

# An Exploratory Study of Published Case Reports Using a Systematic Typology

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## ABSTRACT

**Background and Objectives:** Case reports are a popular publication type, especially for medical learners. They also are an excellent educational vehicle that can spark a long-term interest in scholarship for medical learners. To maximize publication potential, authors need a framework when writing a case report.

**Methods:** We did a manifest content analysis on case reports published in 12 peer-reviewed medical journals between 2010 and 2019. We classified the case reports as detection, extension, diffusion, or fascination. The objective of our study was to determine whether case reports can successfully be classified by their primary contribution to the medical literature as detection, extension, diffusion, or fascination case reports.

**Results:** Using a predefined search strategy, we identified 1,005 manuscripts identified as case reports published from 2010 to 2019 in 12 journals from a variety of medical specialties. Only 673 of the 1,005 (67.0%) met our criteria for a case report. Of these, 59.1% most closely fit the category of diffusion case reports. Fascination case reports were the least common (1.2%). The format of published case reports varied widely among journals.

**Conclusions:** Case reports can be categorized according to their main contribution to the medical literature. Nearly 60% of all published case reports in this study were not published for the purpose of introducing a novel clinical entity. Instead, they were used as a vehicle to educate clinicians about previously described phenomena. Authors seeking to publish case reports should understand how the framing of their report is likely to influence their chances of being published.

## INTRODUCTION

Case reports are a popular publication type, with more than half a million published case reports indexed in PubMed from 2010 and 2019. They are a common form of scholarship, especially for medical learners.<sup>1,2</sup> Case reports can be excellent educational vehicles and can spark a long-term interest in scholarship for medical learners.<sup>3</sup> Some medical schools have even added elective courses focused exclusively on publishing case reports.<sup>4</sup>

In 2020, the National Board of Medical Examiners (NBME) decided to make Step 1 a pass/fail examination. While met as a welcome change by many medical educators, they also recognized early on that this change would have unintended consequences.<sup>5</sup> This change removed one of the key objective measures that residency program directors had available to differentiate medical students applying to their programs. One response from students has been to increase their scholarly products to pad their résumés,<sup>6,7</sup> exacerbating an already

existing push to increase scholarship among medical students.<sup>8</sup> A continued increase in the number of medical students considering publishing case reports can be expected.

To maximize their chances of getting their work published, authors need to frame case reports in a way that best catches the eyes of editors and peer reviewers. Medical editors, on the other hand, need a framework to assess the numerous case reports they are sent for consideration. Two of the authors of this study have proposed a novel typology of case reports based on their potential contribution to the medical literature.<sup>9</sup> The typology sorts cases into one of four categories: detection, extension, diffusion, or fascination.

### Detection

Detection cases represent a true first in the medical literature and are therefore expected to be comparatively rare. These may be newly described diseases, medication side effects, surgical techniques, or a novel treatment complication.

### Extension

Extension cases expand the limits of what is already known. These could be expanding the known age range for a medical condition, an infectious disease appearing in a new location, or new variant of a known adverse event.

### Diffusion

Diffusion case reports are not focused on introducing something new to the literature. Instead, they highlight a known clinical scenario for the purpose of expanding the number of clinicians who are familiar with the topic. The case may represent unusual conditions that should be included in a differential diagnosis, an emerging disease not yet widely known, or a frequently overlooked medication side effect.

### Fascination

Fascination case reports are published because of their wonder-inducing quality. They often are published with striking photos or imaging studies. The educational aspect of these case reports is generally minimal compared to the awe they invoke.

Figure 1 shows a proposed inverse relationship between relative interest and importance of the contribution to the medical literature of these categories.<sup>9</sup> The current study sought to apply this typology to a subset of previously published case reports to understand how well the model fits the existing literature and to determine how useful it may be to future authors and editors.

## METHODS

To characterize case reports published in the medical literature, we used a manifest content analysis<sup>10</sup> of research manuscripts from peer-reviewed journals. The primary unit of analysis was the individual published manuscript. We sampled 12 peer-reviewed journals that publish case reports to represent a broad array of clinical disciplines: *American Journal of Emergency Medicine*; *American Journal of Sports Medicine*; *Anesthesiology*; *Annals of Internal Medicine*; *Annals of Surgery*; *Journal of the American Academy of Dermatology*; *Journal of the American Board of Family Medicine*; *Journal of Clinical Oncology*; *Neurology*; *Obstetrics and Gynecology*; *Otolaryngology–Head and Neck Surgery*; and *Pediatrics*. We chose these journals intentionally because they represent a wide variety of medical specialties, and each publishes a sufficiently large number of case reports on an annual basis.

