like” function for user positive feedback • Direct messaging between users • Specialty interest groups • Private discussion groups • Case sharing to groups
Independent study resources	<ul style="list-style-type: none"> • Assignments • Discussion with tutors • Group work • Laboratory work 	<ul style="list-style-type: none"> • E-mail • Online course • Serious game • Virtual reality • Web based and computer assisted learning 	<ul style="list-style-type: none"> • Case invitation to single users (<i>e.g.</i> to supervisors for review/assessment) • Case polls • Platform newsletter for featured cases
Audio-visual Resources	<ul style="list-style-type: none"> • Lecture • Skills demonstration 	<ul style="list-style-type: none"> • Podcast • Video podcast • Instructional video 	<ul style="list-style-type: none"> • Cases support images, videos and other presentation file type uploads
Point-of-care resources	<ul style="list-style-type: none"> • Guidebooks • Pocketbooks 	<ul style="list-style-type: none"> • Applications (‘Apps’) 	<ul style="list-style-type: none"> • App platform available
Written resources	<ul style="list-style-type: none"> • Textbook • Printed journals • Medical journalism 	<ul style="list-style-type: none"> • Online textbook • Blog • Open access journal • Website 	<ul style="list-style-type: none"> • Case and poll creation
Resource repository	<ul style="list-style-type: none"> • Library • Library classification system 	<ul style="list-style-type: none"> • Online repository • Search engine 	<ul style="list-style-type: none"> • Database of user-created cases for public or private discussion • Platform search engine for cases, groups and user profiles

Adapted from Thoma *et al.*²³

medical congresses that call for submissions of complex or challenging cases. The first digital development from this was for websites to accept submissions that they would then publish after review. The move to user generated cases and content analogous to social media platforms has been attempted by other systems. For example, Figure 1 launched from Canada as ‘Instagram for doctors’ and has had many downloads.⁴⁷

A difference between MedShr and Figure 1 is that MedShr is available for healthcare professionals only and is not open to the public or industry. Being built with the principles of professional conduct and compliance at heart, MedShr cases require consent status to be documented and provide options to attain consent, differing from Figure 1 on this key element.

Connecting clinicians through MedShr groups is a key aspect of work with educational partners

TABLE III.—*MedShr and Digital Media Quality Indicators.*¹⁰

Quality Indicator (From Lin <i>et al.</i> 2015) ¹⁰	Domain / subtheme	Supported on MedShr (Yes/No)	Comments on platform capability:
1 Do the authorities that created the resource list their conflicts of interest?	Credibility / bias	Yes	• Cases linked to author profile
2 Is the identity of the resources author clear?	Credibility / transparency	Yes	• Cases linked to author profile
3 Does the resource make a clear distinction between fact and opinion?	Credibility / bias	Yes	• Case description supports free text for details
4 Is the information presented in the resource accurate?	Content / academic rigour	Yes	• Case description supports free text for details • Comments section for open discussion between users and author
5 Does the resource employ technologies that are universally available to allow learners with standard equipment and software access?	Design / Functionality	Yes	• IOS and android interface supported, with option of web or App-platform access
6 Does the resource cite its references?	Credibility / use of other resources	Yes	• Case description supports free text for details
7 Are the resource’s statements consistent with its references?	Credibility / use of other resources	Yes	• Case description supports free text for details • Comments section for open discussion between users and author
8 Does the resource clearly differentiate between advertisement and content?	Credibility / bias	Yes	• Platform moderators remove unauthorised advertisement content • All authorised advertisement content is clearly signposted
9 Is the resource transparent about who is involved in its creation?	Credibility / transparency	Yes	• Cases linked to author profile
10 Is the content of this educational resource of good quality?	Content	Yes	• Platform moderators review content for quality control • Report function available for users to bring content to the attention of platform moderators
11 Is the content of the resource professional?	Content / Professionalism	Yes	• Platform moderators review content for quality control • Report function available for users to bring content to the attention of platform moderators
12 Is the resource useful and relevant for its intended audience?	Content / orientation	Yes	• Cases can be individualised by selecting levels of visibility: public, private, or for a particular group • Seniority of audience determined by author
13 Is the author well qualified to provide information on the topic?	Credibility / transparency	Yes	• Cases linked to author profile with seniority visible • Cases can be individualised by selecting target audience groups

such as Royal Colleges and Americans Boards, a feature which is not possible on Figure 1. Professional profiles and the ability to connect with colleagues are also not available, making it harder to feel part of a digital community. MedShr has seen a high proportion of senior doctor membership and specialist case discussion which continues to grow with communities of practice finding their place to connect on the platform.

There has been a ground-swell in recent years of various communication apps for medical teams, such as Medcrowd, Siilo, Hospify and more. These apps perform a functional role allowing clinicians to instant message. Although MedShr does allow clinicians to message one another, its main focus is in presenting clinical cases in a practical and searchable way, as well as recognizing the inherent educational value of discussions through awarding CPD and allowing records for portfolio.

