Use of a VISUAL ABSTRACT to Disseminate Scientific Research

Version 4 | January 2018

Editor

Andrew M. Ibrahim MD, MSc
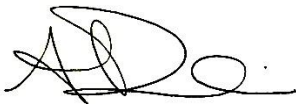University of Michigan
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Preface

Dear Reader,

Since the first visual abstract in July of 2016, more than 50 journals and institutions have adopted its use in their social media strategy to disseminate scientific research. Equally exciting as the widespread adoption has been the community that has developed to share the best tips, tricks and problem-solving required to create a visual abstract. I am incredibly grateful to each of contributors who have taken time to openly share their experience and best practices here, in the 4th Version of the Visual Abstract Primer. More than a collection of ideas and recommendations, it reflects the earnest desire to disseminate and share scientific knowledge. It is my hope that every subsequent versions continues to grow with the same spirit and mission.

Sincerely,

Andrew M. Ibrahim
Ann Arbor, Michigan
January 2018

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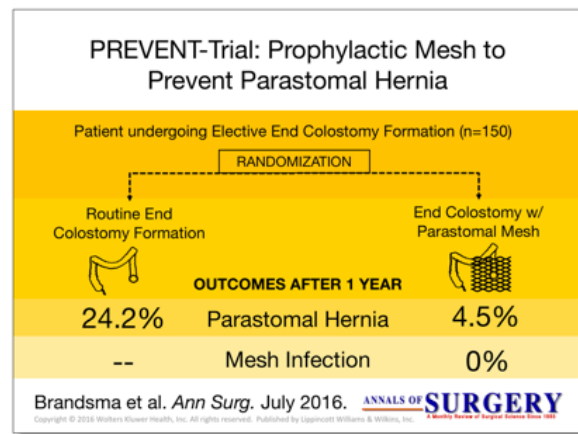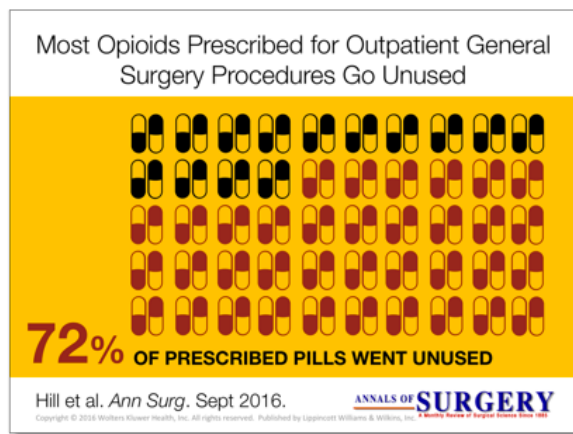
What Is a Visual Abstract?

ANDREW M. IBRAHIM MD, MSC

WHAT IS A VISUAL ABSTRACT?

Simply put, a *visual abstract* is a visual summary of the information usally found within the abstract portion of an article. Similar to the actual text abstract of a research article, it is meant to convey the key the findings of the article in a shorter format.

Use of visuals to summarize scientific articles have a long history, with notable examples in such as the "Central Illustration" in cardiology or the "Graphical Table of Contents" in basic science dating back to the 1980s.

The first #VisualAbstract for social media was introduced by the Annals of Surgery in July of 2016. It differs from previous visual summaries of research by using a triptych layout, single color icons, and direct reporting of primary outcomes. It by no means replaces the article, but serves an adjunct to help readers quickly find the content most relevant to them that they want to pursue further and read.

COMPONENT OF AN EFFECTIVE VISUAL ABSTRACT

When first introduced, visual abstracts followed the general layout show here with attention to specific components:
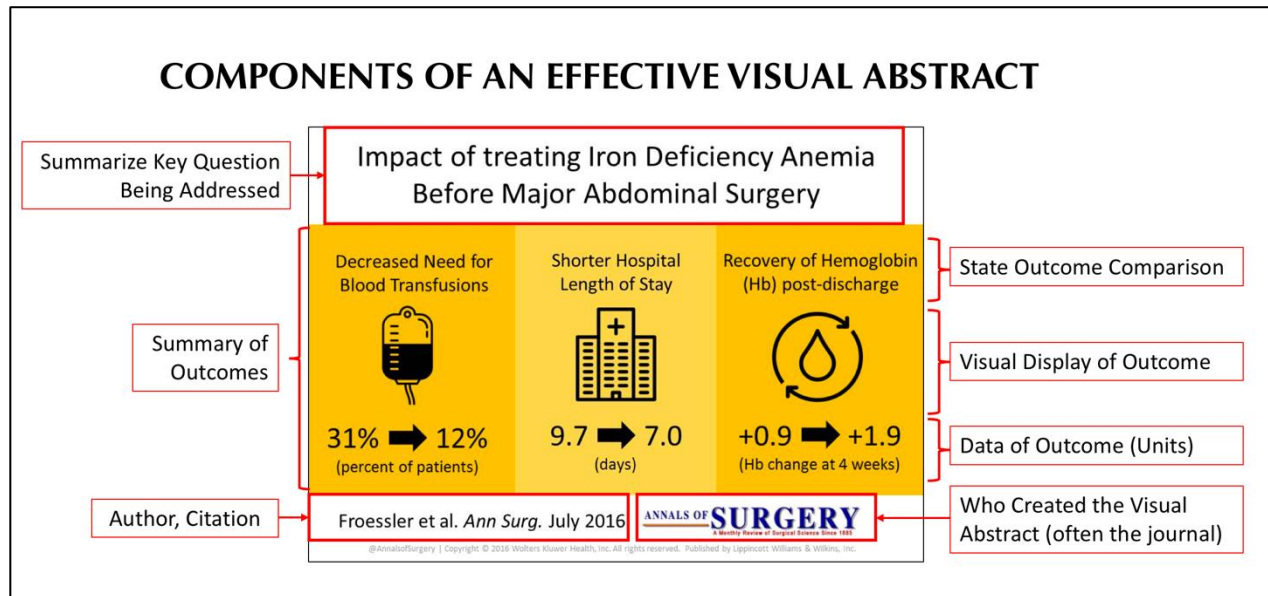
Key components of the visual abstract include:

Summarize Key Question Being Addressed: This usually comes from the title of the article or a heading of key figure.

Summary of Outcomes: Most articles have many more than 3, but the visual abstract will focus on 1-3 that the primary findings of the article.

Author, Citation: Typically including the first author's name, journal, and year of publication.

State Outcome Comparison: A short phrase that clearly states the outcome with some directionality. For example, "Decreased Need for Blood Transfusions" is used rather than simply, "Blood Transfusions." As much as possible, the language used should use the same prose and interpretation used in the article for consistency.

Visual Display of Outcome: A simple, single colored icon that represents the outcome. (More on this below – "Making it Visual.")

Data of Outcome (Units): In addition to stating the outcome, visual abstracts give the numeric representation with clear labeling of the units.

Who Created the Visual Abstract: This is often the journal, but may be individual author. It is important not to use the logo of the journal without their permission.

A VISUAL ABSTRACT IS NOT A SUBSTITUTE FOR READING THE ARTICLE

It is important to state here up front what the visual is NOT. A visual abstract is *not* a substitute for reading the article and does not contain all the details of an article. The goal of a visual abstract is to inform a potential reader of the key findings in an article to help them decide if they want to proceed in reading the entire article. It is similar to the "trailer" of a movie. Just as any single article should not change one's practice, a visual abstract *alone* should not influence clinical decision making or opinion about the paper.

Emerging Evidence on Visual Abstract Impact

JUSTIN B. DIMICK MD, MPH

To those of us following the #VisualAbstract on social media, its impact has seemed self-evident. The visuals are intuitive, eye-catching and easy to share. Importantly, the visual abstract impact on dissemination has been tracked and measured through two important metrics: how many journals have adopted them and how far articles with visual abstracts spread.

INCREASING ADOPTION OF THE VISUAL ABSTRACT

Since the first Visual Abstract in July of 2016, there has been a steady increase in adoption. Individual researchers as well as institutes quickly recognized their value and encouraged their adoption.

To date, more than 50 journals, organizations and institutions have adopted the visual abstract into their social media dissemination strategy including the *New England Journal of Medicine, JAMA Surgery and Heart BMJ*.
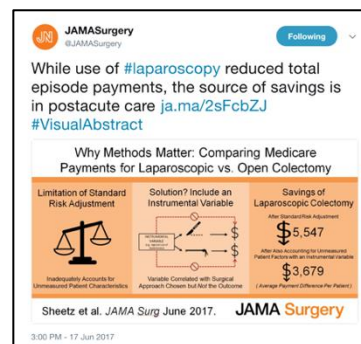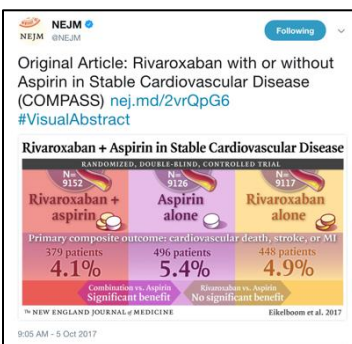
An updated and running list of journals and institutions who have adopted the visual abstract are listed here.