For the sampling frame, we included the first 10 case reports from each journal for each year published from 2010 to 2019. We chose these 10 years prior to 2020 to avoid the impacts of COVID-19. The senior author (C.J.W.L.) conducted a search on PubMed using the name of the journal as indexed in PubMed, the date range January 1, 2010, to December 31, 2019, and the “case reports” filter. The senior author then reviewed all results to identify the first 10 case reports per year for each journal.

The first author (D.A.S.) and the senior author, who has advanced training in content analysis methods, wrote the

deductive codebook and pretested it with a subset of articles outside of the dataset. A copy of the coding instrument is available by contacting the authors. The primary variable was the case report type, as described in Seehusen and Ledford,<sup>9</sup> which classifies case reports as primarily contributing detection, extension, diffusion, or fascination to the medical literature. Additional coded variables included number of authors, number of references, number of images, funding source, consent language, and number of times cited in PubMed since publication.

The senior author trained team members on the codebook. Twelve authors tested the codebook with two case reports outside of the dataset. Training continued until the team reached high interrater reliability (Krippendorff  $\alpha=.887$ ). The 12 coders then read full published manuscripts for study variables. Throughout coding, the team met regularly to discuss progress and potentially ambiguous codes. As a verification strategy, an additional author (W.H. S.) double coded 49 case reports within the dataset. At the end of coding, the senior author reviewed a random sample of each coder’s file as a validation strategy before collapsing data into a single file.

We used descriptive statistics and  $\chi^2$  analysis (SPSS version 28.00 [IBM]) to evaluate the data.

## RESULTS

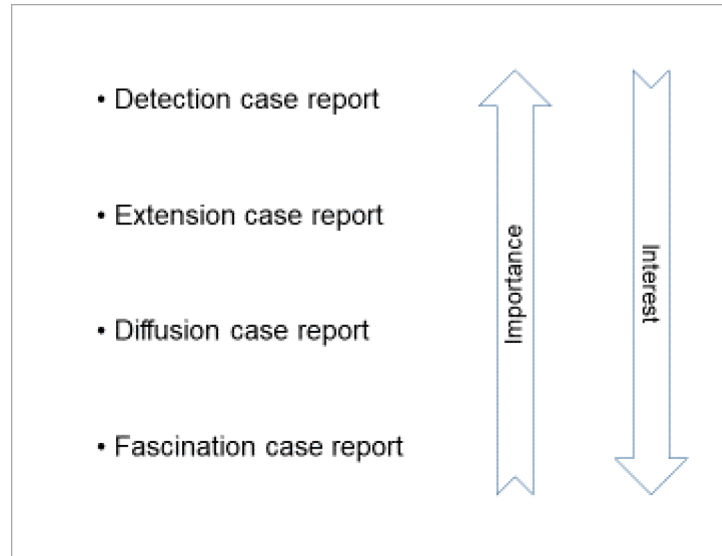
Using our predefined search strategy, we found 1,005 published manuscripts identified as case reports. After review, only 673 of the 1,005 (67.0%) actually met our criteria for a case report. Most of the excluded manuscripts contained a brief description of a clinical scenario but did not fit the traditional model of a case report.

Applying the typology to the manuscripts fitting our definition of case report yielded a total of 59.1% most closely fitting the category of diffusion case reports (Table 1). In all but one of the journals searched, diffusion was the most common type of case report. Fascination was by far the least common type (1.2%). Figure 2 shows the types of case reports by journal. Interrater reliability for type of case report was very good with a Krippendorff  $\alpha=.887$ .<sup>11</sup>

**TABLE 1.** Comparison of Published Case Reports by Type

	Type of case report			
	Detection	Extension	Diffusion	Fascination
Total case reports, n (%)	131 (19.5)	136 (20.2)	398 (59.1)	8 (1.2)
Mean number of authors	4.70	4.36	3.89	4.38
Mean number of images	3.60	3.93	3.60	4.88
Mean number of references	12.23	10.78	11.35	13.25
Mean citations in the literature	4.37	3.57	2.93	2.25

