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REVIEW

An introduction and guide to becoming a social media savvy nephrologist

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ABSTRACT

The use of social media has increased over the last several decades, with ∼72% of the US adult population indicating the use of social networking platforms. Expansion of social media use beyond personal reasons now includes professional uses. This growth is especially true in medicine—and specifically nephrology. An enhanced online presence has the potential to make positive contributions to professional development, education and collaborations, potentially opening doors to academic opportunities. With a growing number of online platforms, resources and conversations, it is natural for one to feel overwhelmed and ultimately avoid social media. We discuss the benefits of social media engagement for nephrologists and provide a practical guide on how they can harness social media professionally and effectively. With an understanding of the basics, existing resources and avoidance of potential pitfalls, physicians can learn to use social media and join the global nephrology community.

Keywords: fellowship, medical education, nephrology, social media, twitter

INTRODUCTION

The use of social media has changed the way we interact. Communication has evolved from a mostly private two-way dialog to a global, always-on network of individuals. Social media has the potential to accelerate and introduce new relationships between individuals that, in the past, would have had more obstacles to overcome. Within the last decade, social networking use has increased almost 10-fold from 7% of the US adult population to 72% [1]. For many, transactions that used to occur in person are now conducted remotely via mobile phones and computers. As a result of this evolution, many retail companies are switching from a bricks-and-mortar setting to electronic commerce for improved customer reach, visibility and profit ratio [2]. Similarly, hospital systems, medical societies and journals are now embracing social media as a means of dissemination and enhancement of connectedness, community and even reputation [3–8]. Importantly, social media has allowed for any individual to share information and create educational content with minimal barriers, such as publishing companies, print journals or news magazines. With the success of this online migration, social media is no longer being restricted to one's personal life and many are integrating social media into their professional lives. Simultaneously, smartphone usage has become nearly ubiquitous and the preferred way to access information and news [9]. These factors have coalesced to allow medical professionals to take advantage of social media and utilize these networks for self-education and increased outreach. Here, we discuss the growth of the nephrology social media community and the benefits of participation, and provide strategies for nephrologists to effectively use social media platforms.

INTRODUCTION TO SOCIAL MEDIA

Social media is the term used to describe openly and freely accessible, user-generated content and communication that is posted on online platforms. It allows individuals, often separated by time, place and ideology, to express themselves in an informal setting by creating, sharing and engaging with each other to discuss common interests. These interactions can occur in various online platforms and take form in numerous ways including text, photo, video, audio, hyperlinks and graphics (Table 1). Each online platform is optimized to share content in a way that achieves its goal. For example, Instagram is a photo-sharing application where individuals can share photos and short videos [10]. Facebook is another highly trafficked social networking site with 2.5 billion followers, where individuals create a profile and then 'friend' other users to establish a personal online network [11]. On Facebook, businesses and organizations can create profiles known as 'pages' to interact with and attract an audience. Pages can be a professional physician

Table 1. Online resources available in nephrology

Visual	**Video-based learning**
	• Professional societies
	  • ASN
	  • ISN
	• Journal
	  • *NDT*
	• Chalk-talk style
	  • Vimeo physiology videos
	  • YouTube WashU Path videos
	• Groups
	  • GlomCon
	  • Nephrology on Demand
	  • ISN Nuances in Nephrology
	• Infographics
	  • Visual Abstracts
	  • *Landmark Nephrology*

Auditory	**Podcasts**
	• Professional societies
	  • ASN
	  • NKF-*Life as a Nephrologist*
	  • RPA
	  • ASPN
	• Journal
	  • *CJASN*
	  • *NEJM*
	  • *Annals of Internal Medicine*
	• Group
	  • NephJC *Freely Filtered*
	  • Core IM
	  • The Curbsiders
	  • Medicina de Impacto (Spanish)
	• Institution
	  • The Rogosin Institute
	• Dialysis organizations
	  • Satellite Healthcare
	  • DaVita

Read/Write	**Blogs**
	• Professional societies
	  • ISN Academy
	• Journal
	  • *AJKDBlog*
	• Nephrologist
	  • *Nephron Power*
	  • *Precious Bodily Fluids*
	  • The Nephrologist
	• Groups
	  • Renal Fellow Network
	  • NephJC
	  • NSMC
	  • UKidney
	  • Last Month in Nephrology
	• Tweetorials