INCREASED DISSEMINATION WITH USE OF A VISUAL ABSTRACT

From July of 2016 to December of 2016, the *Annals of Surgery* carried out the following prospective cross-over study to compare the extent of article dissemination using text-alone tweets versus visual abstracts. The full article can be downloaded here: https://twitter.com/AnnalsofSurgery/status/858036253773660161
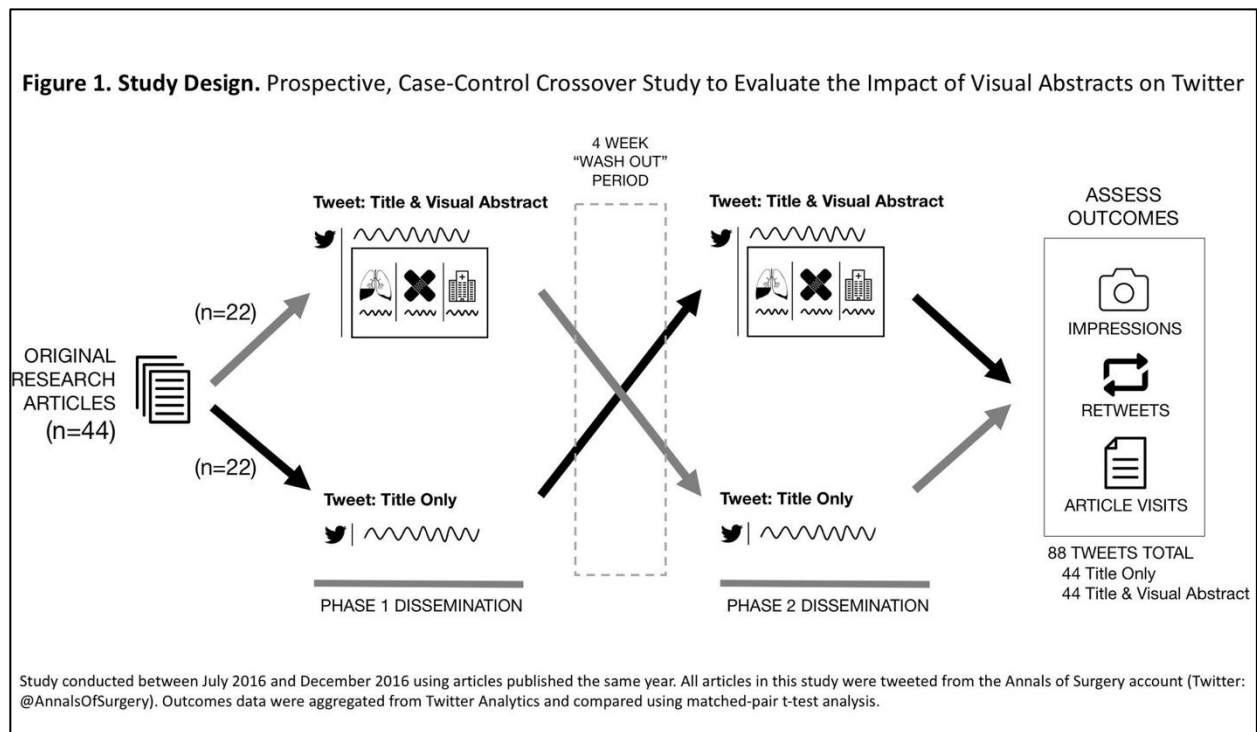

Figure 1. Study Design. Prospective, Case-Control Crossover Study to Evaluate the Impact of Visual Abstracts on Twitter

Study conducted between July 2016 and December 2016 using articles published the same year. All articles in this study were tweeted from the Annals of Surgery account (Twitter: @AnnalsOfSurgery). Outcomes data were aggregated from Twitter Analytics and compared using matched-pair t-test analysis.

TABLE 1. Case-control Crossover Results: Title Alone Versus Title with Visual Abstract

Outcomes (Mean)	Title Alone (n = 44)	Title with Visual Abstract (n = 44)	Increase of Outcome with Visual Abstract	P^*
Impressions	3073.3	23611.2	7.7 fold	<0.001
Retweets	11.0	92.1	8.4 fold	<0.001
Article visits	65.6	175.4	2.7 fold	<0.001

*Comparison of means using matched-pair *t* test analysis comparing 88 total tweets from 44 articles in the case-control crossover study.
Definitions: Impressions (number of times tweet is seen), Retweets (number of times a tweet is shared), article visits (number of times link to article was clicked from tweet).

Ibrahim, AM, Lillemoe K, Klingensmith ME, Dimick JB.. "Visual Abstracts to Disseminate Research on Social Media: A Prospective, Case-control Crossover Study." Ann Surg. 2017 Apr 26. doi: 10.1097/SLA.0000000000002277.

In short, the journal shared 44 original research articles on social media twice; once with a visual abstract and once without. To minimize exposure and content bias, they implemented a cross-over design with a four-week washout period in between each dissemination method.

The trial demonstrated that compared to title only tweets, those with a visual abstract had 7 fold higher impressions, 8 fold higher retweets and nearly a 3-fold higher article visits on the publisher website.

At present, at least two additional trials from other journals are underway measuring the impact of the visual abstract on their ability to disseminate articles.

ADDITIONAL VISUAL ABSTRACT PUBLICATIONS

Additional Publications about the Visual Abstract are listed here:

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 Apr 26. Link to Article

Wray CM, Arora VM. "#VisualAbstract: A Revolution in Communicating Science?" *Ann Surg*. 2017 Dec;266(6):e49-e50. Link to Article.

Ibrahim AM, Bradley SM. "The Adoption of Visual Abstracts at Circulation CQO: why and how we're doing it" *Circ Cardiovasc Qual Outcomes.* 2017 Mar;10(3). Link to Article

Ibrahim AM. "Seeing is Believing: Using Visual Abstracts to Disseminate Scientific Research." *Am J Gastroenterol*. 2017 Sep 19. Link to Article

Nikolian, V, Ibrahim AM. "Visual Abstracts and the Future of Scientific Journals" Clinics in Colon and Rectal Surgery." *Clinics in Colon and Rectal Surgery*. 2017 Sep;30(4):252-25. Link to Chapter

Aungst, T. "Visual Abstracts are Changing How we Share Studies." *Doximity.* July 2017. Op-Ed. Link to Article

Creating a Visual Abstract

Principles of Design Thinking

BON KU MD, MPP

EMBRACING SOME DESIGN PRINCIPLES

An effective visual abstract has a clear message. You will want to embrace some principles of design when creating your visual abstract. These include:

Focus on the user experience. The process of design starts and always returns to the user experience. Always keep in mind, "*What does my audience on Twitter want to know about scientific research?*"

Clarity of Purpose. Particularly within complex articles, you want to spend time narrowing the key message down to what you want to deliver. *Some* simplification of presentation may be necessary to establish a clear focus.

Rapid Prototyping. There are infinite ways to visually display research. Your 1st, 2nd or 10th visual abstract won't be your best one. You will improve significantly by rapidly trying new formats and seeing what works!

Iterative Improvement. Rather than ask, "Is it perfect?" design thinking focuses on, "What is the next step to make it partially better?" You will significantly improve by soliciting feedback and studying other designs.
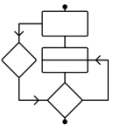
Thoughtful Restraint. Prioritize the key message over completeness. Sure, having every secondary endpoint and every limitation of the article in the visual abstract is ideal to give context, but this can significantly distract from the key message. In the case of visual abstracts, more is not always better.

Relevant Creativity. Thinking outside the box can be valuable, but ultimately needs to be grounded in the desired outcome. Experimenting "just to be different" isn't always effective. You should frequently balance your design creativity with *thoughtful restraint* and *clarity of purpose.*

DEVELOPING YOUR DESIGN SKILLSET

There are countless resources available to help you develop your design skillset. Here are a few options to consider:

Online Toolkits

Stanford d-School Virtual Crash Course

Researchers and designers travel from all over the world to train and learn from the experts at the d-school. Here is a 90-minute virtual crash course in design thinking from them that you can access for free: https://dschool.stanford.edu/resources-collections/a-virtual-crash-course-in-design-thinking

IDEO Design Kit

IDEO is the among the world leaders in design thinking. They have made their tool-kit open source that you can use to help apply design principles into your day to day problem solving. http://www.designkit.org/methods

In-Person Workshops

Visual Abstract Workshops

Periodically, you will find design workshops pop-up. Many of the authors in this primer have run them, including ones specifically targeted for visual abstracts. Ask around your institution or to authors in this primer to find out if any of them are near you.

Collaborating with Designers

Improving your ability to design is like many other skills that improve with deliberate practice and exposure. There's no substitute for simply spending time with designers. You will be surprised how close they may be!
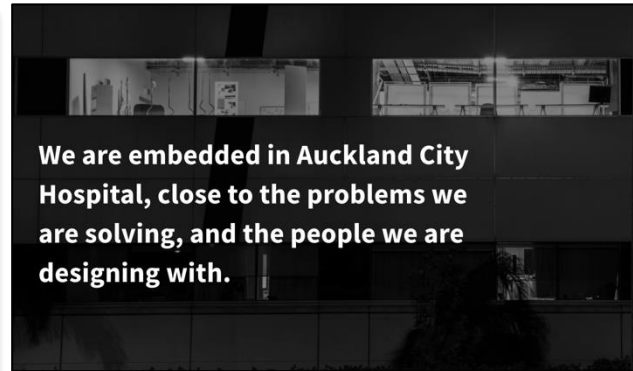
Consider the DHW lab, situated on *within* Auckland City Hospital. Clinical providers frequently rotate through the lab to trouble shoot ideas they see in real life practice and learn from the designers about to address them. Similar healthcare design labs exist at Thomas Jefferson University and the University of Virginia.