Conclusions

Since its launch in October 2015 MedShr has grown rapidly to over one million members in 190 countries across all clinical specialties. There are over 40,000 cardiologists on the platform around half of whom are senior doctors, who create more than half the content. Increasing activity with national and specialist societies is being led by cardiology groups. New features have been released to support this including MedShr Polls and Messaging. The vision for MedShr is to improve healthcare and save lives, supporting doctors in their everyday clinical practice. The platform has a good foundation to realize this ambition and has an ever-increasing array of partnerships to support this.

References

- Haldane T. "Portfolios" as a method of assessment in medical education. *Gastroenterol Hepatol Bed Bench* 2014;7:89–93.
- Workplace Based Assessment. Joint Committee on Surgical Training; ©2006-2018 [Internet]. Available from: https://www.iscp.ac.uk/curriculum/surgical/assessment_wbas.aspx [cited 2018, Jun 18].
- Fielding A, Mulquiney K, Canalese R, Tapley A, Holliday E, Ball J, *et al*. A general practice workplace-based assessment instrument: content and construct validity. *Med Teach* 2020;42:204–12.
- E-portfolios for doctors [Internet]. Health Education England. Available from: <https://www.healthcareers.nhs.uk/career-planning/developing-your-health-career/developing-your-portfolio/e-portfolios-doctors> [cited 2020, Jan 2020].
- Ali JM. Getting lost in translation? Workplace based assessments in surgical training. *Surgeon* 2013;11:286–9.
- Castanelli DJ, Jowsey T, Chen Y, Weller JM. Perceptions of purpose, value, and process of the mini-Clinical Evaluation Exercise in anesthesia training. *Can J Anaesth* 2016;63:1345–56.
- Heeneman S, Driessen EW. The use of a portfolio in post-graduate medical education - reflect, assess and account, one for each or all in one? *GMS J Med Educ* 2017;34:Doc57.
- Madanick RD. Education Becomes Social: The Intersection of Social Media and Medical Education. *Gastroenterology* 2015;149:844–7.
- White JS, Sharma N, Boora P. Surgery 101: evaluating the use of podcasting in a general surgery clerkship. *Med Teach* 2011;33:941–3.
- Lin M, Thoma B, Trueger NS, Ankel F, Sherbino J, Chan T. Quality indicators for blogs and podcasts used in medical education: modified Delphi consensus recommendations by an international cohort of health professions educators. *Postgrad Med J* 2015;91:546–50.
- Purdy E, Thoma B, Bednarczyk J, Migneault D, Sherbino J. The use of free online educational resources by Canadian emergency medicine residents and program directors. *CJEM* 2015;17:101–6.
- Syed S, Rosenberg H. FOAMed and social media - innovation or disruption? *CJEM* 2018;20:818–20.
- Huang S, Martin LJ, Yeh CH, Chin A, Murray H, Sanderson WB, *et al*. The effect of an infographic promotion on research dissemination and readership: A randomized controlled trial. *CJEM* 2018;20:826–33.
- Access FO. Medical Education (FOAMed). Faculty of Intensive Care Medicine (FICM); ©2020 [Internet]. Available from: <https://www.ficm.ac.uk/e-icm/free-open-access-medical-education-foamed> [cited 2020, Jan 5].
- Cadogan M, Thoma B, Chan TM, Lin M. Free Open Access Meducation (FOAM): the rise of emergency medicine and critical care blogs and podcasts (2002-2013). *Emerg Med J* 2014;31(e1):e76–7.
- Redfern J, Ingles J, Neubeck L, Johnston S, Semsarian C. Tweeting our way to cardiovascular health. *J Am Coll Cardiol* 2013;61:1657–8.
- Walsh MN. Social Media and Cardiology. *J Am Coll Cardiol* 2018;71:1044–7.
- Yeh RW. Academic Cardiology and Social Media: Navigating the Wisdom and Madness of the Crowd. *Circ Cardiovasc Qual Outcomes* 2018;11:e004736.
- Vidal-Perez R, Gómez de Diego JJ, Grapsa J, Fontes-Carvalho R, Gonzalez-Juanatey JR. Social media in cardiology: reasons to learn how to use it. *World J Cardiol* 2019;11:217–20.
- Alasnag M, Mamas M, Fischman D, Brugaletta S, Safirstein J, Meier P, *et al*. View point on social media use in interventional cardiology. *Open Heart* 2019;6:e001031.
- Mallin M, Schlein S, Doctor S, Stroud S, Dawson M, Fix M. A survey of the current utilization of asynchronous education among emergency medicine residents in the United States. *Acad Med* 2014;89:598–601.
- O'Dowd-Booth CJ. Medical education innovation: the advent of social media. *Future Healthc J* 2019;6(Suppl 1):134.
- Thoma B, Sanders JL, Lin M, Paterson QS, Steeg J, Chan TM. The social media index: measuring the impact of emer-

gency medicine and critical care websites. *West J Emerg Med* 2015;16:242–9.