Kinesthetic	Interactive learning • NephSIM • NephMadness • NephroWorldCup • ISN Education Quizzes

profile, a business profile or other type of profile. Instagram and Facebook do not easily lend themselves to global interaction, as content sharing may be limited by one's followers. However, closed Facebook groups have been used successfully by a variety of medical groups [11, 12]. Though short videos can be shared on either Instagram or Facebook, Vimeo and YouTube are social media platforms that facilitate free video-sharing [13, 14]. Last but not least is Twitter, the popular online microblogging platform and arguably the birthplace of the global nephrology community [15, 16]. Twitter users can share brief messages containing text or media (limited to 280 characters) called tweets, which not only broadcast to individuals that 'follow' one's Twitter profile, but also can be viewed by anyone with access to the Internet. Similarly, anyone with a Twitter account can amplify tweets by 'retweeting' them or respond to tweets and initiate a public dialogue. Thus, Twitter allows for rapid content dissemination and digestion as well as dialogue-like interchanges. Over the last decade, nephrologists from around the world have flocked to Twitter and created an active community [16, 17].

THE VIRTUAL, GLOBAL NEPHROLOGY COMMUNITY

Blogs, NephMadness and NephJC

About a decade ago, the first virtual meeting place of the nephrology social media community occurred on the comment section of fledgling personal blogs (Renal Fellow Network [18], *Precious Bodily Fluids*, UKidney and *Nephron Power* were some of the earliest, Figure 1). On these blogs, posts focused on high-yield topics relevant to the global nephrology community and invited debate and discussion. Shortly thereafter (∼2010), these conversations moved to Twitter. The ease of discourse on Twitter allowed for quicker conversation and planted the seed of a global community. Early on, the conversations on Twitter were small, oftentimes unfocused, and occurring sporadically at random times. The solution was the creation of a unifying event—in 2013, NephMadness served as the first *de facto* meeting for the online nephrology community and has become an important milestone in the growth of the online nephrology community [19–21].

NephMadness, a product of the *American Journal of Kidney Diseases* online companion blog (first termed eAJKD and now AJKDblog), is an educational tournament played out on social media that has been held annually each March. This event allowed for an international gathering of nephrologists (and anyone interested in kidney health) to interact and connect virtually. The tournament is modeled after the National College Athletic Association March Madness basketball tournament. Instead of basketball teams, NephMadness pits nephrology concepts in eight regions against each other in a bracket. Early examples included pairings like 'Fistula First Initiative' versus 'Peritoneal Dialysis (PD) First Initiative' in the Dialysis Region and 'Mycophenolate Mofetil' versus 'Cyclophosphamide' in the Kidney Transplantation Region [22]. During the tournament in March, participants read blog posts written about these topics and debate them on Twitter. Because of NephMadness, online conversations became more focused and deliberate. Participants add the hashtag (#) #NephMadness to each tweet, so that other participants can easily find them. The number of individuals using the #NephMadness hashtag on Twitter during the tournament grew from 77 in 2013 to 1719 in 2019 [21].

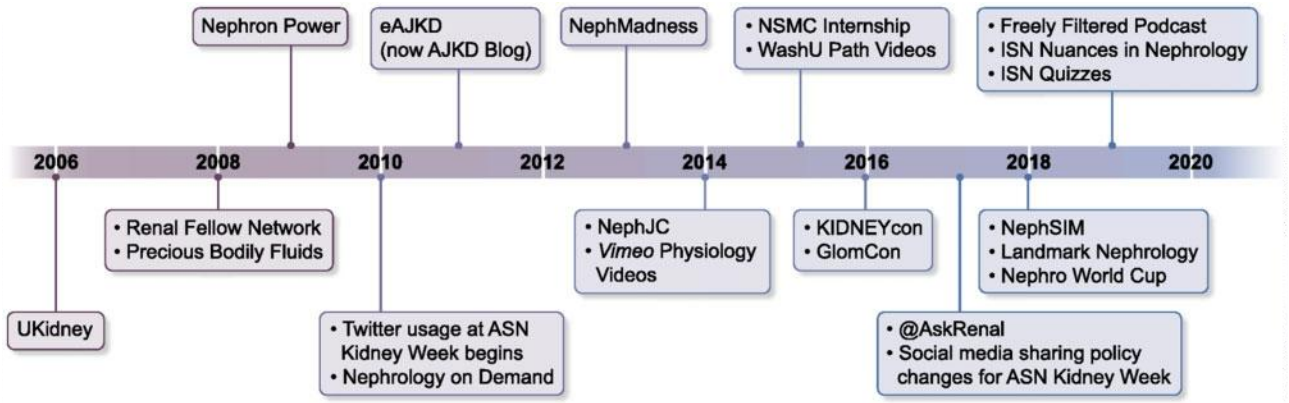

FIGURE 1: Nephrology social media timeline.

