



## Review

# The rise of #SocialMedia in the Nephrology world

Hugo Diniz<sup>a,b,\*</sup>, Edoardo Melilli<sup>c</sup>

<sup>a</sup> Nephrology Department, Centro Hospitalar e Universitário de São João, Oporto, Portugal

<sup>b</sup> Nephrology & Infectious Diseases R&D, i3S – Instituto de Investigação e Inovação em Saúde da Universidade do Porto, Oporto, Portugal

<sup>c</sup> Nephrology Department, Hospital Universitari de Bellvitge, University of Barcelona, IDIBELL, L'Hospitalet de Llobregat, Barcelona, Spain

### ARTICLE INFO

#### Article history:

Received 24 September 2019

Accepted 4 February 2020

#### Keywords:

Education

Nephrology

Research

Scientific societies

Social media

### ABSTRACT

Social media (SoMe) use has increased exponentially in the last decade and is having a profound impact on the Nephrology world. The use of these platforms is contributing to continuous educational and professional development by exposing nephrologists to new research, allowing them to connect with experts, to exchange experiences, or to engage in scientific debates. Here, we introduce the basics of SoMe, focusing on Twitter because it is the most popular SoMe platform used by the medical community for professional purposes. We will review the main education platforms and tools available, such as visual abstracts, blogs, tweetorials, videos, and podcasts. We will also focus on their different applications for educational purposes such as online journal clubs, webinars, or online games. The role of SoMe in academic promotion, dissemination of research, expansion of nephrology societies and coverage of scientific events will also be discussed. In the end, we will reflect on SoMe risks and limitations, much-needed developments in SoMe platforms and the challenges ahead of us.

© 2020 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

### El crecimiento de las redes sociales en el ámbito de la nefrología

#### RESUMEN

Durante la última década, el uso de las redes sociales ha crecido de manera exponencial y está teniendo un profundo impacto en el ámbito de la nefrología. El uso de estas plataformas contribuye al desarrollo educacional y profesional continuo gracias a que expone a los nefrólogos a nuevas investigaciones, lo que les permite contactar con expertos, intercambiar experiencias o mantener debates científicos. A continuación, exponemos los fundamentos de las redes sociales y nos centramos en Twitter por ser la plataforma de redes sociales más popular en la comunidad médica para fines profesionales. Revisaremos las principales plataformas educativas y herramientas disponibles, como resúmenes visuales, blogs, tweetorials, vídeos y podcasts. También nos centraremos en las diferentes aplicaciones con fines educativos como clubs de revistas online, webinars y juegos online. También se analizará el

#### Palabras clave:

Educación

Nefrología

Investigación

Sociedades científicas

Redes sociales

\* Corresponding author.

E-mail address: [hugo.rc.dz@gmail.com](mailto:hugo.rc.dz@gmail.com) (H. Diniz).

<https://doi.org/10.1016/j.nefro.2020.02.003>

0211-6995/© 2020 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

papel de las redes sociales en la promoción académica, la divulgación científica, la expansión de las sociedades de nefrología y la cobertura de eventos científicos. Finalmente, reflexionaremos sobre los riesgos y las limitaciones de las redes sociales, los tan necesarios desarrollos en algunas plataformas de redes sociales y las dificultades que nos esperan.

© 2020 Sociedad Española de Nefrología. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

### Key concepts

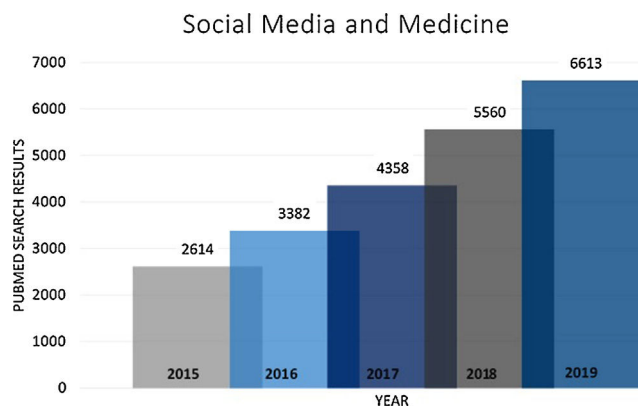
- Social media are web-based tools that are used for electronic communication.
- Social media allows health professionals to gain exposure to new research, connect with experts, exchange experiences, and engage in scientific debates.
- Twitter, a microblogging service, is the most popular SoMe platform used by the medical community for professional purposes.
- Throughout different platforms and tools, social media can deliver different educational experiences, which are mostly free for the consumer.
- Social Media already has an important role in academic promotion, research dissemination, in the expansion of nephrology societies and coverage of scientific events.

## 1. Introduction

Social media (SoMe) are web-based tools that are used for electronic communication.<sup>1</sup> The use of SoMe has risen exponentially in the last decade, with more than 3 billion users worldwide, 28 million users in Spain and 5.3 million users in Portugal.<sup>2,3</sup> The rise of SoMe is closely related to increasing smartphone use, with approximately 67% of the world's population having access to a smartphone.<sup>2</sup> The constant stream of information available at the fingertips, anytime, and everywhere is changing not only our society but every scientific field.

Medicine is no different. SoMe is flattening the educational hierarchy in unforeseen ways, allowing health professionals to gain exposure to new research, connect with experts, exchange experiences, and engage in scientific debates.<sup>4</sup> SoMe is also being used to improve the reach of public health campaigns,<sup>5</sup> and to recruit patients to observational studies and clinical trials.<sup>6</sup> Also, in academic medicine, the influence of SoMe is rapidly increasing: the number of results of the search query "Social Media and Medicine" in Pubmed, more than tripled in the last five years (Fig. 1).

Despite the ubiquitous use of SoMe, a large number of clinicians, departments, societies, and academic institutions in Nephrology are still unaware of SoMe's relevance, and potential applications in their daily activities. Thus, the purpose of



**Fig. 1 – Pubmed search results of the query “Social Media AND Medicine”. The results more than tripled in the last five years. Articles published between 01/01/2000 and 31/08/2019 were considered.**

this article is to introduce the basics of SoMe (focusing on Twitter), review the main education platforms and tools available, discuss its applications in the Nephrology setting, enumerate its risks and limitations, and reflect on much-needed developments.

