So far, this course has focused on writing, research manuscripts.,This week, I'm going to cover,other types of writing in science, such as the literature review,grants and letters of recommendation. Some of these types of writing maybe things that you need for your career right now.,Some of them may be things to put in your repertoire for the future.,In this module, I'm going to talk about writing a narrative review article.,A review article is a great thing for a graduate student or young investigator to tackle.,It's a lot of work, but it gives you a chance to dive into the most recent literature in your field.,It also gives you practice on reading papers, synthesizing and organizing a large amount of information.,And of course, writing review articles can also help your career.,Well written and well organized reviews may Garner a lot of readers and citations, because they are helpful to other scientists.,What's the goal of a review article?,The idea is to synthesize the recent primary literature on a topic.,There's a huge proliferation of papers these days.,Nobody can keep up with the entire primary literature.,Your job as a review article author is to pull together and summarize the recent primary literature so that somebody can go to your paper and get a good sense of the field.,A review article summarizes what we know and what we don't know on a topic.,It may also address particular controversies.,And in the process of doing a review article, ,you're also putting together a comprehensive list of citations on a topic or research question, and that can be a great resource for others in the field.,Just so you are aware, there are three basic types of review articles.,In this module, I am going to address the non systematic review, also called the narrative.,But I want you to be aware of the other options.,A systematic review is more comprehensive review that uses a rigorous search strategy to try to identify all relevant studies on a particular research question, ,even possibly unpublished studies. There are also what we call meta analyses.,These are systematic reviews that go one step further and formally pool data across different studies using statistics for data pooling.,Again, in this module, I'm just addressing non systematic reviews, as the other two types involve some more technical details, more technical than I want to get into in this module.,When writing a narrative review article, you start by searching the literature.,You will likely start with a broader search to get a sense of what's out there.,But then you are going to need to narrow your focus, otherwise there will just be too many papers to read.,Your review needs to have a clear thesis or theme.,This is the key to a good review article.,It can't just be, I'm going to review micro arrays or I'm going to review breast cancer.,Those topics are too broad. Instead, ,you might choose to review the use of microwave arrays in microbiology, or statistical techniques for micro array data, or the history of micro array technology.,You could do a whole review on the link between breast cancer and exercise, or between breast cancer and alcohol.,The topic has to be narrow and focused enough to make it tractable.,Early in my career, I wrote a literature review on eating disorders in athletes.,The body of literature on eating disorders in this specific population was small enough that I was able to cover this