These are exciting times—an almost dizzying array of FDA approvals logged for immunotherapy, interspersed with some novel compounds. Nearing 50 approvals for immunotherapy in 3 years, oncologists are poised to utilize 7 immune checkpoint inhibitors with FDA approval in more than a dozen oncology settings. No class of oncology drugs has spawned such an effort, and by current estimates, 380,900 slots for patients need to be filled to complete current second-generation immune checkpoint inhibitor combination trials [1]. The excitement surrounding these agents has led almost every patient diagnosed with cancer to request treatment with immunotherapy. Therein is the rub—try to find data on the effectiveness of these agents in diseases for which there is no FDA approval and one comes up empty-handed.

We work in a field where the importance of publishing is well-accepted—in basic science, for scientific communication and, beyond that, for grant and job applications and for academic tenure, with an additional layer in clinical science, for communicating clinical trial outcomes. The latter is particularly important, as patients enrolling on clinical trials expect that their contribution will be meaningful, and therefore lasting. However, as we and others have documented, the results of many clinical trials are never published.

In 2016 we reviewed 1,075 ASCO abstracts describing 378 randomized and 697 nonrandomized clinical trials from 2009–2011 [2]. After 5 years, 75% of randomized and 54% of nonrandomized trials were published, with an overall publication rate of 61%. These findings were almost identical to previous reports for abstracts dating to 1984 [3–8]. Similar results were reported by Memorial Sloan Kettering Cancer Center in a single-institution analysis of 809 clinical trials: 70% of trials calculated to be published by 7 years after accrual was closed. Trials that failed to complete accrual were among the most vulnerable [9]. Results are better for newly FDA-approved agents. The FDA Amendments Act of 2009 required clinical trial registration and reporting of results, and in at least one analysis, the success of this strategy for novel FDA-approved drugs (mostly non-oncologic) was measurable, with an 80% publication rate for trials linked to these drugs [10]. Another analysis found that 99% of press releases were followed by a peer-reviewed manuscript [11]. Clearly publication bias, a related concern for these trials is the rush to early publication of such “positive” results, with only a handful of patients followed beyond 1 year.

These findings are not unique to oncology clinical trials; indeed, failure to publish impacts many if not all academic groups, including international clinical trials. A Danish group found that 73% of completed trials were published [12]. Among randomized clinical trials supported by the Swiss National Science Foundation, 40% were not published in peer-reviewed journals, with the number rising to 70% for discontinued randomized clinical trials [13]. And among clinical trials in The Netherlands, trials that were terminated early had a much lower rate of publication, at 33% published, compared with trials that were completed as planned (64% published; adjusted OR 0.2, 95% CI 0.1–0.3) [14].

The consistent nature of 30–40% of trials going unpublished in analyses spanning 3 decades leads one to the question of whether things will change or have changed with the immune checkpoint inhibitor approvals. Early indicators suggest that, for the trials leading to FDA approval, there has been, but for the cohorts not receiving benefit, not so much. As one example, think of pancreatic cancer, for which options are limited beyond two standard of care regimens and a prescription for immunotherapy is very tempting. Where are the results with immune-oncologic agents for pancreatic cancer? Very hard to find beyond the responses observed in patients with tumors bearing mismatch repair deficiency, a subset of tumors for which a histology-agnostic FDA approval exists [15–18].

As a solution for the failure to publish, enter Clinical Trial Results (CTR) in The Oncologist. Here we publish any clinical trial that teaches us lessons or contributes to our knowledge base, whether successful or disappointing; accrual complete or incomplete; terminated early or as planned; or with endpoints met or unmet. We use an established template that allows the author to easily build a manuscript while providing the essential data of efficacy and toxicity and that includes an automated process for creating Kaplan-Meier graphs and waterfall plots. We ask about “Lessons Learned”. In so doing we offer the opportunity that every patient’s legacy of clinical trial enrollment will be counted. Every patient’s tumor response or adverse event will be permanently recorded. When patients consent to clinical trials, they consent to have their participation matter. All of us have heard patients altruistically express their
feeling that, even if it does not help them, their hope is that it will help others. Not publishing a clinical trial means effectively that trial and that patient enrollment never existed. Beyond the patient commitment, non-publication leads to a myriad of other problems, including duplication of effort and misperceptions of both efficacy and toxicity. If you are tempted to treat your patient with biliary tract cancer with pembrolizumab off label, you may first want to read the CTR published by Arkenau and colleagues, showing a 4% objective response rate [19]. So much to learn and so little time.