## 2. A little bit of history

The digital revolution in medical education started with the foundation of UpToDate by the nephrologist Dr. Burton D. Rose in 1992.<sup>7</sup> Initially, the “textbook” was published on CD-ROM, but it already brought several innovations to medical education, such as the “search” feature.<sup>8</sup> The break from the printed text also meant that page limits could end, allowing an increased depth of coverage that was not possible in traditional medical textbooks. Then came the Internet, and the rest is history. UpToDate is the number one clinical decision support resource, influencing 300,000 clinical decisions every day.<sup>7</sup>

With the popularization of the world wide web in the late 90s (known as “Web 1.0”), other on-line medical education resources appeared such as Medscape, and WebMD. The main characteristic of these platforms that pushed this movement forward was that they were free for the consumer. It is curious to see that pairing “search” with “free” lead to such radical democratization of medical information to both patients and health professionals.<sup>8</sup>

The next big thing that ultimately lay the path to the rise of “Web 2.0” was Wikipedia. Founded in 2001, Wikipedia is the prototypical example of a crowd-sourced information site,<sup>9</sup> eventually becoming the biggest and most popular reference work on the internet.<sup>10</sup> Wikipedia is frequently at the top of the results of medical terms search in Google.<sup>8</sup> Medical students and doctors also contribute to a significant portion of Wikipedia’s medical-related traffic.<sup>11,12</sup>

“Web 2.0” shifted the paradigm on how users interacted with the internet. Websites evolved into interactive pages focusing on multidirectional communication, allowing the users to contribute with content, knowledge, and experiences.<sup>13</sup> Prime examples of this are blogs, wikis, videos, podcasts, and SoMe. The primary “Web 2.0” product in Medicine is free open-access medical education, also known as FOAMed.<sup>14</sup> FOAMed is a SoMe-centered approach of providing medical educational resources via “Web 2.0” platforms without barriers such as paywalls.<sup>15</sup> This has completely changed how medical professionals acquire and share health-related information.

### 3. The basics of social media

There are multiple SoMe platforms with broad multimedia tools such as Facebook, Instagram, and LinkedIn, but the most popular SoMe platform used by the medical community for professional purposes is Twitter.<sup>16</sup> Twitter is a microblogging service designed from its onset for mobile, where users can post short bits of content, like a small text accompanied by a link or pictures. Users are defined by the symbol “@”, followed by a unique identifier, and posts are called tweets (Fig. 1). The initial 140-character limit was designed to allow an entire tweet to fit into a single SMS message, but in November 2017 character limit was increased to 280.<sup>17</sup> The user will see any posts from the accounts that they follow, but unlike Facebook, there is no mutuality on this relationship. This asymmetry is quite common, and only those who follow the user will see the posts of the author.

Hashtags (denoted by the “#” sign) are the cornerstone of tweets by helping categorization and information finding. For example, the hashtag #ClinicalPearls marks tweets that contain clinically-relevant tidbits of information (Fig. 1). One can learn more about a particular hashtag by clicking on it or searching for it. This allows the user to see all of the tweets with that hashtag whether or not the user subscribes to the author. Hashtags are essential to use Twitter as a communication channel, for example, for Journal Clubs or live coverage of conferences.

The critical aspect of Twitter in Medicine is its conversational nature. The imposed brevity encourages informal and rapid information sharing, simulating an in-person conversation. This interchange widens one’s circle of contacts to an ever-growing community of likeminded people, creating educational experiences between learners and experts from any part of the world.<sup>18</sup>

## 4. Social media educational platforms and tools

### 4.1. Visual abstracts

A visual abstract (VA), also known as graphical abstract or infographic, is a visual summary of the information usually found within the abstract portion of an article (Fig. 2). VAs are perfectly suited for the short attention spans of social media consumers, allowing the user to quickly “preview” a manuscript to see if it is relevant to them.<sup>19</sup>

Visual abstracts for social media were introduced in *Annals of Surgery* in July 2016 by Creative Editor Andrew Ibrahim.<sup>20</sup> Compared to text-alone formats, articles disseminated with a VA were shared on SoMe eight times more often and approximately three times as many people accessed the full article.<sup>20</sup>

As images are more engaging on SoMe than text alone,<sup>21</sup> VAs are increasingly being used by scientific journals and institutions to promote their research or initiatives. Because they are readily available, the images can also be downloaded and integrated into conferences, rounds, lectures, and journal clubs, increasing the level of engagement and discussion.

After *Annals of Surgery*, many journals adopted VAs into their publications. At the time of this manuscript writing, more than 70 journals worldwide,<sup>22</sup> including some of the most reputed Internal Medicine journals such as the *New England Journal of Medicine* are using VAs to help disseminate their research on SoMe. In Nephrology, the most impactful journals also adopted VAs, such as the *Kidney International* (KI), the *Journal of the American Society of Nephrology* (JASN), the *Clinical Journal of the American Society of Nephrology* (CJASN), or the *American Journal of Kidney Diseases* (AJKD).

### Blogs

Blogs, a contraction of “web logs,” effectively are online journals. They can be written by an individual or by a group of contributors, usually focusing on a specific field or specialty. Blog posts can provide a critical appraisal of journal articles, reviews of specific topics, teaching resources, patient experiences, or physician perspectives.<sup>18</sup> Blogs allow the writers to interact with the readers through comments or social media, which can assist in attracting a large and dedicated readership.

Renal Fellow Network (RFN), a blog associated with the *American Society of Nephrology*, is by far the most popular nephrology blog, with 50,000 monthly visits in 2018.<sup>23</sup> RFN is managed by several faculty advisors who have editorial and peer-reviewing responsibilities. Fellows may select a topic of their choice, draft a post, and then submit to a faculty advisor for review.<sup>23</sup> This process helps to ensure a high-quality and accurate post, and also prevents the posting of inappropriate or inaccurate material. Journal-associated blogs, such as the AJKD Blog, also has a SoMe editor and a SoMe advisory board.<sup>24</sup> However, most blogs do not have any editorial board or peer-reviewing process, meaning that there are some concerns regarding accuracy or biased information. Despite these limitations, blogs are one of the most popular and successful forms of FOAMed content delivery.