literature in a single review Organization is critical.,When we talked about the writing process, I told you about the pre writing step for review articles.,The importance of pre writing is magnified.,You have to find a way to get organized, or you will never finish writing the review.,There's just too much information. For my review on eating disorders and athletes.,I typed notes from each paper as I read the papers.,I also,figured out the sections and subsections of the paper early in the process so that I could organize,my notes bissection and by subsection.,There are several computer programs available that can help you to organize your references and notes, such as end note and Mendly, you can see that the reading, ,note taking an organization of information is going to take way more time than the actual writing of the review, so focus on that pre writing step.,I recommend writing the article in sections, each with their own headings.,That helps to organize the review, and also makes life easier for readers.,If you have numeric information, maybe put it in a summary table, e.g.,I used a date a table in my review to present data about the prevalence of eating disorders in different sports and for men and women separately.,If you have a tangential information, you could put that inside bars.,I had case reports on individual athletes who suffered from eating disorders.,These made interesting stories. but that kind of thing can go in a side bar or box off to the side, if it's hard to integrate it into the text.,Finally, write for a broad audience.,People may be reading your review article as an introduction to the field, so don't abbreviate too much, and don't assume prior knowledge.,And of course, write in a lively, engaging and easy to read style, using all the writing tips you've learned in this course.,A review article usually starts with an abstract, which I recommend that you write last.,You're going to have an introduction section that clearly states the aim of the review.,In my article on eating disorders and athletes, I started with some historical papers.,I went back to the 1980s where the 1st papers on eating disorders in ballet dancers were published.,These papers romanticized eating disorders and athletes.,So I talked about this as an interesting way to introduce the topic.,but then I jumped into my overall theme, which was that eating disorders in athletes need to be considered separately from eating disorders in the general population.,The nature of the disease may be fundamentally different in athletes.,And then I clearly stated the goal of my review, which was to critically evaluate the literature in the areas of measurement, prevalence, risk factors, outcomes, diagnosis, prevention and treatment.,The body of the paper should be broken into sections that have a nice logical structure.,For my review paper, it was easy, because I just divided my sections into definitions and diagnostic criteria, measurement, prevalence, risk factors, etc.,And then I even had subsections with within each of those sections, with separate sub headings.,In each section, I summarized what we know on the topic, what remains unknown, and how studies could do better in the future to fill in the gaps.,The conclusion should summarize what you found and give specific recommendations for what researchers should do going forward.,In my review, I noted that male athletes are at much