Creating a Visual Abstract

ANDREW M. IBRAHIM MD, MSC

STARTING WITH A SOFTWARE

While the work can be done with expensive software (e.g. Adobe Photoshop Suite), most (or even all of it) can be done in Microsoft PowerPoint or Keynote. In fact, to facilitate the "thoughtful restraint" mindset as a core design principle, I almost exclusively stick to Power Point.

If you have a higher end design taste and want to create images more sophisticated than *Paint* allows, try *Pixlr (*https://pixlr.com/editor/) a free online image editor.

STEP BY STEP PROCESS OF CREATING A VISUAL ABSTRACT

The following steps in this order can help you create a simple visual abstract:

Step 1: Choose an Article. Choose an article and spend time identifying the key message is that you want you convey. Pull out the key outcomes. While most articles have several key points, it is difficult to convey more than 2 or 3 in a visual abstract.

Step 2: Create Your Visual Fields. There are many ways to do this, but colored boxes can be quite easy and helpful.
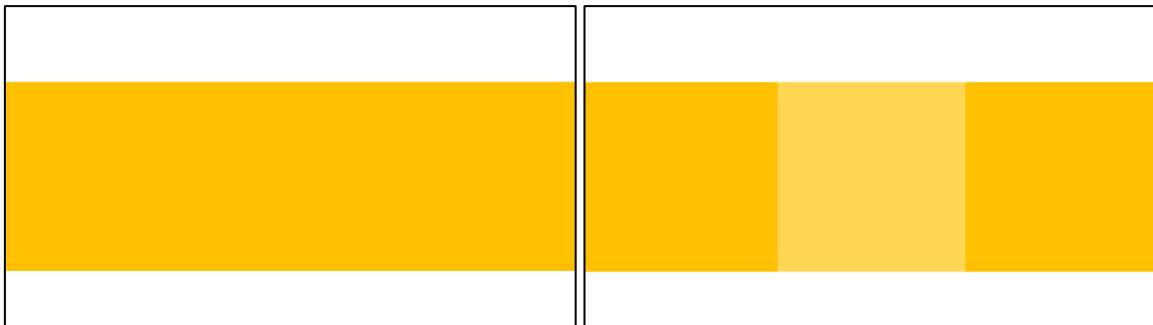
Step 3: Add Author, Journal and Title. Starting filling in some of the essential information.

Impact of treating Iron Deficiency Anemia Before Major Abdominal Surgery

Froessler et al. *Ann Surg.* July 2016.

ANNALS OF SURGERY

A Monthly Review of Surgical Science Since 1885

@AnnalsofSurgery | Copyright © 2016 Wolters Kluwer Health, Inc. All rights reserved. Published by Lippincott Williams & Wilkins, Inc.
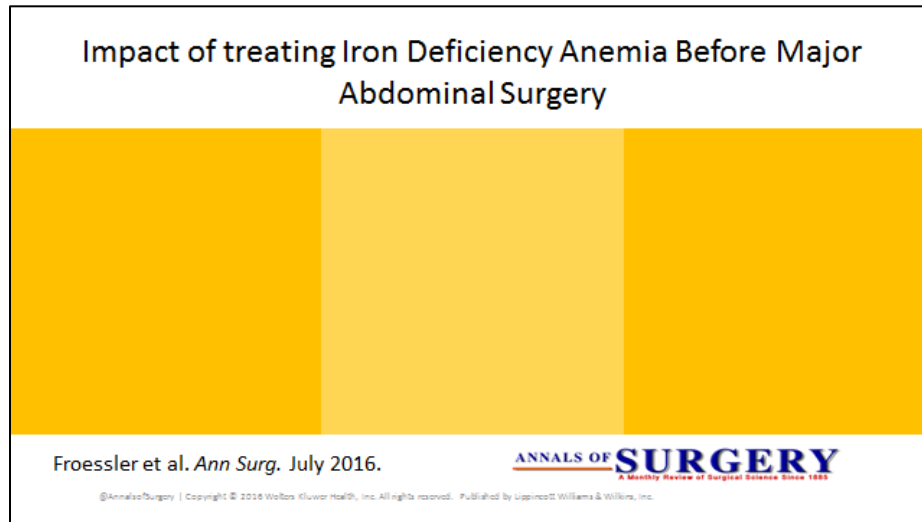
Step 4: Layout Your Outcomes. Describe the outcomes across the top in short phrases with comparative phrases inside of text boxes.

Impact of treating Iron Deficiency Anemia Before Major Abdominal Surgery

Decreased Need for Blood Transfusions

Shorter Hospital Length of Stay

Recovery of Hemoglobin (Hb) post-discharge

Froessler et al. *Ann Surg.* July 2016.

ANNALS OF SURGERY

A Monthly Review of Surgical Science Since 1885

@AnnalsofSurgery | Copyright © 2016 Wolters Kluwer Health, Inc. All rights reserved. Published by Lippincott Williams & Wilkins, Inc.

Step 5: Add in Values for Each Outcome. Add in the numeric values of each outcome, including the units.
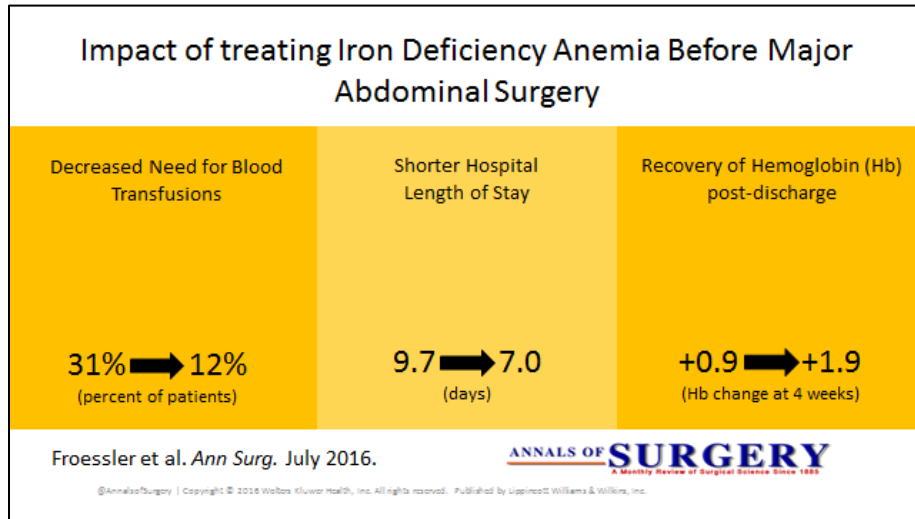
Step 6: Add Visuals. This is arguably the hardest part for most people, and an entire section ("Making It Visual") is dedicated to it below. It is CRUCIAL that you do not use images for which you do not have permissions or rights.
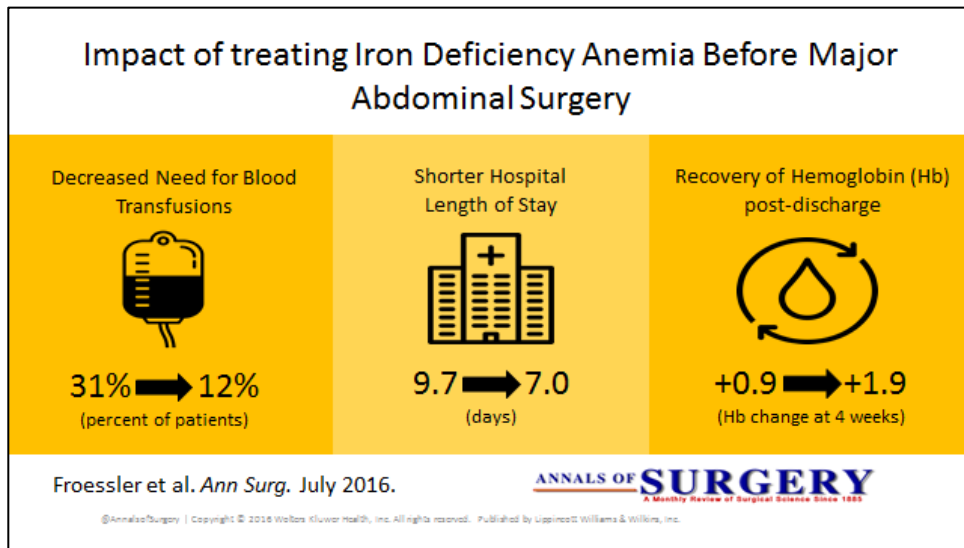
Step 7: Export your File. You will want to save the file as a JPEG of other image file to make it easily usable for social media. Be sure to proof read and double check all your outcomes so that they are consistent with the article. If the methods (e.g. randomized trial, retrospective review) are not clear in the visual abstract, be sure to include it in the text of the Tweet.