Hugo Diniz 🇵🇹  
@HDiniz\_



⚠️ Medications can be a hidden source of phosphorus!


➡️ You need 5 sevelamer tablets to bind the phosphate content of one pill of paroxetine 40 mg (GalaxoSmithKline) 🤔

#ASNBRCU #ClinicalPearls

Traduzir Tweet

| Medication       | Manufacturer     | Phosphorus content | Sevelamer tablets required to bind |
|------------------|------------------|--------------------|------------------------------------|
| Amlodipine 10 mg | Greenstone LLC   | 27.8 mg            | 1                                  |
| Lisinopril 10 mg | Blue Point Labs  | 32.6 mg            | 1.5                                |
| Lisinopril 10 mg | Qualitest        | 40.1mg             | 2                                  |
| Paroxetine 40 mg | GalaxoSmithKline | 111.5 mg           | 5                                  |
| Paroxetine 40 mg | Cadila           | 22.7 mg            | 1                                  |
| Renavite         | Cypress          | 37.7mg             | 1.5                                |

Sherman RA et al. *Kidney Int* 87: 1097-1099, 2015



**Fig. 2 – The anatomy of a tweet.** A tweet is usually composed by the name of the user who sent the tweet, the content, written in a casual style and often using “emojis”, the hashtags (#ASNBRCU, #ClinicalPearls), and one (or more) pictures. One can reply, quote or retweet, or “favorite” the tweet.

#### 4.2. Tweetorials

A Tweetorial is a short series of grouped multimedia tweets containing educational content centered around a particular topic or to demonstrate a point. This creative way, found by the medical community, to bypass Twitter’s number of characters limitation, allows the delivery of complex topics, in an evidence-based approach, without needing to disconnect the user off the platform. Tweetorials are structured interactively with question polls, a stepwise revelation of diagnostic clues,

and opportunities for questions and feedback (Fig. 3).<sup>25</sup> Their goals are similar to a blog post, but they provide a more active way of learning or reviewing concepts, which is superior to passive reading in acquiring and retaining knowledge.<sup>26</sup>

#### 4.3. Podcasts

Podcasts allow for the creation of audio content where education can be delivered through story-telling, a discussion, or an interview.<sup>27</sup> They are similar to radio shows but made

## Comparison of lung auscultation with ultrasound assessment of interstitial fluid in HD patients: LUST trial

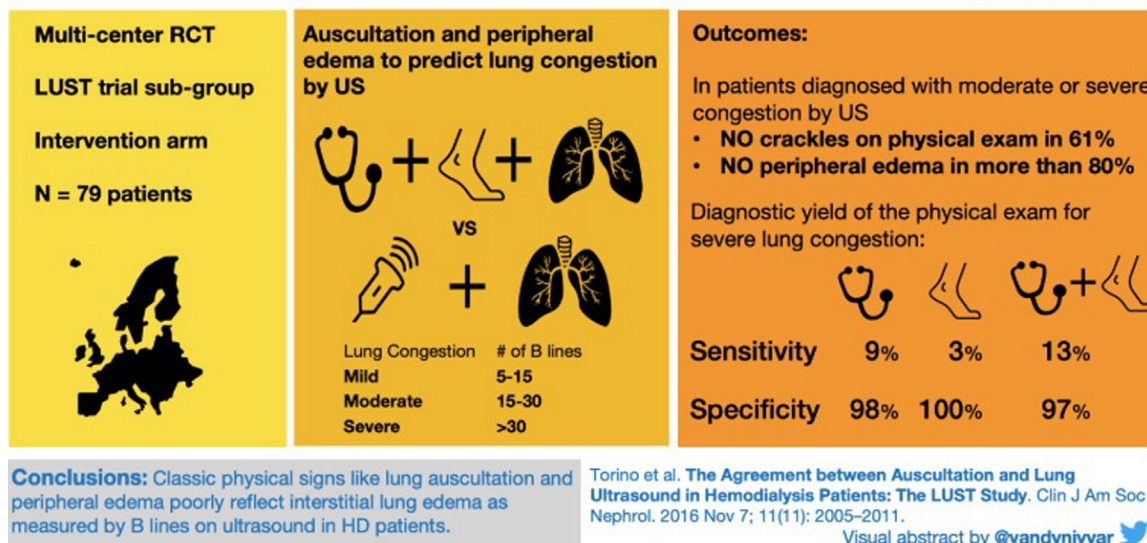


Fig. 3 – An example of a Visual Abstract from NephMadness 2019.<sup>69</sup> Reproduced with authorization from the author.

available through the internet, and often target a specialized audience. They offer the benefit of flexibility and versatility, whereby users can consume its content at their convenience, for example, while exercising or driving to work.

One of the most popular internal medicine podcasts to date, *The Curbsiders*, premiered in February 2016.<sup>28</sup> Each episode is dedicated to a specific topic, and through clinical cases and expert interviews, they highlight clinical pearls and practice-changing knowledge. Due to their quality and success, they are now supported by the *American College of Physicians*.<sup>28</sup>

Podcasting in Nephrology is still in its infancy, but slowly new projects are being aired. CJASN started adding 2–5 min audio article summaries of the papers published in their journal at the beginning of 2017.<sup>29</sup> *Life as a Nephrologist*, a podcast of the *National Kidney Foundation* (NKF), begun in May 2018 and explores the different paths of the Nephrology career, while providing insight into why people choose to pursue them.<sup>30</sup> *Freely Filtered*, a podcast associated with NephJC (a Twitter-based nephrology journal club) that started early this year, discusses the latest topics that were highlighted in the online journal club.<sup>31</sup>

#### 4.4. Videos

Videos are already a popular vector of medical education. They are usually published on an on-line platform, such as YouTube, Vimeo, or Periscope. One example of a successful video series is *WashUPath*, the Washington University in St Louis Nephrology Web Episode series by Timothy Yau,<sup>32</sup> which won an ASN Innovations in Kidney Education Contest award in 2016.<sup>33</sup> There are a few other nephrology-related channels on YouTube, such as *Pencasts*, a chalkboard-style teaching tool repackaged for video,<sup>34</sup> or *Nephrology On-Demand*, which has many lectures on various topics in video format.<sup>35</sup>

The *International Society of Nephrology* (ISN) uses Periscope to live-stream conference oral communications and selected poster presentations, as well as to stream live lectures.<sup>36</sup> The *European Renal Association – European Dialysis and Transplantation Association* (ERA-EDTA) SoMe team also used Periscope to interview the authors of selected posters in the 56th ERA-EDTA Congress.<sup>37</sup> Periscope not only allows live streaming, but videos can be archived and watched at a later date. However, videos do not allow for a 2-way conversation to occur, except in the form of comments, leaving little room for collaborative dialog between the user and the educator.