24. Visser CL, Ket JC, Croiset G, Kusrkar RA. Perceptions of residents, medical and nursing students about Interprofessional education: a systematic review of the quantitative and qualitative literature. *BMC Med Educ* 2017;17:77.

25. Kashner TM, Hettler DL, Zeiss RA, Aron DC, Bennett DS, Brannen JL, *et al.* Has Interprofessional Education Changed Learning Preferences? A National Perspective. *Health Serv Res* 2017;52:268–90.

26. O'Brien A, O'Reilly K, Dechen T, Demosthenes N, Kelly V, Mackinson L, *et al.* Redesigning Rounds in the ICU: Standardizing Key Elements Improves Interdisciplinary Communication. *Jt Comm J Qual Patient Saf* 2018;44:590–8.

27. Habib G, Lancellotti P, Antunes MJ, Bongioni MG, Casalta JP, Del Zotti F, *et al.*; ESC Scientific Document Group. 2015 ESC Guidelines for the management of infective endocarditis: The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). *Eur Heart J* 2015;36:3075–128.

28. Nissen T, Wynn R. The history of the case report: a selective review. *JRSM Open* 2014;5:2054270414523410.

29. Kim K, Lee YM. Understanding uncertainty in medicine: concepts and implications in medical education. *Korean J Med Educ* 2018;30:181–8.

30. O'Riordan M, Dahinden A, Aktürk Z, Ortiz JM, Dağdeviren N, Elwyn G, *et al.* Dealing with uncertainty in general practice: an essential skill for the general practitioner. *Qual Prim Care* 2011;19:175–81.

31. Bhise V, Rajan SS, Sittig DF, Morgan RO, Chaudhary P, Singh H. Defining and measuring diagnostic uncertainty in medicine: a systematic review. *J Gen Intern Med* 2018;33:103–15.

32. Mandrola J, Futyma P. The role of social media in cardiology. *Trends Cardiovasc Med* 2020;30:32–5.

33. Fischman DL, Savage MP. Cardiowitter: new virtual tools to advance skillsets in Interventional Cardiology. *Curr Cardiol Rev* 2019. [Epub ahead of print]

34. Tonelli MR. In defense of expert opinion. *Acad Med* 1999;74:1187–92.

35. Eibling D, Fried M, Blitzer A, Postma G. Commentary on the role of expert opinion in developing evidence-based guidelines. *Laryngoscope* 2014;124:355–7.

36. Sacristán JA. Evidence based medicine and patient centered medicine: some thoughts on their integration. *Rev Clin Esp (Barc)* 2013;213:460–4.

37. Nordic-Baltic-British Left Main Revascularisation Study – NOBLE. 23rd December 2019. Kumbhani DJ, American College of Cardiology; ©2020 [Internet]. Available from: <https://www.acc.org/latest-in-cardiology/clinical-trials/2016/10/28/19/49/noble> [cited 2020, Jan 13].

38. Evaluation of XIENCE, *versus* Coronary Artery Bypass Surgery for Effectiveness of Left Main Revascularization – EXCEL. 7th November 2019. Kumbhani DJ, American College of Cardiology; ©2020 [Internet]. Available: <https://www.acc.org/latest-in-cardiology/clinical-trials/2016/10/28/19/37/excel> [cited 2020, Jan 13].

39. Good Medical Practice. General Medical Council; ©2020 [Internet]. Available from: <https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/good-medical-practice> [cited 2020, Jan 5].

40. Gruzd A, Staves K, Wilk A. Tenure and Promotion in the Age of Online Social Media. *Am Soc Inform Sci Annu Meet Proc* 2012;48(1):1-4.

41. Hendricks A. Bloggership, or is publishing a blog scholarship? A survey of academic librarians. *Libr Hi Tech* 2010;28:470–7.

42. Thoma B, Chan T, Benitez J, Lin M. Educational scholarship in the digital age. ©2020 [Internet]. Available from: <https://thewinnower.com/papers/educational-scholarship-in-the-digital-age-a-scoping-review-and-analysis-of-scholarly-products> [cited 2020, Jan 4].

43. Anderson LW, Krathwohl DR. A Taxonomy for Learning Teaching and Assessing: a revision of blooms taxonomy of educational objectives. New York; Longman; 2001.

44. Boyer EL. Scholarship Reconsidered: Priorities of the Professoriate. Princeton, NJ; The Carnegie Foundation for the Advancement of Teaching; 1990.

45. Glassick CE. Boyer's expanded definitions of scholarship, the standards for assessing scholarship, and the elusiveness of the scholarship of teaching. *Acad Med* 2000;75:877–80.

46. On the evaluation of digital media as scholarship. Rockwell G, Modern Language Association; ©2020 [Internet]. Available from: <https://www.mlaajournals.org/doi/abs/10.1632/prof.2011.2011.1.152> [cited 2020, Jan 7].

47. Figure 1. Toronto ©2020 [Internet]. Available from: <https://www.figure1.com> [cited 2020, Feb 19].

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