SHORT VIDEO SUMMARY ON CREATING A VISUAL ABSTRACT

The key steps described above are summarized in a two-minute video here:
https://twitter.com/AndrewMIbrahim/status/839642707089899520

ALTERNATIVE LAYOUTS

Below are additional visual abstracts layouts shown in their template form (blue) and their final form (yellow) as used at the Annals of Surgery.

[State Title or Context of the Article]

[Finding 1]	[Finding 2]	[Finding 3]
[image]	[image]	[image]
[Value to Support Finding 1] (define units of value)	**[Value to Support Finding 2]** (define units of value)	**[Value to Support Finding 3]** (define units of value)

Citation (include author, title, journal, date). This #VisualAbstract was created by [insert name / Twitter Handle]

Survey of 1,033 Surgeons:
Barriers to Developing Surgical Scientists…

Pressure to be Clinically Productive	Excessive Administrative Duties	Concern about Work-Life Balance
88% (Percent of Surgeons)	64% (Percent of Surgeons)	60% (Percent of Surgeons)

Keswani et al. *Ann Surg.* Sept 2016.

ANNALS OF **SURGERY**

Here are more examples from the *New England Journal of Medicine* using similar templates but with their own branding and color schemes:

[State Title or Context of Article]

STUDY POPULATION	INTERVENTION	OUTCOME
[study population]	[Control]	[outcome 1]
[image]	[intervention]	[Outcomes 2]
[study population explained]	[explain intervention]	[Define Outcome]

(RANDOMIZATION)

Citation (include author, title, journal, date). This #VisualAbstract was created by [insert name / Twitter Handle]

PCI in Myocardial Infarction with Cardiogenic Shock

RANDOMIZED, MULTICENTER TRIAL

Culprit-lesion-only PCI with the option of staged revascularization N=351

Immediate multivessel PCI N=355

Patients with multivessel coronary artery disease, acute MI, and cardiogenic shock

Death or severe renal failure requiring renal-replacement therapy at 30 days

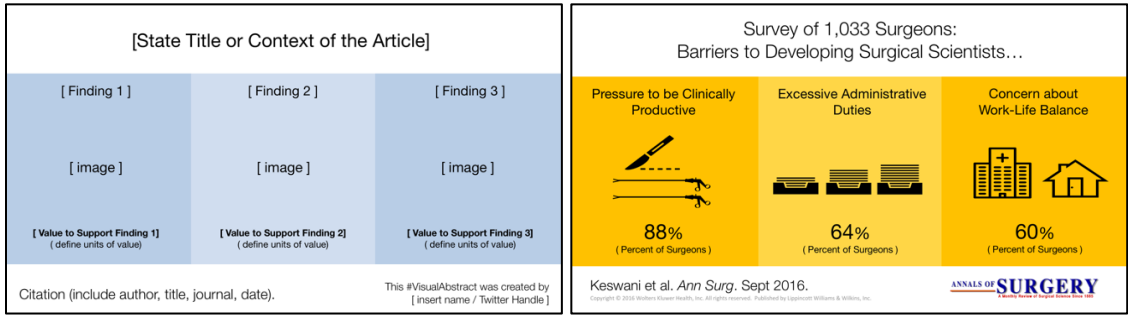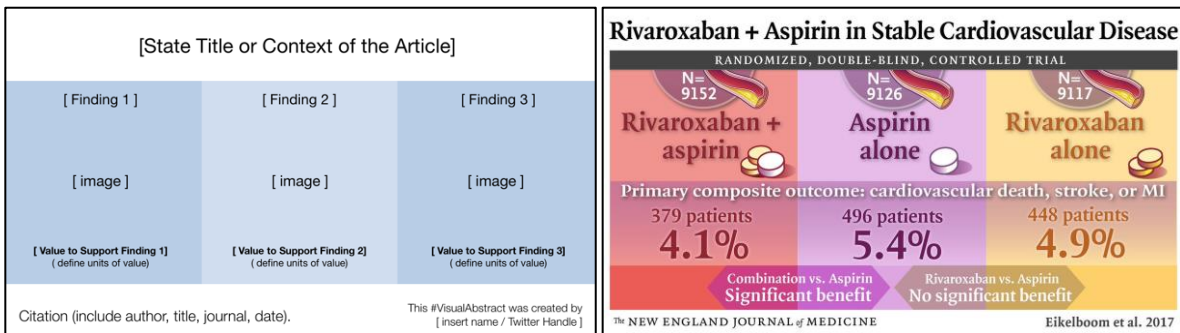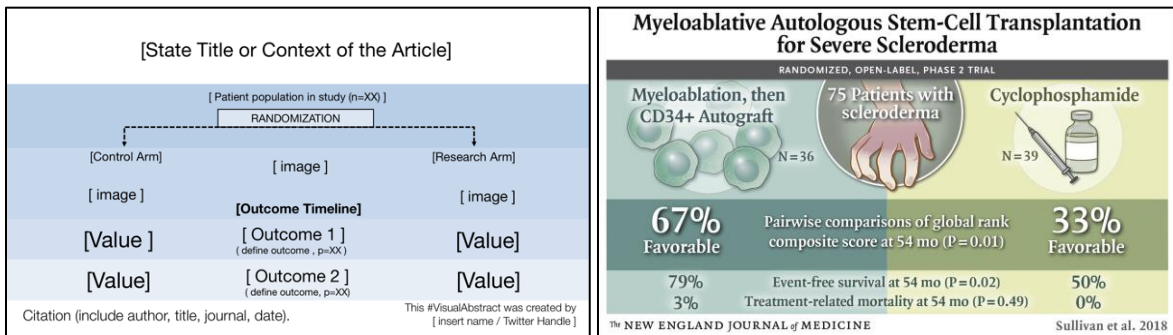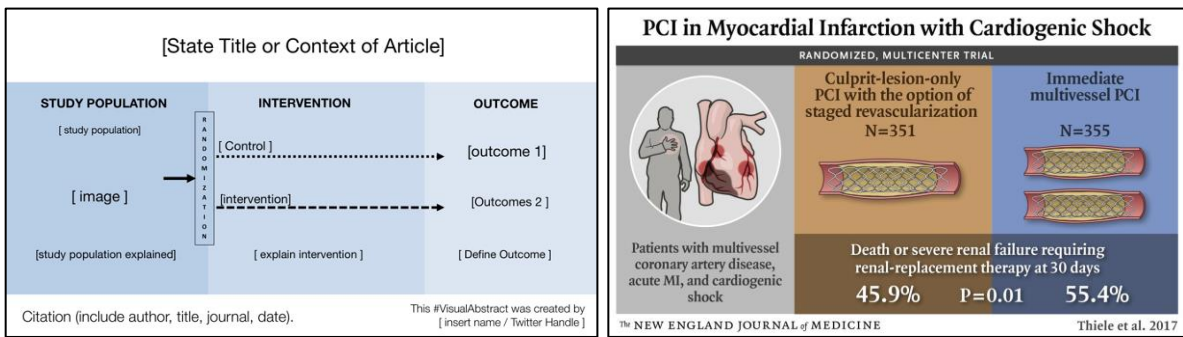45.9%   P=0.01   55.4%

The NEW ENGLAND JOURNAL *of* MEDICINE

Thiele et al. 2017

[State Title or Context of the Article]

[Patient population in study (n=XX)]

RANDOMIZATION

[Control Arm]	[image]	[Research Arm]
[image]	**[Outcome Timeline]**	[image]
[Value]	[Outcome 1] (define outcome , p=XX)	[Value]
[Value]	[Outcome 2] (define outcome, p=XX)	[Value]

Citation (include author, title, journal, date). This #VisualAbstract was created by [insert name / Twitter Handle]

Myeloablative Autologous Stem-Cell Transplantation for Severe Scleroderma

RANDOMIZED, OPEN-LABEL, PHASE 2 TRIAL

Myeloablation, then CD34+ Autograft   N=36

75 Patients with scleroderma

Cyclophosphamide   N=39

67% Favorable

Pairwise comparisons of global rank composite score at 54 mo (P=0.01)

33% Favorable

| 79% | Event-free survival at 54 mo (P=0.02) | 50% |
| 3% | Treatment-related mortality at 54 mo (P=0.49) | 0% |

The NEW ENGLAND JOURNAL *of* MEDICINE

Sullivan et al. 2018

[State Title or Context of the Article]

[Finding 1]	[Finding 2]	[Finding 3]
[image]	[image]	[image]
[Value to Support Finding 1] (define units of value)	**[Value to Support Finding 2]** (define units of value)	**[Value to Support Finding 3]** (define units of value)

Citation (include author, title, journal, date). This #VisualAbstract was created by [insert name / Twitter Handle]

Rivaroxaban + Aspirin in Stable Cardiovascular Disease

RANDOMIZED, DOUBLE-BLIND, CONTROLLED TRIAL

N=9152 Rivaroxaban + aspirin	N=9126 Aspirin alone	N=9117 Rivaroxaban alone
Primary composite outcome: cardiovascular death, stroke, or MI		
379 patients 4.1%	496 patients 5.4%	448 patients 4.9%
Combination vs. Aspirin **Significant benefit**	Rivaroxaban vs. Aspirin **No significant benefit**	

*The* NEW ENGLAND JOURNAL *of* MEDICINE

Eikelboom et al. 2017

Making Your Abstract Visual

EMILY SMITH, MS

MAKING IT VISUAL

Many researchers encounter design challenges with developing effective visual abstracts for lay audiences. Even with a simple message and only the necessary facts, researchers may face practical difficulties selecting effective images and designing an effective layout. Below are some common challenges and solutions.