One year after the inaugural NephMadness, another key component of the nephrology community was born, in 2014: the online Nephrology Journal Club (NephJC; Figure 1) [12]. NephJC is a biweekly, hour-long, online journal club that occurs on Twitter, similar to a divisional grand rounds or in-person journal club schedule. Prior to the session or 'Twitter chat', a blog post summarizing the research study is published. The discussion itself is led by a host who tweets from NephJC's Twitter account and poses sequential questions to the group to focus the discussion. Similar to #NephMadness, the hashtag #NephJC is added to each tweet and allows anyone to follow tweets related to the discussion in real-time or review afterward. Over the last 5 years, NephJC has expanded its reach by hosting these chats in three separate time zones (North American, Europe and Asia). Each session typically garners ∼100 people who use the #NephJC hashtag, and it is likely that others passively follow the discussions. During the chat, a clinical nephrologist in Houston, a gastroenterologist in Phoenix, a patient with advanced CKD and a medical student in Brooklyn can all engage on a platform irrespective of location, medical specialty or training level. This allows for global dissemination of information throughout our community (and beyond) instantaneously. Moreover, the recurrent nature of NephJC helps to reinforce relationships and strengthen collaborations. Authors of the research study are frequently chat participants, providing a unique opportunity for individuals to ask questions about study design or statistical analysis directly to the authors.

#Nephrology hashtags

With the flood of information available on social media platforms, how does one streamline their experience? Briefly discussed above, a widely used solution to this is the hashtag (#), which serves as a categorical tag for a social media message [23, 24]. For example, following the hashtag #nephrology on Twitter takes the user to the latest or most popular tweets containing that hashtag. A popular nephrology hashtag is #AskRenal, which essentially tags a message with 'This is a question for the nephrology community.' An automated Twitter account, or Twitter bot, was designed in 2016 by the Nephrology Social Media Collective (NSMC) to search Twitter for #AskRenal and then retweet the message if found. The #AskRenal Twitter bot account has >3500 followers [25]. This mechanism allows for an individual with a limited network of Twitter followers to reach a larger and more engaged audience. Initially inspired by an inquisitive medical student on Twitter, the goal of #AskRenal and the Twitter bot account was to yield a wealth of responses for all nephrology-related questions posed on Twitter and cultivate a culture of learning [23]. For example, a learner asked 'What are other causes of oval fat bodies and fatty casts in urine besides nephrotic syndrome? #AskRenal' on Twitter, and this question was answered by several individuals with citations. This initiative is an example of how the virtual nephrology community was further strengthened by allowing both trainees and colleagues to discuss nephrology topics in an open learning environment. The AskRenal Twitter bot account retweets ∼120–150 tweets per month that have been flagged with #AskRenal.

Similarly, society meetings and specialty conferences of all sizes have utilized hashtags to enrich the conference experience for both attendees and those unable to attend. A decade ago, conference material was not accessible unless one was physically present. Now, many nephrology conferences such as the American Society of Nephrology (ASN) Kidney Week, European Renal Association – European Dialysis and Transplant Association (ERA-EDTA) Congress, International Society of Nephrology (ISN) World Congress of Nephrology, National Kidney Foundation (NKF) Spring Clinical Meeting, KIDNEYcon and Nephrology Business Leadership University, among others, have facilitated live sharing of content by removing on taking pictures of slides and actively encourage social media sharing—creating a virtual conference experience. In order to enhance content sharing at conferences, we suggest using photo enhancing applications like Office Lens or U Scanner to allow pictures of projected slides to become more legible. In addition, threading (linking in order) tweets is an effective way to organize content to permit learners to read multiple slides of a presentation. Conference content shared via Twitter and coupled with the conference's official hashtag (e.g. #KidneyWk, #NKFClinicals, #KIDNEYcon, #NBLUniv) has been shown to promote networking, resource sharing, practice updates, public awareness and online discussion of sessions to both conference attendees and those who do not attend [4, 5, 7, 26]. Both national and international nephrology societies (e.g. ISN, ERA-EDTA, NKF) have developed social media teams to provide

more structure and deliberate coverage of conferences [27]. Moreover, anecdotal evidence suggests that social media exposure at conferences may serve as a stimulus for individuals to increase their social media engagement after the meeting [28].