While not the original intent of “Publish or Perish” [20], an ethically meaningful interpretation is this: if we do not publish the results of clinical trials, the lessons learned from those trials perish.

DISCLOSURES
The author indicated no financial relationships.

REFERENCES
1. Tang J, Yu JX, Hubbard-Lucey VM et al. Trial watch: The clinical trial landscape for PD1/PDL1 immune checkpoint inhibitors. Nat Rev Drug Discov 2018;17:854–855.
2. Massey PR, Wang R, Prasad V et al. Assessing the eventual publication of clinical trial abstracts submitted to a large annual oncology meeting. The Oncologist 2016;21:261–268.
3. De Bellefeuille C, Morrison CA, Tannock IF. The fate of abstracts submitted to a cancer meeting: Factors which influence presentation and subsequent publication. Ann Oncol 1992;3:187–191.
4. Krzyzanowska MK, Pintilie M, Tannock IF. Factors associated with failure to publish large randomized trials presented at an oncology meeting. JAMA 2003;290:495–501.
5. Hoeg RT, Lee JA, Mathiason MA et al. Publication outcomes of phase II oncology clinical trials. Am J Clin Oncol 2009;32:253–257.
6. Camacho LH, Back J, Cheung A et al. Presentation and subsequent publication rates of phase I oncology clinical trials. Cancer 2005;104:1497–1504.
7. Tam VC, Hotte SJ. Consistency of phase III clinical trial abstracts presented at an annual meeting of the American Society of Clinical Oncology compared with their subsequent full text publications. J Clin Oncol 2008;26:2205–2211.
8. Tam VC, Tannock IF, Massey C et al. Compendium of unpublished phase III trials in oncology: Characteristics and impact on clinical practice. J Clin Oncol 2011;29:3133–3139.
9. Chapman PB, Liu NI, Zhou Q et al. Time to publication of oncology trials and why some trials are never published. PLoS One 2017;12:e0184025.
10. Miller JE, Wilenzick M, Ritcey N et al. Measuring clinical trial transparency: An empirical analysis of newly approved drugs and large pharmaceutical companies. BMJ Open 2017;7:e017917.
11. Gunaj L, Jain RH, Atoria CL et al. Delays in the publication of important clinical trial findings in oncology. JAMA Oncol 2018;4:e180264.
12. Berends J, Petersen LG, Bach KF et al. Barriers towards the publication of academic drug trials. Follow-up of trials approved by the Danish Medicines Agency. PLoS One 2017;12:e0172581.
13. Amstutz A, Schandelmaier S, Frei R et al. Discontinuation and non-publication of randomised clinical trials supported by the main public funding body in Switzerland: A retrospective cohort study. BMJ Open 2017;7:e016216.
14. van den Bogert CA, Souverein PC, Brekelmans CT et al. Non-publication is common among phase I, single-center, not prospectively registered, or early terminated clinical drug trials: Results of a nationwide inception cohort study in the Netherlands. PLoS One 2016;11:e0167709.
15. Royal RE, Levy C, Turner K et al. Phase 2 trial of single agent Ipilimumab (anti-CTLA-4) for locally advanced or metastatic pancreatic adenocarcinoma. J Immunother 2010;33:828–833.
16. Brahmer JR, Tykodi SS, Chow LQ et al. Safety and activity of anti-PD-L1 antibody in patients with advanced cancer. N Engl J Med 2012;366:2455–2465.
17. Le DT, Durham JN, Smith KN et al. Mismatch repair deficiency predicts response of solid tumors to PD-1 blockade. Science 2017;357:409–413.
18. Hu ZI, Shia J, Stadler ZK et al. Evaluating mismatch repair deficiency in pancreatic adenocarcinoma: Challenges and recommendations. Clin Cancer Res 2018;24:1326–1336.
19. Arkenau HT, Martin-Liberal J, Calvo E et al. Ramucirumab plus pembrolizumab in patients with previously treated advanced or metastatic biliary tract cancer: Nonrandomized, open-label, phase I trial (JVDF). The Oncologist 2018;23:1407–e136.
20. Garfield E. What is the primordial reference for the phrase “publish or perish”? The Scientist 1996;10:11.