#### 4.5. Applications of social media in nephrology

##### 4.5.1. Online journal club

Journal clubs have been a mainstay of medical education in the last fifty years, serving both to disseminate recent advances in medicine, as well as to discuss and critically appraise the published literature.<sup>38</sup> This kind of activity fits perfectly into the SoMe background, where conversation and discussion are highly facilitated. Twitter has become the most common platform for hosting online journal clubs, and they are growing steadily in the last few years.

The Nephrology Journal Club (NephJC) is a Twitter-based online journal club that was started in April 2014 and is conducted twice a month. Articles are selected by a committee of 15 nephrologists from 5 countries, and highlight high-impact or controversial articles, primarily in clinical nephrology.<sup>39</sup> A few days before the journal club, a summary of the article is posted on the NephJC website. In addition to the summary, these posts detail the background of the study and raise possible topics for discussion. The actual journal club is a Twitter chat, and the hashtag #NephJC allows everyone to participate and follow the discussion. A moderator “hosts” the chat, and guides the conversation, usually with a prepared script.

Each edition of the NephJC has three sessions at different schedules (US Chat, EU Chat and India Chat), to allow individuals in different time zones to participate actively. Authors often join the chat and provide additional insight or answer questions from the participants directly. For example, the CRE-DENCE trial, one of the most important Nephrology articles published this year,<sup>40</sup> was discussed by 639 participants, and the lead author actively engaged in the three sessions of the journal club.<sup>41</sup> The presence of an author contributes to the flattening of the educational hierarchy and makes the journal club a richer learning experience.

#### 4.5.2. Webinars and other interactive live video events

The webinar, the contraction of the words “web seminar”, is an interactive seminar conducted through the web, usually with live video transmission, and users can participate through text-based chat, voice or video.<sup>42</sup> The ISN organizes monthly freely accessed 60-min webinars held by renowned experts in various Nephrology topics, followed by a live “questions and answers” session. They are also available for offline view in the ISN Academy website.

Another good example of free webinar-based education is the one provided by the Glomerular Disease Study and Trial Consortium (GlomCon). GlomCon has a biweekly web-based nephropathology educational conference, where a case is presented by a nephrologist, followed by a review of the pathology slides and case discussion.<sup>43</sup> Participants are allowed to ask questions and to give their opinions regarding the case. It is also possible to review the webinars later, as they are recorded and upload into the GlomCon website.

#### 4.5.3. Online educational games

NephMadness is an online educational game modeled after a yearly college basketball tournament known as March Madness, that started in 2013.<sup>44</sup> Thirty-two topics are chosen each year to “compete” head-to-head in a single-elimination tournament with winners chosen by a panel of nephrology experts (“Blue Ribbon Panel”) (Fig. 4). This panel judges the matchups based on a particular topic’s relevance or potential ability to affect the lives of patients with kidney disease.

Each of the 32 concepts is described in a short, but fully referenced, entry written by guest authors who are experts in the field and published in the AJKD blog.<sup>45</sup> People play NephMadness by predicting the outcomes of all matchups (Fig. 5). Players accrue points when their predictions match the results determined by the Blue Ribbon Panel. Participants are encouraged to tweet, blog, and promote their picks using the hashtag #NephMadness.<sup>46</sup> The prolonged nature of the game also enforces spaced education, a concept defined by presenting information repeatedly over time instead of in isolated binges, which increases the uptake and durability of knowledge.<sup>47</sup>

The 2018 Nephrology World Cup was created by the ISN Education SoMe team to promote nephrology-focused scholarly work from around the world.<sup>48</sup> A representative paper, published in each nation’s leading domestic nephrology journal, was selected to compete in the Nephrology World Cup, using the same 32-country roster as the 2018 FIFA World Cup.<sup>49</sup> This included an article published by *Nefrología*.<sup>50</sup>

Each article was summarized and/or converted into a single-page infographic, forming the “scouting report”. These reports summarized the methodology, findings, and implications of each work and included editorial commentary from a member of the organizing team. Scouting reports were divided into eight groups that paralleled the FIFA World Cup structure, and participants voted for the winner of each group and the top 3 competitors. Gamification seems to be a valid strategy to increase the interest and dissemination of locally published scientific work.

#### 4.5.4. Academic promotion and research dissemination

Medical centers and academic institutions have begun considering SoMe and digital activities as part of their criteria when considering academic appointments and promotions, not only in nephrology but in other fields as well.<sup>51-53</sup> As the scope and reach of SoMe have increased exponentially, the use of these new technologies for multiple applications such as dissemination, branding, advertisement, advocacy, research, and education is being adopted. The Mayo Clinic became one of the first academic institutions to formally include social media scholarship as part of their metrics for promotion.<sup>54</sup> One method for objectively measuring one’s digital impact is the Altmetric score.

Altmetrics is the term that was coined to describe the method of measuring dissemination and impact of specific articles, or other academic activities.<sup>55</sup> Unlike traditional journal-based metrics, such as the impact factor and the h-index, altmetrics can rapidly quantify the dissemination, generated discussion, and potential impact of any academic product, whether it is a journal article, a blog post or a podcast.<sup>56</sup> This metric includes weighted measures of tweets, shares, links from blog posts, as well as traditional media mentions.<sup>52</sup> The use of such metrics allows the quantification of the dissemination of information to a broader group of people, such as students or non-academic clinicians, and demonstrate general public engagement, which may also be relevant to the success of a project.