INNOVATIVE WAYS TO LEARN, EDUCATE AND DISSEMINATE

Social media has provided a unique venue to innovate educational methods and apply novel dissemination strategies. In particular, free open access medical education (FOAMed) resources cater to a variety of learning styles (e.g. visual, auditory, kinesthetic) and preferences. These resources can be accessed from different types of devices including computers, tablets and mobile phones. Similar to content posted directly to Twitter, all content is readily discoverable via search engines. These resources can enrich the educational experience for the learner and provide a refreshing supplement to traditional resources. One of the most powerful features of these resources is the ease of sharing. For example, these resources can be accessed together by team members during nephrology rounds or even shared via text message within a matter of seconds. Because online platforms are now easily accessible via mobile devices, they demonstrate novel methods of educating in comparison with traditional textbooks, journals or slide-based lectures. These resources can provide the learner with a unique and refreshing way of staying up-to-date, but should be validated and used as an adjunct to traditional learning tools. Several nephrology FOAMed resources are summarized in Table 1 and briefly described below.

Video-based content

For visual learners, several types of video-based content are available including traditional slide-based lectures, recorded symposium presentations, live and recorded webinars, online nephropathology conferences and chalk talks (Table 1). One such program is a nephropathology conference called The Glomerular Disease Study & Trial Consortium (GlomCon). GlomCon is a live, interactive online case presentation similar to biopsy conference in nephrology training [29]. Other examples include the 'Washington University in St. Louis Nephrology' YouTube channel [30] and a series of video chalk talks that covers basic nephrology concepts for medical trainees can be viewed on Vimeo [31] and has been used in a medical school physiology curriculum [32]. These resources provide easily digestible and shareable material that can enhance an educational curriculum or one's own learning.

Podcasts

For auditory learners, and those looking for a convenient way to learn, podcasts offer a way to listen to downloadable content during a commute or at the gym. Most FOAMed resources, including a myriad of medical podcasts, can be subscribed to, providing listeners with a notification when new content is available [33, 34]. Similarly, many professional nephrology societies publish podcasts including the ASN, NKF-*Life as a Nephrologist*, RPA and American Society of Pediatric Nephrology (Table 1). Several organizations have embraced podcasts for medical education, examples include The Rogosin Institute podcast, Satellite Healthcare (*NephTalk*), the *Clinical Journal of the American Society of Nephrology*, DaVita (*DaVita Medical Insights*). NephJC produces a podcast, *Freely Filtered*. This podcast covers recent nephrology articles that are discussed on the bimonthly NephJC Twitter chats. Depending on the podcast content, length, and moderators or group running the channel, nephrologists have a number of options to choose from and the ability to passively learn on-the-go.

Written resources: blogs, websites and tweetorials

Learners who prefer a written dialogue (read/write) have a preference to convey and receive information using printed words [35]. Blogs are web pages run by an individual or a group where written content can be posted in intervals on a particular topic. Content is displayed in reverse chronological order and can range from the authors perspective to case reports, reviews of journal articles as well as society conference material [15]. One of the earliest nephrology blogs to be created was Renal Fellow Network, started by the late Dr Nate Hellman in 2008 [18]. With as many as 31 100 visitors per month worldwide in 2019, this blog has become a well-known hub for nephrology trainees and others interested in nephrology [18]. Trainees contribute peer-reviewed content that is shared via social media platforms and a blog email subscriber list. Other nephrologist-run blogs and websites include *Nephron Power* by Dr Kenar Jhaveri [36], *Precious Bodily Fluids* by Dr Joel Topf, *The Nephrologist* by Dr Vanessa Grubbs [37], the NephJC blog and *Landmark Nephrology* [38]. The inclusion of other types of FOAMed content (e.g. videos, links, visual abstracts) on blogs helps to further enhance learning.

Finally, medical educators can leverage Twitter itself as their classroom by creating tweetorials. A 'tweetorial' is a series of tweets that serve as a 'tutorial' on a specific topic [39]. The tweetorial classroom is not restricted by location, time, level of training or field. Furthermore, they often take on a short, engaging format and may include polls, primary source links, videos and other multimedia including graphics interchange format images. Tweetorials have gained traction among the medical community, and many clinicians and journals have used tweetorials to supplement lectures, podcasts or newly published research [39].