higher risk of eating disorders than men in general, but eating disorders and male athletes has been sorely under studied.,I also suggested a specific type of study design that might be able to more accurately identify eating disorders and athletes.,So I gave a bunch of very specific recommendations, including stating what I thought should be the be the priorities in research going forward.,Then, of course, you have the references.,E.g., my review had 173 references.,Just to give you an example of a theme or thesis.,So the theme of my literature review was that eating disorders ,and athletes have distinct ideologies and require specialized approaches to things like measurement, diagnosis, prevention and treatment.,The aims of the literature review, the chapter were to critically review the latest research on eating disorders and athletes, ,including measurement issues, prevalence, risk factors, sequela prevention and treatment strategies.,And the sections of my paper lined up exactly with these goals.,I had an introduction and then definitions and diagnostic criteria, then measurement issues, then prevalence, then risk,factors and so on. And I actually had subsections with subheadings.,Within each of these larger sections, e.g.,under outcomes, I had distinct subsections on skeletal effects, injuries, detriments to performance, mortality and co morbidities. It was pretty easy to write the review once I had my organizational structure in place, because each of the subsections had maybe one to ten relevant papers that needed to be synthesized.,So again, the key to review articles is narrowly and clearly defining the theme of your review, ,and then collecting, reading and organizing your papers in an efficient manner, and then coming up with a good logical organizational structure.,If you can do all that, than writing the review is much easier.,Here are some other examples of reviews.,Here. I'm quoting a review on Crispr Cast nine.,Genome Editing Crispr Cast nine is a huge topic, but the authors didn't try to review everything about CRISPR cas9.,Rather, they narrowed in on the history of the technology.,So this review was focused on history.,Here were the sections of that paper.,If you skim through them, you'll see that they give an introduction to the technology, and then they go back decades in history.,Then they talk about figuring out the biological mechanism of how CRISPR Cast nine actually works.,Then they go into the more recent developments in the technology, and they give some clues about where we're going and what the technology might be used for in the future.,Here's another example. Ebola has been written about a lot lately, due to the big outbreak in West Africa that occurred in 2014.,This review that I'm quoting here looked specifically at one controversial aspect of Ebola,, which is how long does the virus persist and shed after someone has recovered from Ebola and isn't sick anymore?,That was a major concern, especially at the end of the outbreak, because doctors were worried about new cases cropping up and rekindling the epidemic.,Here are the sections of that paper.,They briefly described their search strategy.,That's not essential in a narrative review, but something you could include.,Then they reviewed studies that have measured shedding in blood and body fluids.,Then they reviewed all the studies that have tried to define the risks of transmission from various moods, such as sexual transmission and mother to child transmission. Then they gave a conclusion with take home messages.,Like one of the take home messages was that, although there are documented cases of sexual transmission from survivors, the risk is pretty low.