Finding Images. There are a number of image banks on the internet (e.g. Google image search), some of which are free to use. Researchers who frequently prepare visual presentations may benefit from purchasing a subscription to access higher end icons (e.g. Shutterstock, Getty Images, Noun Project.)
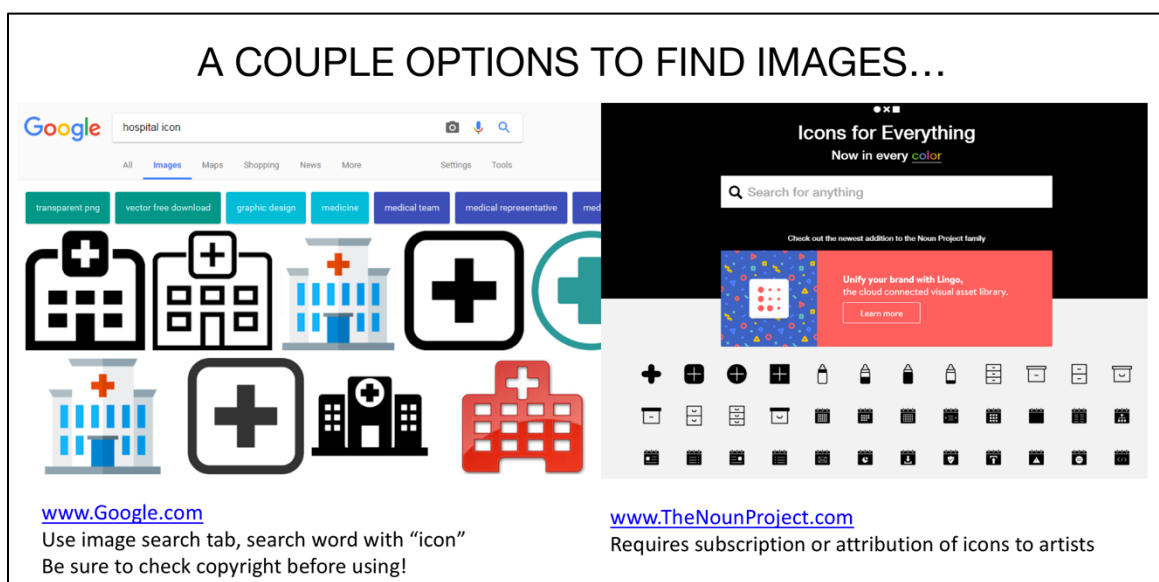
In some cases, the researcher may need to create the icon or collaborate with a graphic designer.

Finding the Right Images. When choosing an image, people often choose the wrong one. Researchers should plan to "rapidly prototype" multiple iterations of their visual abstract with different audiences of their peers before choosing the final lay out and images. Audiences are a great resource to help identify if the visuals best depict the information.

More on Choosing the Right Images. There is no clear "visual style" for academic journals, however, solid colored "icons" have the strongest professional appeal over cartoon-like images. While ultimately up to the researcher, it is highly encouraged to stick with solid color icons.

Copyright Issues. Just because an image is on the internet, does not mean it is free to use. A researcher MUST make sure that they have copyright permission to use the images. This point

cannot be overemphasized enough. To avoid this problem, either use the copyright filter during an image search or subscribe to an icon image bank.

Follow Design Rules. To create a strong visual abstract, it is important to respect design conventions including attention to contrast, repetition, alignment, and proximity. For example, to create hierarchy with information, use contrast techniques such as bold, color, and size. Following design rules will help create a consistent visual abstract that allows audiences to easily understand the key findings of the article.

COLLABORATING WITH A DESIGNER

If creating a visual abstract is more than a one-off effort, you might find it helpful to start collaborating with a designer. Here is some practical advice on making that collaboration productive.

How to Find a Designer

Start Local. When looking for a designer to assist with a visual abstract, first determine if your company, department, or unit employs a staffed designer. We are always surprised how often they are underutilized because employees simply don't know about them. Contact your communications or marketing staff to help you determine if there is a designer available.

Ask Colleagues. You probably learned about the visual abstract because you saw it in the work of a colleague online or at a meeting. They may be best to point you toward a designer who is familiar with visual abstracts and with whom they have a good track record.

Go the Internet. If your institution does not house a designer then head to the internet and start search for a local graphic designer or through online design resources (e.g. DesignCrowd, Upwork).

Making Your Designer Relationship Productive

Once you have a designer in place, here are a few suggestions to help you make the most of your collaboration to create a visual abstract:

<u>Meet Early</u>. Before getting too carried away with your project, meet with a designer early. The more time you have to co-create the project, the more satisfied you'll be with the result.

<u>Focus Your Message</u>. Designers won't know your research as well as you do. Take time to really craft and simplify your message to focus what you want to communicate. Ideally put this into 2-3 short bullets.
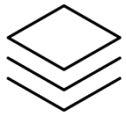
<u>Provide Examples</u>. If the designer has never created a visual abstract, explain the goals of visual abstracts, share some examples, and recommend the appropriate visual abstract layout structure (this primer can serve as good start, and can be downloaded free here: https://www.surgeryredesign.com/resources).

<u>Embrace Mutual Feedback</u>. The first (or even third draft) of the visual abstract won't be perfect. If the designer finds your content confusing, you may need to revisit your message. Expect and embrace iterative feedback both ways.

On a practical note, creating a visual abstract has a learning curve. If you find a designer that you enjoy working with, you may find it easiest to stick with them so they can learn your style and preferences, and thereby expedite the timeline of future project.

Leveraging the Visual Abstract for Dissemination

Disseminating Your
Visual Abstract on Social Media

TOM VARGHESE MD

Once you have created your visual abstract, you will need a plan to disseminate it. Social media has emerged as an enormous tool to improve dissemination of research. Many platforms exist— *Facebook*, Twitter, *LinkedIN,SnapChat— and* each have their own benefits and drawbacks. Our experience has primarily been on Twitter, and we will focus on it here.

The surgeon and social media: Twitter as a tool for practicing surgeons

by PAULA FERRADA, MD, FACS, JAMES W. SULIBURK, MD, FACS, SARAH B. BRYCZKOWSKI, MD, LUKE V. SELBY, MD, MS, EUGENIA E. LEE, MD, MADELINE TORRES, MD, ANAI N. KOTHARI, MD AND AFIF N. KULAYLAT, MD
PUBLISHED JUNE 1, 2016 • PRINT-FRIENDLY

As a start, if you're not familiar with *Twitter*, consider this excellent introduction from the American College of Surgeons.

Improving Your Dissemination and Reach on Twitter

Once you have created a visual abstract, you will want to maximize how far it disseminates. Here are four suggestions to help you improve your reach.

<u>Contact the Journal</u>*.* Many journals have dedicated public relation or social media personnel. Let them know you've created a visual abstract and share it with them. They may be able to share it, possibly after some modifications, through their social media network.
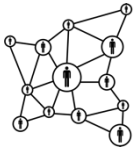
<u>Tag the Authors & Institutions</u>*.* Twitter allows you to "tag" photos with other Twitter accounts. By tagging authors, institutions or key thought leaders on the topic, they will be alerted to the post and more likely to share it within their network.

<u>Make it Reusable.</u> Visual abstracts have a shelf life well beyond their initial post. They recycle themselves into grand round slides, conference presentations and press releases. To help make the image reusable, take extra effort to make the message clear as a stand-alone image & release it in a high quality image format.

<u>Watch for Important Events.</u> While most authors and journals release the visual abstract when the article comes into press, additional follow-up opportunities also exist when a similar topic is discussed at a national meeting or in the news. Stay abreast of them and consider re-posting the visual abstract in that context.

You should also ask around at your institution if a social media team exists that may also help you improve the dissemination of your visual abstract and research.

Measuring Your Social Media Reach

Hopefully creating a visual abstract is not a one off project for you, and you plan to do it a few times. If that is the case, you will want to make an effort to track how well your content is disseminating. This may be particularly important if you need to justify a budget or time spent creating one.

Twitter itself will allow you to follow dissemination statistics. Common "outcomes" used to follow tweets include:

Impressions. The number of times a tweet is seen on Twitter. This is largely a measure of *exposure* and influenced by the number of followers each account has that shares the tweet.

Retweets. The number of times a tweet is shared. This reflects how *interesting* people find the content as it passed their threshold to pass it along to their network of followers.

Link Clicks. The number of times the link in the tweet is clicked. For most visual abstracts this will be a link to the article, and therefore serves as a surrogate for article visits. This best represents *engagement* in the actual content of the article.

Many additional consulting groups and websites will allow you to track additional measures of how your visual abstract is disseminating. For most users, however, these three metrics serve as a good initial foundation.