Through its platforms and tools, SoMe has the potential to reduce the time lag between publication of evidence and its translation to the bedside, by allowing for quicker and broader sharing of relevant information due to user posting and amplification.<sup>57</sup> Multiple trials show that articles promoted on SoMe are more widely accessed compared to those without some promotion.<sup>20,58,59</sup>

Both academic and non-academic nephrologists should consider developing a SoMe portfolio that documents their digital activities, demonstrating evidence of their quality, and the impact of their digital work. SoMe presence and expertise may lead to other opportunities including leadership chances, recognition in medical journals (e.g., VA editor, journal blog editor) and medical societies (e.g., social media teams, education awards).

#### 4.5.5. Scientific societies and communities

Scientific societies and communities, especially nephrology-related ones, are extending their presence in SoMe platforms, as there are many benefits to be gained from it. Beyond the obvious utility of recruiting members more easily, SoMe is the best channel to spread useful information, such as future

**Hugo Diniz** 🇧🇷 @HDiniz\_ · 31 de mar

Em resposta a @HDiniz\_

**2** Which #OldSchool tool do you value most for volume assessment in ESKD?

|                         |     |
|-------------------------|-----|
| Jugular Venous Pressure | 35% |
| Dependent Edema         | 14% |
| Lung Auscultation       | 35% |
| Blood Pressure          | 16% |


37 votos · Resultados finais

1 1 2

---

**Hugo Diniz** 🇧🇷 @HDiniz\_ · 31 de mar

**3** JVP is a quick way to estimate central venous pressure (CVP). While a post-dialysis JVP > 3 cm correlates well with extracellular fluid volume (ECFV) expansion, it is only present in approx. 50% of hypervolemic ESKD patients!




The role of natriuretic peptides in volume assessmen...  
Maintaining optimal fluid balance is essential in haemodialysis (HD) patients but clinical evaluation ...  
[ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)

1 3 6

---

**Hugo Diniz** 🇧🇷 @HDiniz\_ · 31 de mar

**4** There are also other causes of elevated JVP, which are not uncommon in our patient population, which can complicate things. Also, the presence of central venous catheters for dialysis makes JVP unreliable.



JVP waveform explained  
Written, illustrated, animated, and voiced by Catherine Tsai Catherine.tsai.art@gmail.com UCSF School of ...  
[youtube.com](https://youtube.com)

**Fig. 4** – An example of a tweetorial on volume assessment in end-stage kidney disease. A tweetorial is a series of posts with high educational content regarding a, usually presented in a dynamic way with question pools, multimedia content, and opportunities to interact.



**Fig. 5 – NephMadness 2019 brackets.** NephMadness is an online initiative that leverages the tools of social media to teach about the latest and greatest breakthroughs in the field of nephrology based on the premise of the “March Madness” basketball tournament. 32 nephrology concepts are divided into eight main topics (regions) with four subtopics (teams), where the participant decides which topic is more relevant in each direct matchup.<sup>70</sup>

events, scientific groups associated with the society itself, the existence of grants, etc. Ultimately, this makes societies more transparent and closer to its members and to the rest of the nephrology community.

ISN, ASN, and ERA-EDTA are the most important scientific societies of nephrology on Twitter, and their accounts sum more than 30 thousand followers. All of them use English as their official language. National societies of nephrologists are also present on SoMe. Among them, the *Sociedad Española de Nefrología* (@SENeurologia) is the prime example of the importance to have a presence on SoMe for a National Scientific Society. With more than 8 thousand followers on Twitter @SENeurologia reaches a huge number of nephrologists, not only in Spain but also in Latin America, since it uses Spanish as its official language.<sup>60</sup> The success of @SENeurologia ultimately led to the birth of regional Spanish nephrology societies on Twitter such as the *Sociedad Valenciana de Nefrología* (@SVNefro), *Sociedad Madrileña de Nefrología* (@SOMANEorg), and the *Societat Catalana de Nefrologia* (@nefrocat). This heavily contributed to the expansion and diffusion of projects and ideas, papers published on small national journals, local medical protocols, etc. from a local context to potentially everywhere. The key to success for @SENeurologia and other regional societies on SoMe is probably due to the fact that nephrologists themselves (especially younger ones) are managing these accounts. Other National Societies tried to use external marketing companies with not very brilliant results. For example,

the official account of Italian Nephrologist Society (@SinReni), is actually inactive since 2018. Other societies such as the Portuguese or the German have no international SoMe presence whatsoever.

#### 4.5.6. Scientific events and social media

Before the advent of SoMe, live sharing of congresses and conferences was difficult, and those who were not attending were left in the dark. Nowadays, academic societies encourage the sharing of information at conferences by providing an official hashtag, Wi-Fi, and by updating their photography and sharing policies to endorse SoMe activity. Live-tweeting at academic conferences has become the new norm.

International nephrology societies such as the ISN and the ERA-EDTA formed their own dedicated SoMe teams, with one of the duties being the coverage of their associated meetings and conferences.<sup>36</sup> These groups of “tweet warriors” divide themselves through the parallel sessions to bring highly educational content, such as lecture summaries, selected posters pictures, and video interviews with faculty speakers or award winners. SoMe coverage not only increases the dissemination of the current nephrology hot topics but also the reach of the conference for the scientific community, expanding the opportunities for debate and potentiating participation in future editions.<sup>61,62</sup>

Promotion of scientific events in SoMe is already an established approach to increase the chance of success of a



particular event. Virtually every major institution or organization share their events in one or more SoMe platforms. Recently, a strategy involving the use of “giveaways” in Facebook was successfully used to promote the “Encontro Renal 2017”, the Portuguese nephrology congress, making it the edition with the highest number of participants until that date.<sup>63</sup>

#### 4.6. Risks and limitations of social media

All SoMe platforms are public, which means patients, co-workers, employers, lawyers, or journalists, have access to our online activity. As physicians, we are required to maintain professionalism toward colleagues and ensure patient privacy and safety at all times, despite the more relaxed atmosphere of the SoMe world.

We should assume that all posts and tweets are permanent, regardless of our presumed ability to edit or delete them. One should remain polite and respectful while voicing disagreement and opinions should be backed up with caveats or evidence. It is important to disclose any conflict of interest. Attention to patient health information is also vital. Even if the European Union’s General Data Protection Rules stipulate that data that have been rendered anonymous are no longer considered personal,<sup>64</sup> patients rarely are asked for consent to their cases being discussed online.<sup>65</sup> Extra attention should be taken to remove any bit of information that can be used to identify the patient. Users should familiarize themselves with and comply with their employer’s/institution’s code of conduct and SoMe regulation, if available.