到目前为止，本课程的重点是撰写研究论文。本周，我将介绍其他类型的科学写作，例如文献综述、补助金和推荐信。其中一些类型的写作可能是你现在职业生涯所需要的东西，其中一些可能是你将来需要写在曲目中的东西。在本模块中，我将讨论如何写一篇叙事评论文章。对于研究生或年轻的研究人员来说，评论文章是一件好事。这是一项艰巨的工作，但它让你有机会深入研究你所在领域的最新文献。它还可以让你练习阅读论文、合成和整理大量信息，当然还有写作。评论文章也可以对你的职业生涯有所帮助。写得好、组织良好的评论可能会吸引很多读者和引用，因为它们对其他科学家有帮助。评论文章的目标是什么？这个想法是综合最近关于某个主题的主要文献。如今，报纸激增。没有人能跟上整个初级文献的步伐。作为评论文章的作者，你的工作是整理和总结最近的主要文献，这样人们就可以去看你的论文，对这个领域有很好的了解。一篇评论文章总结了我们在某个主题上所知道和不知道的内容。它还可能解决特定的争议，在撰写评论文章的过程中，你还整理了一份关于某个主题或研究问题的完整引文清单，对于该领域的其他人来说，这可能是一个很好的资源。如你所知，评论文章有三种基本类型。在本模块中，我将介绍非系统性综述，也称为叙事综述。但我希望你知道其他选择。系统综述是一种更全面的综述，它使用严格的检索策略来尝试识别有关特定研究问题的所有相关研究，甚至可能是未发表的研究。还有我们所说的荟萃分析。这些系统综述更进一步，使用统计数据进行数据共享，非正式地汇集不同研究的数据。再说一遍，在本模块中，我只是在讨论非系统综述，因为其他两种类型涉及的技术细节更多，比我想在本模块中介绍的更具技术性的细节。在撰写叙事评论文章时，首先要搜索文献。你可能会从更广泛的搜索开始，以了解那里有什么。但是接下来你需要缩小注意力。否则，将有太多的论文可供阅读。您的评论需要有明确的论点或主题。这是写一篇好评论文章的关键。不可能只是，我要回顾微阵列，或者我要回顾乳腺癌，这些话题太广泛了。相反，你可以选择回顾微阵列在微生物学中的使用，或者研究微阵列数据的统计技术。或者是微阵列技术的历史。你可以对乳腺癌与运动之间或乳腺癌与酒精之间的联系进行全面的回顾。话题必须足够狭隘和集中，以使其易于处理。在我职业生涯的早期，我写了一篇关于运动员饮食失调的文献综述。关于这一特定人群饮食失调的文献数量足够小，我能够在一篇综述中涵盖这些文献。组织至关重要。当我们谈到写作过程时，我告诉了你写作前的步骤。对于评论文章，预先写作的重要性被放大了。你必须想办法组织起来，否则你将永远无法写完评论。信息太多了。在我对运动员饮食失调的评论中，我在阅读报纸时键入了每篇论文的笔记。在过程的早期，我还弄清楚了论文的章节和小节。这样我就可以按章节和小节整理笔记。有几种计算机程序可以帮助您整理参考文献和笔记，例如endnote和Mendely。你可以看到，阅读、记笔记和整理信息将比实际撰写评论花费更多的时间。因此，请专注于写作前的步骤。我建议分节写这篇文章，每个章节都有自己的标题。这有助于整理评论，也让读者的生活更轻松。如果你有数字信息，可以把它放在汇总表中，例如，我在评论中使用了一个表格来分别列出不同运动中饮食失调患病率的数据，以及男性和女性的饮食失调患病率。如果你有切线信息，你可以把它放在侧边栏里。我收到了个别患有饮食失调症的运动员的病例报告。这些故事很有趣，但是如果很难将其整合到文本中，那么这种东西可以放在侧边栏或旁边的方框中。最后，为广大读者写作。人们可能正在阅读您的评论文章作为该领域的入门。因此，不要缩写得太多。而且不要假设有先验知识。当然，使用你在本课程中学到的所有写作技巧，以生动、引人入胜且易于阅读的风格写作。评论文章通常以摘要开头，我建议你最后写一篇。你将有一个简介部分，明确说明本综述的目的。在我关于运动员饮食失调的文章中，我从一些历史论文开始，我回到了20世纪80年代，那里发表了第一篇关于芭蕾舞演员饮食失调的论文。这些论文浪漫化了运动员的饮食失调，所以我把它当作介绍这个话题的一种有趣方式。但是后来我跳到了我的总体主题，那就是需要将运动员的饮食失调与普通人群的饮食失调分开考虑。在运动员身上，这种疾病的性质可能有根本的不同。然后，我明确陈述了我的综述目标，即批判性地评估测量、患病率、风险因素、结果、诊断、预防和治疗领域的文献。论文的正文应分成具有良好逻辑结构的部分。对于我的评论论文来说，这很容易，因为我只是将各部分分为定义和诊断标准、测量、患病率、风险因素等。然后，我甚至在每个部分中都有带有单独副标题的小节。在每个部分中，我总结了我们在该主题上的了解，还有哪些未知数，以及将来研究如何更好地填补空白。结论应总结你的发现，并就研究人员今后应做的事情提出具体建议。在我的评论中，我注意到男性运动员患饮食失调的风险比男性运动员高得多，但是对男运动员饮食失调的研究严重不足。我还建议了一种特定类型的研究设计。这也许能够更准确地识别运动员的饮食失调。因此，我给出了很多非常具体的建议，包括说明我认为未来研究的优先事项。然后，当然，你有参考文献，例如，我的评论有173篇参考文献。举一个主题或论文的例子，所以我的文献综述的主题是，运动员的饮食失调有不同的意识形态，需要专门的方法来进行测量、诊断、预防和治疗之类的事情。本章文献综述的目的是批判性地回顾有关运动员饮食失调的最新研究，包括测量问题、患病率、危险因素、后遗症、预防和治疗策略。我论文的各个部分与这些目标完全一致。我有一个介绍，然后是定义和诊断标准，然后是测量问题，然后是患病率，然后是风险因素，依此类推。实际上，在每个较大的部分中，我都有带有副标题的小节。例如，在结果下，我有关于骨骼影响、损伤、对表现的损害、死亡率和合并症的不同小节。一旦我有了组织结构，写这篇评论就很容易了。因为每个小节都有一到十篇需要综合的相关论文。因此，再说一遍，评论文章的关键是狭隘而清晰地定义评论的主题，然后以有效的方式收集、阅读和整理论文，然后想出一个良好、合乎逻辑的组织结构。如果你能做到所有这些，那么写评论就会容易得多。以下是其他一些评论示例。在这里，我引用了一篇关于CRISPR-Cas9基因组编辑的评论。CRISPR-Cas9是一个很大的话题，但是作者并没有试图回顾有关CRISPR-Cas9的所有内容，而是将范围缩小了该技术的历史，因此这篇评论的重点是历史。以下是那篇论文的章节。如果你浏览一下，你会发现它们介绍了这项技术，然后它们可以追溯到几十年前的历史。然后，他们谈论弄清楚CRISPR-Cas9实际起作用的生物学机制。然后，他们探讨了该技术的最新发展，并提供了一些线索，说明我们的发展方向，以及该技术将来可能用于什么。再举一个例子，由于2014年在西非爆发大规模疫情，埃博拉最近引起了很多报道。我在这里引用的这篇评论专门探讨了埃博拉的一个有争议的方面，即在有人从埃博拉中康复并且不再生病后，病毒会持续多长时间并脱落。这是一个令人担忧的主要问题，尤其是在疫情结束时，因为医生们担心会出现新的病例并重新引发疫情。以下是那篇论文的章节，他们简要描述了他们的搜索策略，这些策略在叙事评论中不是必不可少的，但你可以包括一些内容。然后，他们回顾了测量血液和体液脱落的研究。然后，他们回顾了所有试图定义各种模式传播风险的研究。例如性传播和母婴传播。然后，他们用带回家的信息得出了结论，比如其中一条带回家的信息是，尽管有记录在案的幸存者性传播病例，但风险相当低。另一个带回家的信息是，我们只是不知道诸如通过唾液传播或幸存者的眼泪之类的事情。因此，需要对这些领域进行更多的研究。