Interactive learning

Kinesthetic learners prefer an interactive, hands-on approach for education [40]. Nephrology Simulator (NephSIM) is an online, mobile-optimized teaching tool that provides an interactive interface needed for kinesthetic learners to stay engaged via case-based learning (CBL) [41, 42]. Cases simulate real patient interactions, beginning with history of presenting illness and physical examination. Learners are asked questions as the case unfolds and are provided with immediate feedback (both reinforcing and constructive). In addition to CBL, NephSIM has an image gallery, infographics and succinct tutorials on the performance of urine microscopy, interpretation of kidney pathology slides, and an approach to acid–base disorders. Similarly, both NephMadness and NephJC are interactive learning activities.

Staying up-to-date

In addition to innovative educational endeavors, physicians looking to be informed with the most current literature and research studies may find social media engagement both an effective and efficient way to do so. Weeks or months before publication in hard copy journals, manuscripts may be rapidly circulated via social media channels and reach thousands of individuals. Since 2016, many journals have now embraced the 'visual abstract'—a graphical representation of the traditional written abstract [25]. With minimal words, the visual abstract tells the story of a research study with pictures. One can discern the key points from the manuscript before delving into the full text within a few seconds. These graphical representations appear regularly on social media platforms as well as within presentations at international conferences.

DIGITAL SCHOLARSHIP AND CAREER ADVANCEMENT

We posit that digital scholarship and social media can be effectively harnessed for career advancement, though some may argue that time spent on social media is ultimately detrimental to scholarship production and academic promotion [43–45]. Social media users can create bona fide digital scholarship, engage in national and international conversations, create multinational and diverse collaborations, and deploy educational curricula and research findings to a much larger and broader audience. In fact, social media engagement with one's research (alternative metrics or Altmetrics) is now publicly reported and a measure of the impact of one's scholarly work [46]. Digital scholarship can similarly be described by numbers of subscribers, content downloads, and online visitors and views. Notably, institutions are now recognizing and encouraging online content creation that can be included in one's 'curriculum vitae' and used for academic promotion [39, 42].

Nephrologists can leverage social media to build their own brand or niche, reach target audiences and collaborate with others. One can gain both credibility and visibility with consistent and focused creation, curation and sharing. Establishing a robust digital presence can enhance one's career 'offline' in a multitude of ways and open doors to invitations to speak, join committees or editorial board positions, and find new research collaborations leading to publications leading to career advancement.

POTENTIAL PITFALLS

The praises of social media in nephrology must be balanced with the concern for important drawbacks, which include misinformation, time consumption and permanence. The Internet is a vast ocean of information and within seconds, an answer to virtually any question can be found. Unfortunately, 'an answer' may not always be 'the correct answer'. False claims and deceptive sources exist and can be difficult to discern. Verification of educational materials, even from trusted sources, is critical. An elegant solution to the spread of misinformation on social media is social media itself [47–49]. Social media users themselves can initiate dialogue to verify shared claims. The perception of excessive time consumption may present a barrier when considering social media use. Though social media platforms have dramatically simplified consumption of nearly anything, this consumption takes time and may be addictive [50].

Finally, it is critical that all interactions online remain professional. Virtual communities must be treated no different than real-life situations. Any unprofessional behavior can be rapidly distributed, even after deletion, and has the potential to damage the reputation of the user as well as their practice or institution. Digital permanence should be considered prior to posting any online content. In addition, social media content may be misinterpreted or viewed by an unintended audience (e.g. employer, patients, lawyers). Patient confidentiality is of utmost importance and should be protected at all costs by healthcare professionals who engage in public, online scientific discussions. Patient identifiers should be removed and one must obtain consent prior to posting any media from patients. Physicians who use social media should also adhere to employer, governmental and institutional policies. Understanding these drawbacks and taking preventative measures is key to a successful social media presence.

A GUIDE FOR PROFESSIONAL SOCIAL MEDIA ENGAGEMENT

For nephrologists unsure of where to begin, we provide a practical guide on social media use (Table 2). Our guide provides the user with a structured approach to various online platforms. Of note, we do not believe that one must participate in all possible social media activities. Like the practice of medicine, social media use, too, must be personalized to its user. As described earlier, use of hashtags (e.g. #NephJC, #NephMadness, #AskRenal) can help categorize the plethora of content available and direct the nephrologist to the virtual nephrology community. The spectrum of engagement may range from passive viewing of shared social media content to active creation of FOAMed. One's level of engagement may grow over time, as comfort level with social media platforms increases.