Another potential problem of SoMe is that formal peer review is mostly absent in FOAMed. Since the production of content is unrestricted, there is a higher risk of inaccurate or biased information. As mentioned before, a lot of the content associated with journals and institutions has some form of “accuracy control”. On the other hand, there is already a robust network of experts active on SoMe, meaning that corrections are often just a tweet or comment away. Unfortunately, this regulatory mechanism is inherently sporadic and unpredictable, but it is transparent and has the potential to be performed by the whole community instead of a small number of peers. A fine example of this “wisdom of the crowds” is the research study on genetic signatures of human longevity that was published in *Science*,<sup>66</sup> which was later retracted because of serious flaws in the methods and data, identified by the scientific community on Twitter.<sup>67</sup>

#### 4.7. Future directions

The continued educational process of FOAMed and the dissemination of knowledge and information in SoMe is highly appealing to both trainees and nephrologists in every step of their careers, and the number of users increases every day. Still, SoMe needs further development in some key areas.

Official SoMe policies or guidelines are mostly lacking, and institutions’ code of conduct generally does not encompass SoMe interactions.<sup>68</sup> Future guidelines should focus on privacy rights, patient confidentiality, disclosure of conflict of interest, distinguishing personal opinions from the institutional views, and proper referencing/crediting the authors to avoid plagiarism.

An important feature that is currently missing is the option to archive, catalog, or quickly retrieve posts/conversations. The archiving system of most of the SoMe platforms is archaic at best and is missing an advanced search option. This absence reduces the “retention” of conversations or threads of high educational value on the web.

Finally, as health misinformation, “anti-vaxxer” movements and non-evidence based “alternative” therapeutics bloom on the internet, clinicians and educators should fill in the void and provide proper and reliable medical knowledge to dilute the information pollution and increase the health literacy of our population.<sup>67</sup> The use of other social media platforms such as Facebook, Instagram, and Snapchat (among others) have robust audiences and are ripe for further development and expansion to the general public.

## 5. Conclusion

SoMe has completely revolutionized medical education and the dissemination of information in the nephrology world in the last decade. Its power to communicate openly, and faster than ever before, makes it the ultimate “medical lounge”. On SoMe, anyone can become a teacher or learner: lifelong learning now goes beyond textbooks, lectures and journal articles and is available anywhere, 24/7.

In many fronts, Nephrology was and will continue to be a leader in this new form of medical education. In Europe, the Spanish nephrology community is setting the pace and becoming a role model in maximizing SoMe for professional purposes. Rather than resist it, nephrologists should build a SoMe presence through the publication, content creation, and sharing of their work and ideas, while keeping in mind the limitations and responsibilities that come with the use of such media. Our patients and colleagues will always welcome a new perspective.

## Conflicts of interest

HD and EM are members of the ERA-EDTA Social Media team. HD is part of the Nephrology Social Media Collective, class of 2019. There are no financial disclosures.

## REFERENCES

- Obar JA, Wildman S. Social media definition and the governance challenge: an introduction to the special issue. *Telecommun Policy*. 2015;39:745–50, <http://dx.doi.org/10.1016/j.telpol.2015.07.014>.
- Digital 2019: Global Internet use accelerates. We are soc 2019. <https://wearesocial.com/blog/2019/01/digital-2019-global-internet-use-accelerates> [accessed 22.09.19].
- 5,3 milhões de portugueses usam redes sociais n.d. <https://www.marktest.com/wap/a/n/id~2429.aspx> [accessed 11.08.19].
- Desai T, Sridharan S, Parada X, Claire-Del Granado R, Orantes C, Madariaga H, et al. Exploring the uncharted territory of social media: the next frontier of medical education in nephrology. *Clin Kidney J*. 2018;11:156–61, <http://dx.doi.org/10.1093/ckj/sfy003>.