Read Thrice, Tweet Once

Although social media may seem less formal that other forms of communication, it should be taken with the utmost seriousness. Each tweet shared on social media has enormous potential to spread quickly to a broad audience. As such, take time to really revaluate your work before sharing it to ensure that it reflects the professionalisms and brand you want you associated with your work.

Use of Visual Abstracts & Live Tweeting at Academic Meetings

CHELSEA HARRIS MD, MSC

WHAT IS LIVE VISUAL ABSTRACTING?

Live Visual Abstracting (LVA) is the latest frontier in research dissemination. This concept combines the principles of a standard visual abstract (using compelling images to relay the key aspects of a topic) with live tweeting (provide a running, publically available window into a conference or speech). In much the same ways that standard visual abstracts increase article downloads and improve dissemination, LVA helps raise the visibility of speakers, their research, and the conference itself.

Live visual abstracts share many of the same core design principles as standard visual abstracts, but there are unique elements in both their creation and circulation that prospective abstracters should consider before embarking. It is important to note that because LVA is a relatively new paradigm, some procedural issues remain unresolved; we will highlight these areas where relevant.

PRE-CONFERENCE PREPARATION

Understanding The Context

Creating live visual abstracts at an academic meeting works best if you can understand the context and your role beforehand.

Don't Work in a Silo. Deciding to make your own Live Visual Abstract may not engender a lot of enthusiasm if you are seen to be encroaching on someone else's domain or if you are producing duplicate work. This is particularly important if you plan on using conference iconography (society logos etc.) as this may give the false impression that you are associated with an organization in an official capacity.

Work with the Conference Planners. Currently, there are no regulations regarding who can and should make Visual Abstracts. However, if the overarching goal is to produce succinct, visually appealing messages, knowing if the conference organizers have a Live Visual Abstracting procedure in place (including templates, designated designers, and review strategies) is prudent.

Keep Presenters in the Loop. Finally, if you are a presenter, you clearly have more latitude to make your own than an audience member. However, contacting the organizers may still be beneficial as they may be able to provide you with templates or icons that will maintain a consistent, professional aesthetic. If you're not the present, be sure to inform them beforehand – they may help provide content and also keep you from surprising them during the talk.

Creating Live Visual Abstract Templates

Once you have clarified your LVA role, you should begin preparing your templates. One of the key differences between live and standard visual abstracts is the timeframe for creating live visual abstracts is much shorter. For maximal impact, the time between the conference session and the abstract dissemination should be very short. Thus, abstractors should aim to have a nearly complete product by the time each session ends. There are several strategies to facilitate timely and effective LVA production.

Make templates ahead of time. Decide on color schemes, enter in session title, conferences logos, and authors names/credentials prior to the session. The fast pace potentiates small mistakes like typos, so pre-filling whatever information you have *a priori* will give you more time to proofread your final product.
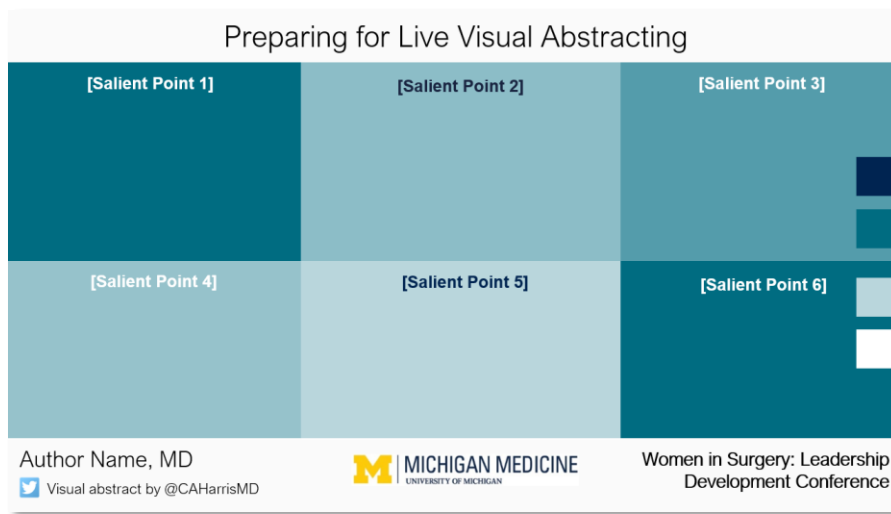
Customize Your Icon Color Scheme: Both Power Point and subscription icon services allow you to make customized colors, so if you plan on using a non-standard palate, take a few minutes to save those in ahead of time. The eyedropper function which is available in newer version of Power Point is a great tool as it allows you to match your colors to conference logos exactly, and can ensure your text matches as well.

Have Multiple Candidate Templates per Talk: For example, if you are planning on making an LVA for a panel, have several pre-filled options. You can consider making templates with all the authors on a single slide, individual slides for each author, or some combination. Similarly, you can prepare templates that emphasize quotations or include a range in panel numbere. At some point fairly early on you will have to make a judgement call regarding how much space

you want to give each speaker, but being able to expand or condense your template quickly is key.

ADJUSTING YOUR TEMPLATES

Conferences are inherently different than research papers. They are often more fluid, include multiple presentations in quick succession, and may include opinion as well as references. To accommodate these nuances, abstractors may want to adjust their templates to include quotation-anchored and non-linear formats.

Examples shown here from the recent Women in Surgery Leadership Development Conference:

<u>Expand template to include more findings</u>: instead of the increasingly common 3-panels structure seen in standard visual abstracts, consider a layout that can accommodate 4-8 findings. Changing slide size in Power Point from a standard 4:3 ratio to a widescreen 16:19 can provide more space. As always, abstractors must balance thoroughness with readability, so you should be judicious in what you ultimately include.

<u>Anchor to a quotation</u>: speakers often frame their talks with pithy quotations so using these as a starting point is a great way to attract attention. If the quotation is glib or somewhat controversial, making sure to attribute it to the original source is also a good strategy to ensure you are not putting words in the speakers' mouth.

<u>Employ non-linear formats</u>: unlike scientific papers which are formulaic, conferences follow a looser format so you can be creative in how you display your information. Test out new formats beforehand with your colleagues to weed out ones that are boring or too busy.

Final Checks

Time pressure will inevitably make Live Visual Abstracts error prone, so make sure you review your draft in full screen and ideally enlist a second reviewer before sending out the final product. Pay special attention to authors' names and credentials as these are more important than small typos.

COMMONLY ASKED QUESTIONS ABOUT LIVE VISUAL ABSTRACTING

If there is no pre-existing plan for LVA at a session I'm attending can I try my hand at it alone?

<u>Yes, but would not recommend it.</u> The short answer is no one can stop you, but there are several things to keep in mind. First, if you haven't practiced with standard visual abstracts, this is probably not a great first step. As noted earlier, creating quality visual abstracts is an iterative process, and there is not much time to edit in the live setting. In addition, if you are attending a session given by a paid consultant, you should be cognizant of whether broad dissemination of the key points will undermine their business model, or if the information is proprietary. You will be most effective (and avoid creating enemies) by working with the conference planners and speakers on a pre-arranged plan.

How can we ensure the message is correct?

<u>Engage the conference planners and speakers</u>. This is probably the biggest controversy in LVA. To date, most previous abstracting has had some quality control built in either through a dedicated review process at the journal promoting the VA, or because the author created their

own and could therefore control the message. Similarly, as live tweeting often includes pictures of slides, the author still retains primary control and citations are displayed prominently to give context and validity. Because conference speakers are often moving on to the next session quickly, it may be difficult to obtain permission or get them to review the live visual abstract in a timely manner. We recommend several strategies to address this tension. First, a prior clear agreement with conference organizers about who will be performing LVA, informing speakers of its occurrence, and potential review is best. In the absence of existing structures, approaching the moderator prior to the session's start to inquire if they would be willing to spot check your work is another viable approach. Finally, if you don't have access to any of these things, asking a fellow attendee to review and confirm your draft may also work.

What happens if I tweet out a LVA and realize there is an error?

Acknowledge it and repost the correct version**.** Time and severity are the two biggest considerations here. If you notice immediately and it has not been widely shared, delete your tweet, correct the abstract and try again. If you noticed a typo after the abstract has been widely shared, acknowledge your mistake repost a corrected version but leave the original—the message is likely more important than spelling. If you make a message error—meaning you mispresent the content—we recommend working with the original speaker to make corrections. This may entail deleting the original tweet, issuing a retraction, or other remedial efforts. This ties back in to the creative control issue: because visual abstracts reach wide audiences, retracting the message is impossible. Ultimately, having established LVA practices are ideal.

What should I do if someone has made a visual abstract that I don't like or misrepresents my work?

Contact the person who made it. Contacting the abstractor is a good first start. Misrepresenting your work is obviously a more serious transgression than creating a product that is simply unattractive, but working together to correct the mistake will be most successful. There may be little you can do to reign in spread once its public, but you can issue corrections. As is often the case in medicine, prevention is probably most helpful—designating someone to create your abstract and announcing this or preparing yours ahead of time will avoid this issue altogether.

How can I use the Visual Abstract to drive traffic to the relevant journal articles?