For first-time social media users, we recommend joining Twitter, following a small group of users, joining live Twitter chats (e.g. NephJC or others), participating in NephMadness and exploring FOAMed resources (Table 1). Often, individuals begin as passive social media users until a certain comfort level is achieved and then begin to share their own contact and publicly engage with other users. In our experience, discourse in the nephrology social media space (#NephTwitter) is, on the whole, very friendly, uplifting and nonthreatening.

For those who create FOAMed and digital scholarly work, we recommend the creation of a social media scholarship portfolio to quantify scholarly output. Social media activity should be described in detail with the inclusion of information describing reach (e.g. page views), editorial structure, peer review process and context of the material presented (e.g. blog, tweetorial, podcast). There may be opportunities to publish manuscripts that both describe and critically assess FOAMed activities.

The growth of social media usage and the development of recurrent FOAMed content in nephrology now necessitate the need for training the next generation of learners able to use this

Table 2. A practical guide to the use of social media

Guide	Details
Choose the right platform	• Choose the appropriate platform based on desired content and goal (e.g. Instagram, Facebook, Twitter, LinkedIn, YouTube)
Select a target audience	• Separate business and personal social media accounts • Adjust and be aware of privacy settings
Build a brand	• Consider a profile as a personal reflection • Be professional and considerate • Share content produced by others
Create content	• Post relevant, engaging content • Use high-quality media (e.g. photos, tables, algorithms, videos) • Cite original sources • Use hashtags appropriately • Protect patient confidentiality
Network/community	• Take part in online Twitter chats • Share content at national meetings or conferences • Engage with others online on a consistent basis • Learn about and share new opportunities
Restraint/balance	• Limit usage to certain times of the day • Take breaks away from social media • Avoid posting when emotionally charged
Education	• Follow key opinion leaders and experts • Follow people with similar professional interests • Follow professional societies and institutions • Learn and share new information
Scholarship	• Create a social media scholarship portfolio • Quantify and describe content creation • Critically assess and publish

public forum of discourse professionally and effectively. The NSMC internship was started in 2015 with the goal to arm medical professionals with tools, mentorship and guidance to effectively and cautiously use social media while avoiding potential pitfalls as medical professionals [51]. From anecdotal data, applicants who apply for an internship position are often passive social media users looking to increase their level of engagement.

CONCLUSION

Nephrologists can leverage social media to build a brand, champion a cause, reach a target audience, and both interact and collaborate with a global community. Establishment of a strong digital presence can enhance one's career offline in a multitude of ways. Nephrologists should view social media as a tool to learn, strengthen collaborations, lift up others and share their voice [12]. Social media provides one with a network and opportunities beyond one's current institution that can translate into collaborations, inclusion on national committees, speaking invitations, and academic opportunities including manuscripts and research projects [16]. Furthermore, online activities are now being recognized by large academic institutions as scholarly work that is required for academic promotion and tenure [44]. Outside of academic institutions, successful social media marketing of oneself or one's practice may increase business and patient referrals [52, 53]. As the use of social media continues to grow, there are important limitations to consider. For instance, as the number of people engaging in conversations online grows, the risk of message dilution increases. Another limitation is whether or not a specific platform (e.g. Twitter or Facebook) will continue to exist, thus, taking the medium away from the conversation completely. We suggest that the future will continue to be dominated by applications that allow for a global conversation. With an understanding of its basics and potential pitfalls, nephrologists of all levels may learn to harness the power of social media for education, collaboration, conversation and self-expression.

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CONFLICT OF INTEREST STATEMENT

N.N.D., M.A.S. and S.S.F. are on the executive committee of the NSMC. M.A.S is on the board of directors of NephJC. S.S.F is a faculty member of NephJC. N.N.D., M.A.S. and S.S.F are members of the ASN Media and Communications Committee. M.A.S. is cocreator and S.S.F. is on executive team of NephMadness. S.S.F. is coeditor of Renal Fellow Network and cocreator of NephSIM. M.A.S. and S.S.F. are members of NephJC Podcast, *Freely Filtered*. NephJC is a nonprofit organization that supports the work of NephJC and the NSMC.

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