5. Prochaska JJ, Coughlin SS, Lyons EJ. Social media and mobile technology for cancer prevention and treatment. *Am Soc Clin Oncol Educ Book*. 2017;37:128-37, <http://dx.doi.org/10.14694/EDBK.173841>.
6. Kapp JM, Peters C, Oliver DP. Research recruitment using facebook advertising: big potential, big challenges. *J Cancer Educ*. 2013;28:134-7, <http://dx.doi.org/10.1007/s13187-012-0443-z>.
7. The UpToDate Story. UpToDate n.d. <https://www.uptodate.com/home/uptodate-story> [accessed 13.08.19].
8. Topf JM, Hiremath S. Social media, medicine and the modern journal club. *Int Rev Psychiatry*. 2015;27:147-54, <http://dx.doi.org/10.3109/09540261.2014.998991>.
9. Wikipédia. Wikipédia Enciclopédia Livre. 2019.
10. Tancer B. Look who's using wikipedia. *Time*. 2007.
11. Allahwala UK, Nadkarni A, Sebaratnam DF. Wikipedia use amongst medical students – new insights into the digital revolution. *Med Teach*. 2013;35:337, <http://dx.doi.org/10.3109/0142159X.2012.737064>.
12. Beck J. Doctors' #1 source for healthcare information: wikipedia. *The atlantic*; 2014 <https://www.theatlantic.com/health/archive/2014/03/doctors-1-source-for-healthcare-information-wikipedia/284206/> [accessed 14.08.19].
13. Giustini D. How Web 2.0 is changing medicine. *BMJ*. 2006;333:1283-4, <http://dx.doi.org/10.1136/bmj.39062.555405.80>.
14. 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, <http://dx.doi.org/10.1097/ACM.000000000000170>.
15. Shah S, Topf J. Mentorship in the digital age: nephrology social media collective internship. *Clin J Am Soc Nephrol*. 2019;14:294-6, <http://dx.doi.org/10.2215/CJN.09970818>.
16. Social media for scientists. *Nat Cell Biol* 2018;20:1329. [doi:10.1038/s41556-018-0253-6](https://doi.org/10.1038/s41556-018-0253-6).
17. Tweeting Made Easier n.d. <https://blog.twitter.com/en-us/topics/product/2017/tweetingmadeeasier.html> [accessed 14.08.19].
18. Sparks MA, O'Seaghdha CM, Sethi SK, Jhaveri KD. Embracing the internet as a means of enhancing medical education in nephrology. *Am J Kidney Dis*. 2011;58:512-8, <http://dx.doi.org/10.1053/j.ajkd.2011.06.009>.
19. Ibrahim AM. Seeing is believing: using visual abstracts to disseminate scientific research. *Am J Gastroenterol*. 2018;113:459-61, <http://dx.doi.org/10.1038/ajg.2017268>.
20. Ibrahim AM, Lillemoe KD, Klingensmith ME, Dimick JB. Visual abstracts to disseminate research on social media: a prospective. Case-control crossover study. *Ann Surg*. 2017;266:e46-8, <http://dx.doi.org/10.1097/SLA.0000000000002277>.
21. What fuels a Tweet's engagement? n.d. <https://blog.twitter.com/en.us/a/2014/what-fuels-a-tweets-engagement.html> [accessed 15.08.19].
22. VisualAbstract Running List. Google Docs n.d. <https://docs.google.com/spreadsheets/d/1f9C-ONqfMfBQZSay9FODwVnyNdjcieobarhifLN7rM/edit#gid=0> [accessed 15.08.19].
23. Farouk S, Sparks MA. Renal fellow network: past and future. *Clin J Am Soc Nephrol*. 2018;13:1915-7, <http://dx.doi.org/10.2215/CJN.06700518>.
24. Meet the Team. *AJKD Blog* 2017. <https://ajkdblog.org/meet-the-team/> [accessed 16.08.19].
25. Medical Physiology/Pathophysiology Tutorials/Twitter. Twitter n.d. <https://twitter.com/i/moments/1094395650010202118> [accessed 10.09.19].
26. Roediger HL, Butler AC. The critical role of retrieval practice in long-term retention. *Trends Cogn Sci*. 2011;15:20-7, <http://dx.doi.org/10.1016/j.tics.2010.09.003>.
27. Verduco LM. What are podcasts? Home healthc now. 2016;34:224-5, <http://dx.doi.org/10.1097/NHH.0000000000000380>.
28. Durkin M. Now trending: Internal medicine podcasts for education n.d. <https://acpinternist.org/archives/2018/10/now-trending-internal-medicine-podcasts-for-education.htm> [accessed 17.08.19].
29. Mehrotra R. CJASN: turning the page. *Clin J Am Soc Nephrol*. 2017;12:1-2, <http://dx.doi.org/10.2215/CJN.11511116>.
30. Development P. Life as a Nephrologist Series n. d. <https://nationalkidneyfoundation.podbean.com> [accessed 17.08.19].
31. Podcast – Freely Filtered a NephJC Podcast. NephJC n.d. <http://www.nephjc.com/freelyfiltered/category/Podcast> [accessed 17.08.19].
32. Washington University in St. Louis Nephrology Web Series. YouTube n.d. <https://www.youtube.com/channel/UC1mJLTtBsf6PTbuiv08vcOA> [accessed 17.08.19].
33. American Society of Nephrology CME - Innovations in Kidney Education Contest n.d. <https://www.asn-online.org/education/contest/> [accessed 17.08.19].
34. Parslow GR. Commentary: the khan academy and the day-night flipped classroom. *Biochem Mol Biol Educ*. 2012;40:337-8, <http://dx.doi.org/10.1002/bmb.20642>.
35. Desai T, Sanghani V, Fang X, Christiano C, Ferris M. Assessing a nephrology-focused YouTube channel's potential to educate health care providers. *J Nephrol*. 2013;26:81-5, <http://dx.doi.org/10.5301/jn.5000115>.
36. Desai T, Conjeevaram A, Taco O, Nair S, Sridharan S, Claire-Del Granado R, et al. The birth of @ISNeducation. *Kidney Int*. 2017;92:1024-8, <http://dx.doi.org/10.1016/j.kint.2017.07.014>.
37. ERA-EDTA (@ERAEDTA) "#rooftoposter now Pamodi Kodikara interview by @hugodiniz from #eraedta19 Budapest #crossfit", 14th June 2019, 8:34 a.m. Tweet <https://twitter.com/eraedta/status/1139435892743868418> [accessed 17.08.19].
38. Linzer M. The journal club and medical education: over one hundred years of unrecorded history. *Postgrad Med J*. 1987;63:475-8, <http://dx.doi.org/10.1136/pgmj.63.740.475>.
39. Topf JM, Sparks MA, Phelan PJ, Shah N, Lerma EV, Graham-Brown MPM, et al. The evolution of the journal club: from osler to Twitter. *Am J Kidney Dis*. 2017;69:827-36, <http://dx.doi.org/10.1053/j.ajkd.2016.12.012>.
40. Perkovic V, Jardine MJ, Neal B, Bompoint S, Heerspink HJL, Charytan DM, et al. Canagliflozin and renal outcomes in type 2 diabetes and nephropathy. *N Engl J Med*. 2019;380:2295-306, <http://dx.doi.org/10.1056/NEJMoa1811744>.
41. CREDENCE wrapup. NephJC n.d. <http://www.nephjc.com/news/credencewrapup> [accessed 24.08.19].
42. Sura K, Lischalk JW, Leckie J, Welsh JS, Mundt AJ, Fernandez E. Webinar-based contouring education for residents. *J Am Coll Radiol*. 2017;14:1074-9, <http://dx.doi.org/10.1016/j.jacr.2017.03.013>, e3.
43. Poyan Mehr A, Sadeghi-Najafabadi M, Chau K, Messmer J, Pai R, Roy N, et al. The glomerular disease study and trial consortium: a grassroots initiative to foster collaboration and innovation. *Kidney Int Rep*. 2019;4:20-9, <http://dx.doi.org/10.1016/j.ekir.2018.09.012>.
44. Sparks MA, Lerma EV, Kupin W, Phelan PJ, Jhaveri KD, Topf J. NephMadness 2015: nephrology as a cornerstone of medicine.