Tweet in tandem. The best way is to leverage a friend. Depending on the pace of the conference you may not have time to thoroughly reply to or augment your initial tweet. Therefore having a second person who can link article to the abstract or tie in other information is very useful.

Use of Visual Abstracts & Online Journal Clubs

Joel Topf MD

Critics of visual abstracts are concerned that they provide a superficial understanding of the article and oversimplify the work. In my experience, they have been just the opposite. *Visual abstracts serve as a gateway to deeper conversations about the articles as we use them to draw attention to our online journal clubs.*

In this section I will give an overview of how we organize our online journal clubs and have subsequently integrated the visual abstracts to improve our engagement and broaden our reach.

ABOUT NEPHROLOGY JOURNAL CLUB (#NephJC)

Nephrology Journal Club was established in 2014 as a means to bring together the online nephrology community to discuss the articles that are driving nephrology forward. NephJC discusses two articles a month.

Our monthly cycle for #NephJC includes the following components:

Blog Post Introduction. The cycle begins with a blog post that summarizes the key points of the article.

Patient Essay. On the same page, we also include an essay by a patient discussing how the disease, test, or treatment affects them.

Visual Abstract. To bring attention to the blog post, the patient essay, and the upcoming journal club, we create a visual abstract for the article that is shared it on social media and through our newsletter.

Online Twitter Chat. The primary event that these efforts are supporting are two 1-hour Twitter chats, one timed for North America and one for Europe. Thirty to one hundred people participate in each chat. The conversation is lively and is similar in content to a face-to-face journal club with discussions of previous work, methods, results, and the implications and next steps for the field.

Summary of Discussion. After the discussion is complete a summary of the chat is created and links to the discussion are added in a comment to the PubMed listing using PubMed Commons

A more detailed summary of our work and process has been published in the American Journal of Kidney Disease.

USING VISUAL ABSTRACTS FOR JOURNAL CLUBS

In 2017 NephJC began creating visual abstracts for each article we discussed. The visual abstracts were published to promote the Twitter chat and to get more people to participate and clarify the subject of the discussion. Nearly a year later we find visual abstracts to be particularly helpful in three core areas:
1. Lower Engagement Audiences
2. Studies where a Prior Article is Critical for Context
3. Complex Studies

Low Engagement Audience. Like many on-line activities, the audience for NephJC has various levels of commitment. While we have a strong cohort of people who read the article, editorials, and every supplement, we also have many people who come to the journal club chat without reading the article. For the latter group having a visual abstract of the study orients them so they can follow and understand the discussion. While visual abstracts are not intended to replace the entire manuscript for some people it is enough for them to understand and get useful information from the chat.

Studies where a prior article is critical for context. Another place visual abstracts are particularly helpful is describing the research landscape that has already been written. For example, when discussing the *TESTING trial for IgA*, it was helpful to review the visual abstract for the *STOP-IgAN trial* because one could only understand the importance of the latter trial if you were familiar with the former. Posting them together for the journal club quickly provided context and enriched the discussion. The ability of a visual abstract to allow people to quickly digest the prior literature allowed people to quickly grasp how the current study fit into the scientific discussion.
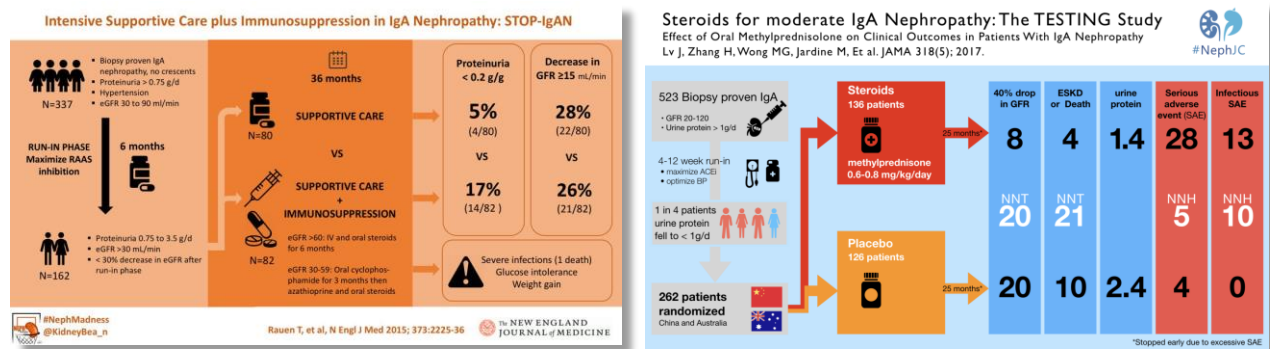
Complex Studies. We sometimes review studies with complex methods involving multiple trial arms and interventions (seen at right.) Even for people who have read the article thoroughly, it can be difficult to keep them all straight. Having a visual abstract allowed people to better understand the methods and refer to specific aspects fo the article.
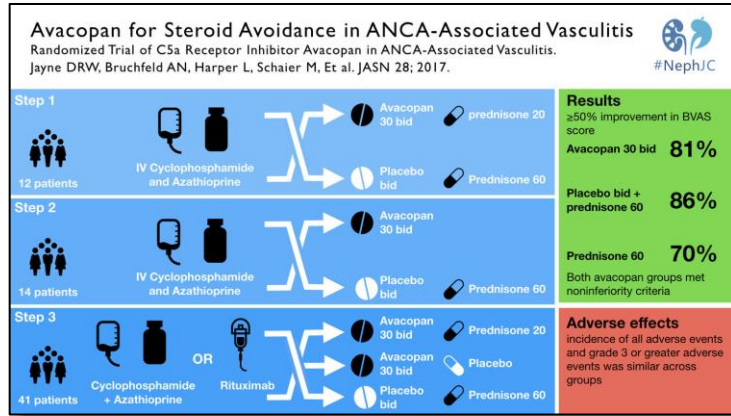
ADOPTION BEYOND JOURNAL CLUBS

Perhaps the best testament to the visual abstract experience at #NephJC has been the subsequent broad uptake within the nephrology community. Over the last year, several of our leading journals have adopted the visual abstract. JASN has gone even further to create a visual abstract editor section on editorial board.

Visual Abstract:
Views from the *Journal*

Implementation of Visual Abstracts at Your Journal

Rebecca E. Berger MD

This section is dedicated to academic journal editors and editorial staff who want to integrate visual abstracts into their dissemination strategy. It builds directly on my experience implementing the process at the *New England Journal of Medicine* in 2017 while working there as an editorial fellow.


MAKING THE PITCH TO THE EDITORIAL BOARD

You may have encountered the visual abstract and wondered, "Why doesn't my journal do this?" Before you approach the editorial board of a journal, you will want to think through some important questions:

- ✓ Can the results of the typical manuscript published in my journal be translated into the visual abstract format?
- ✓ Would my readers benefit from seeing the journal content in the visual abstract format?
- ✓ How should I "sell" the idea of visual abstracts to the editors and editorial staff? Is the goal to improve the number of readers, number of page views, number of subscriptions for our journal? How would using visual abstracts meet any of these goals?
- ✓ Who would be responsible for creating and disseminating visual abstracts? Will you be asking the editorial staff or authors to create and disseminate visual abstracts, or will the process involve a collaboration of the two?
- ✓ How will I address anticipated challenges or criticisms of using this format at my journal? The more common concerns include the risk of over-simplification of complicated content and logistical considerations regarding accuracy, the review process, formatting, and dissemination.
- ✓ How will we pilot visual abstracts for our journal?
- ✓ What will be our plan to test and improve our process and outputs?

Being prepared to answer these questions will help you better engage a journal editorial board on whether or not to adopt the visual abstract. It is also helpful to talk to other journals who have adopted the visual abstract to learn how they worked through the common hurdles listed above. As evident by this primer, the visual abstract community is full of people openly sharing their advice and experience.

GETTING STARTED

Once your editorial board has agreed to adopt the Visual Abstract, here are some practical tips to help you get started:
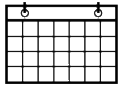
Start Small. A modest goal of one visual abstract a month is appropriate as your start to figure out your templates, patterns and work flow. Plan to pilot 2-3 visual abstracts before re-grouping with your editorial team to troubleshoot any challenges in the process and output.

Choose Wisely. Some articles lend themselves to a visual abstract better than others. Especially early on, choose articles with straight forward methods and clearly reported outcomes. Decide with your editorial team how much content you want to highlight on each visual abstract.

Dedicate a Point Person. Creating a visual abstract has a learning curve. Start by identifying a single person (or perhaps 2) to create the first 10 visual abstracts, rather than "spreading the work out" and having 10 people each make one.

Engage Key Team Members. If your journal has a staff member responsible for social media, make sure they are involved in the process as they will likely be the ones responsible for disseminating your work. If your journal has a business or marketing team, they may have approved logos and branded images that they prefer you use.

Commit to Your Brand. Another reason to limit the early phases to a single person is to maintain a style and consistency that can be recognized as part of the journal. Standardizing simple design elements such as lay out, font, and color schemes can go a long way to make your visual abstracts easy to produce and instantly recognizable.

Measure What Matters. Decide in advance with your team how you want to measure success in your visual abstract pilot. Do you want to measure click-through rates, or solicit feedback from a group of readers? If so, make sure you have the mechanisms to collect this information in advance of releasing your first visual abstract.