- Am J Kidney Dis. 2015;65:375-7, <http://dx.doi.org/10.1053/j.ajkd.2014.12.002>.
45. NephMadness. AJKD Blog n.d. <https://ajkdblog.org/category/nephmadness/> [accessed 25.08.19].
  46. Melilli E. AJKD official blog. *Nefrología*. 2018;10:93.
  47. Kerfoot BP, DeWolf WC, Masser BA, Church PA, Federman DD. Spaced education improves the retention of clinical knowledge by medical students: a randomised controlled trial. *Med Educ*. 2007;41:23-31, <http://dx.doi.org/10.1111/j.1365-2929.2006.02644.x>.
  48. Vela X, Conjeevaram A, Rodriguez S, Desai T. Nephrology education: it's in the game. *Nephrol Dial Transplant*. 2019, <http://dx.doi.org/10.1093/ndt/gfz117>.
  49. 2018 Nephrology World Cup - Manual. Google Docs n.d. [https://docs.google.com/document/d/1wBwc4R5l7q\\_uwLetqJrO95dwavEQ78dvnVAn\\_ygMgZE/edit?usp=sharing&usp=embed\\_facebook](https://docs.google.com/document/d/1wBwc4R5l7q_uwLetqJrO95dwavEQ78dvnVAn_ygMgZE/edit?usp=sharing&usp=embed_facebook) [accessed 25.08.19].
  50. Fernández-Rodríguez D, Grillo-Pérez JJ, Pérez-Hernández H, Rodríguez-Esteban M, Pimienta R, Acosta-Materán C, et al. Evaluación prospectiva del desarrollo de nefropatía inducida por contraste en pacientes con síndrome coronario agudo tratados con angiografía coronaria rotacional vs. angiografía coronaria convencional: Estudio CINERAMA. *Nefrología*. 2018;38:169-78, <http://dx.doi.org/10.1016/j.nefro.2017.05.011>.
  51. Parwani P, Choi AD, Lopez-Mattei J, Raza S, Chen T, Narang A, et al. Understanding social media: opportunities for cardiovascular medicine. *J Am Coll Cardiol*. 2019;73:1089-93, <http://dx.doi.org/10.1016/j.jacc.2018.12.044>.
  52. Cabrera D, Roy D, Chisolm MS. Social media scholarship and alternative metrics for academic promotion and tenure. *J Am Coll Radiol*. 2018;15:135-41, <http://dx.doi.org/10.1016/j.jacr.2017.09.012>.
  53. Smith DR, Watson R. Career development tips for today's nursing academic: bibliometrics, altmetrics and social media. *J Adv Nurs*. 2016;72:2654-61, <http://dx.doi.org/10.1111/jan.13067>.
  54. Cabrera D, Vartabedian BS, Spinner RJ, Jordan BL, Aase LA, Timimi FK. More than likes and tweets: creating social media portfolios for academic promotion and tenure. *J Grad Med Educ*. 2017;9:421-5, <http://dx.doi.org/10.4300/JGME-D-17-00171.1>.
  55. Chisolm MS. Altmetrics for medical educators. *Acad Psychiatry*. 2017;41:460-6, <http://dx.doi.org/10.1007/s40596-016-0639-3>.
  56. Carpenter CR, Cone DC, Sarli CC. Using publication metrics to highlight academic productivity and research impact. *Acad Emerg Med*. 2014;21:1160-72, <http://dx.doi.org/10.1111/acem.12482>.
  57. Mandrola J, Futyma P. The role of social media in cardiology. *Trends Cardiovasc Med*. 2019, <http://dx.doi.org/10.1016/j.tcm.2019.01.009>.
  58. Widmer RJ, Mandrekar J, Ward A, Aase LA, Lanier WL, Timimi FK, et al. Effect of promotion via social media on access of articles in an academic medical journal: a randomized controlled trial. *Acad Med*. 2019;1, <http://dx.doi.org/10.1097/ACM.0000000000002811>.
  59. Luc JGY, Archer MA, Arora RC, Bender EM, Blitz A, Cooke DT, et al. Social media improves cardiothoracic surgery literature dissemination: results of a randomized trial. *Ann Thorac Surg*. 2019, <http://dx.doi.org/10.1016/j.athoracsur.2019.06.062>.
  60. S.E.N. Nefrología (@SENeurologia)/Twitter. Twitter n.d. <https://twitter.com/seneurologia> [accessed 22.09.19].
  61. Hudson S, Mackenzie G. 'Not your daughter's Facebook': Twitter use at the European Society of Cardiology Conference 2018. *Heart*. 2019;105:169-70, <http://dx.doi.org/10.1136/heartjnl-2018-314163>.
  62. Kalia V, Ortiz DA, Patel AK, Moriarity AK, Canon CL, Duszak R. Leveraging Twitter to maximize the radiology meeting experience. *J Am Coll Radiol*. 2018;15:177-83, <http://dx.doi.org/10.1016/j.jacr.2017.10.022>.
  63. Maximino J, Loureiro A, Paiva A, Adragão T. Comissão Organizadora. 2019;26.
  64. European Society of Radiology (ESR). The new EU General Data Protection Regulation: what the radiologist should know. *Insights Imaging* 2017;8:295-9. [doi:10.1007/s13244-017-0552-7](https://doi.org/10.1007/s13244-017-0552-7).
  65. 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, <http://dx.doi.org/10.1136/openhrt-2019-001031>.
  66. Sebastiani P, Solovieff N, Puca A, Hartley SW, Melista E, Andersen S, et al. Genetic signatures of exceptional longevity in humans. *Science*. 2010, <http://dx.doi.org/10.1126/science.1190532>.
  67. Farouk S, Sparks MA. Editorial commentary: the public physician in cardiology: the solution to information pollution. *Trends Cardiovasc Med*. 2019, <http://dx.doi.org/10.1016/j.tcm.2019.02.002>. S1050173819300106.
  68. Hennessy CM, Smith CF, Greener S, Ferns G. Social media guidelines: a review for health professionals and faculty members. *Clin Teach*. 2019, <http://dx.doi.org/10.1111/tct.13033>.
  69. AJKDblog. #NephMadness 2019: Volume Assessment Region. AJKD Blog 2019. <https://ajkdblog.org/2019/03/15/nephmadness-2019-volume-assessment-region/> [accessed 3.09.19].
  70. AJKDblog. Welcome to #NephMadness 2019. AJKD Blog 2019. <https://ajkdblog.org/2019/03/04/welcome-to-nephmadness-2019/> [accessed 3.09.19].