Growth Mindset. Even if you do not formally collect feedback from readers, make sure you get feedback from your editorial team and colleagues including from other journals. Iterative improvements can help further define the scope of your visual abstracts and make each one better than the last. Most of the improvements we made over the last year came directly from suggestions by our readers or colleagues.

After Adoption – Avoiding Visual Abstracts Mistakes at Your Journal

Hari Keshava MD, Mohamed Abbasi MD

Table 1. Guidelines to Standardize Visual Abstracts for Scientific Research

Guideline	Rationale
Clearly state the question or purpose of the study.	Give context for study
Describe the research design (e.g., randomized trial, retrospective review, survey).	Make quality of evidence clear
Include the primary outcome of the study.	Minimize reporting bias
Report, when appropriate, *P*-values or others measures of significance.	Improve reader ability to interpret findings
Label citation of the article in image itself, and include link to the full article when posted.	Make source of data easy to locate
Use language consistent with the terms and definitions used in the article.	Minimize "editorializing" and bias
Only use images for which the authors or journal have rights.	Avoid violating copyright laws.
External review (by someone who did not create the visual abstract) for accuracy and assessment of bias.	Ensure credibility and identify unconscious bias.

While creating visual abstracts has plenty of upside for dissemination of research, it also has many potential pitfalls. We outline here some common mistakes made by those creating visual abstracts and strategies to mitigate them. As a start, we recommend taking time to look through this primer as well as examples of visual abstracts – e.g. search the hashtag #VisualAbstract on social media – to learn different styles and approaches.

A recent publication in *Nature AJG* (figure from article show to the left) outlines some guidelines to standardize the quality of visual abstracts. These are not meant to be restrictive *rules*, but rather safeguards meant to guide you away from common mistakes.

We build on those here using our own experience working within a large international journal.

KEEP THE GOAL OF A VISUAL ABSTRACT IN PERSPECTIVE

The experience of creating a visual abstract should involve some tension. You don't want it to be so simplistic that you "dumb down" the research and offend the authors. You also do not want to make the visual abstract so complex that it fails to engage potential readers. Even worse, in either circumstance you do not want to misrepresent the actual research.

To take off some of the tension, we frequently give ourselves a couple reminders:

It's Not About You, It's the Article. You may find yourself stressed out that you have injected too much of our own opinion in interpreting the article or that the findings are controversial. Remember, this isn't about you. The visual abstract should simply reflect the actual article itself. Comments and critiques often apply to the article itself and not you.

It's Just a Preview, Not A Substitute. Most good articles that catch your attention have multiple important findings as well as specific caveats. It is impossible to capture all the nuance in a visual abstract, and it's rarely done in the actual text abstract. Although you should try to be thorough, remember that the visual abstract is just preview and not designed to be a substitute for the article.

STRATEGIES TO LIMIT VISUAL ABSTRACT MISTAKES

Below are some strategies we have found helpful to reduce and even limit common visual abstract mistakes.

Stick to the Prose of the Article. Try your best to use the same language that the original author used in the article to minimize confusion and limit your own bias in interpreting the findings.

Include the Methods. While visual abstracts usually feature a key outcome of findings, remember to include the methods. At a minimum, we recommend including the study design (e.g. randomized controlled trial, survey, etc) and sample size to help give the reader context.

Clearly State the Authors Conclusion. Although the visual abstract is compared to a "movie trailer" in that it's just a snap shot of the article, a visual abstract should include the conclusion. Avoid the "cliff-hangers" and click-bait, and simply state the conclusion.

Include Measures of Significance. If the abstract or article has measures of significance (e.g. p-value) for the main finding you're showing the in visual abstract, then include that measure. This will help give validity and again help the reader interpret the findings.

Link to the Article. Remember, the goal is here is to preview the article, not be a substitute. Be sure that when sharing the visual abstract, you clearly link to the actual article. This will make it easier for readers to know where the information is derived.

Make the Visual Abstract Searchable. At present there is not a repository for visual abstracts, but most journal use the hashtag #VisualAbstract on social media to readers find them. Some also post them on their site with the article itself.

Use the Right Images. Only use images that you either have a copyright to use, or that you've purchased through a subscription that allows you to use them. Copyright violations will deeply threaten your journal's credibility in this space.

IMPROVING THE VISUAL ABSTRACT PROCESS AT YOUR JOURNAL

While visual abstracts can be created by individual authors and one-off projects, we strongly advocate that journals commit resources to a create a dedicated team. Many journals now have made "Visual Abstract Editor" or a "Creative Director" position on their editorial board to spear head visual abstract creation.

After your journal has gotten started, here are some tips to help improve your process:

Maximize the Learning Curve. Creating a visual abstract has a learning curve. It is best to have one or two people create the first ten, rather than ten people each creating one. Quality and consistency from your journal will go a long way to establish brand and credibility.

Establish Internal/External Review. Many mistakes in transcription or unconscious bias can be detected before the visual abstract is disseminated by having another person at the journal and/or someone outside the journal review it.

Be Responsive & Transparent. Even the best of us will make a mistake. If there is an error (e.g. incorrect value, mislabeled outcome) detected in your visual abstract after it has been shared, own it. Make the correction and re-post it.

Commit to a Dissemination Plan. Make sure you have a dedicated account that will be used for the purpose of disseminating the visual abstract. From our standpoint, tweeting the abstract is always done through the journal's twitter account with the goal of 4-6 abstracts per month.

A final word of advice-- do not hesitate to ask for help. This primer brings together a dozen of us who have never been in the same room together, but all share tips and tricks together on how to create a better visual abstract.

Future of Visual Abstracts

Librarians & Visual Abstracts

Patricia Anderson, MILS

Visual abstracts have gained enormous traction over the last year. From the view of a librarian, they have several benefits, drawbacks and future issues that need to be considered.

BENEFITS, DRAWBACKS OF VISUAL ABSTRACTS

Benefits

The benefits of a visual abstract are numerous. In addition to the [evidence](#) that articles with visual abstracts are read more often, they also have potential for broad application. A visual abstract lends itself to plain language explanations of concepts, clarity for funding agencies and policy makers, and as a tool for public outreach and education. The visual abstract may be more accessible to people with cognitive disabilities or who prefer visual learning (albeit while being less accessible to those with visual disabilities.) There are powerful benefits, especially in this era of publicly contested science findings.

Drawbacks

Visual abstracts are not without draw backs. Although never the intent, there appears to be some temptation to have them replace written abstracts. Another challenge is that they currently are not searchable in databases, and the issue of how to include and discover visual abstracts in MEDLINE remains to be addressed by the National Library of Medicine. Personally, I'm not sure that it replaces the full functionality of the traditional abstract, but rather supplements it, which I suspect is the intent of most users. Offering both strongly empowers science communicators and educators, especially if the images are licensed to promote use and dissemination. It would be ideal if the standard of practice for visual abstracts would be to make them Creative Commons licensed.

What is the Role of a Librarian?

Visual abstracts have generated discussion amongst librarians because of its potential to efficiently organize and communicate a broad body of scientific research. Librarians and libraries can provide useful expertise and resources in support of developing visual abstracts. Specifically, librarians can help in the discovery of royalty-free and Creative Commons images appropriate for use; training, acquisition, and licensing of image manipulation software and image databanks; as well as development and management of visual media, infographics, and image creation services.

FUTURE QUESTIONS ABOUT THE VISUAL ABSTRACTS

Over the last two years several important considerations have been raised regarding the future of visual abstracts.

1. Should the Visual Abstract be part of the actual article? The original intent of the visual abstract was as an adjunct on social media to highlight key findings from an article. They have become, however, valuable resources that readers download and integrate into their lectures and presentations to reference the paper. At least one journal, Annals of Thoracic Surgery, has included the visual abstract alongside the article itself.

2. Who should create the Visual Abstract? Do authors get academic credit? While the spirit of the visual abstract has been to open source creation and make it available to researchers, journals and institutions will likely shoulder the responsibility of facilitating that they are done at a high quality (i.e. provide resources, edit them, etc). At present there is no formal recognition for creating a visual abstract. However, several authors, having spent hours and multiple revisions creating one have started to list them on their CV.

3. Should Visual Abstracts be required from authors? While creating a visual abstract was initiated as a purely voluntary activity, demand for them has grown. In April of 2017, Stroke was first to announce that it will require visual abstracts for basic science manuscripts accepted to the journal. Other journals have followed suit, but it is unclear to what extent these requirements will be enforced.

4. Should there be a central repository for Visual Abstracts? At present, most visual abstracts only exist on social media platforms. Ideally they should be integrated in the MEDLINE or the publisher website so they can be readily included with the article itself. Efforts to create a central repository of visual abstracts have been discussed, but not formally implemented yet.

Moving Forward
Toward Better Visual Abstracts

ANDREW M. IBRAHIM MD, MSC

If the past year is any indication, our ability to create better visual abstracts will only grow. Particularly as journals make investments to professionalize the practice, it will become more common place.

If you have ideas and content you want to see in the next version of the visual abstract primer, please share them with us (email: iandrew@umich.edu) and we'll work to incorporate it into the next edition.