**FIGURE 1.** Typology of Case Reports Based on Their Contribution to the Literature



**FIGURE 2.** Types of Case Reports Published in 12 Representative Medical Journals

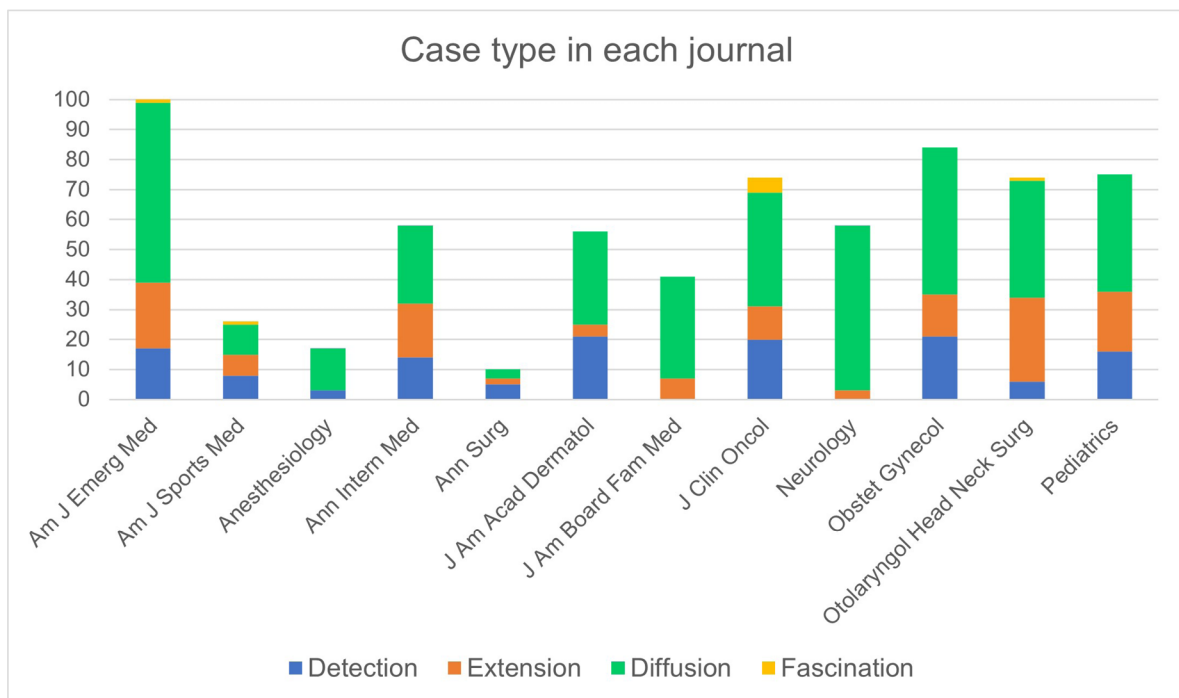


Table 1 shows how several additional variables compared among the types of case reports. While not statistically significant ( $P=.06$ ), the frequency of citations in the medical literature followed the pattern theorized by the authors, with detection cases resulting in the most citations and fascination cases resulting in the least.

Only 26 (3.8%) of the cases explicitly stated that the patient who was the subject of the case report consented to the publication. A total of 53 (7.7%) manuscripts explicitly identified an author as a medical trainee. How many more authors were

medical learners but were not specifically identified as such is unclear.

### DISCUSSION AND CONCLUSIONS

Case reports have been widely acknowledged as a valuable beginner form of scholarship for medical learners.<sup>12,13</sup> Our study revealed that published case reports in the medical literature can successfully be categorized using the proposed typology. The high interrater reliability suggests that these categories are robust enough to be used generally. This typology

allows authors and editors to have a common language and a shared mental model regarding case reports and their main contribution to the medical literature.

We noted that the exact format of published papers meeting the definition of case reports varied widely. Not surprisingly, the format varied by journal. This variation would be expected because the format is driven by the instructions for authors of each journal. However, we also noted some clustering of formats by specialty types, such as surgical versus nonsurgical specialties. This finding may be a manifestation of what is valued in a case report by various specialties.

The knowledge presented here should be helpful for authors, including medical students, as they consider attempting to publish an encountered clinical scenario as a case report. Our typology can help authors frame their case report within one of the four categories and also should help guide them to journals that are more likely to publish a particular type of case report. Similarly, for editors, our findings may be useful for understanding which types of case reports are most valued within a specialty.

Diffusion was the most common type of case report for 11 of the 12 journals studied. This finding suggests that while a case report is popularly thought of as a paper “where an unexpected or novel occurrence is described in a detailed report of findings, clinical course, and prognosis of an individual patient,”<sup>14</sup> the majority of published case reports are not published for the purpose of introducing a novel clinical entity, but rather are used as a vehicle to educate a wide audience about a previously described phenomenon.

In contrast, fascination case reports are uncommon and appear to be published only in a subset of journals. This finding fits with the authors’ model of the fascination case report being the most interesting type of case report, yet the least valuable to the medical literature overall. This finding is further supported by the fact that citations for fascination case reports are about half the average number of citations for detection case reports.

Surprisingly, few case report authors were explicitly identified as learners. This finding does not match published experiences from recent years.<sup>7</sup> This discrepancy may be attributed to the fact that the specific years looked at predated the NBME switch to pass/fail for Step 1. A rise should be expected in the number of student authors in coming years.

This study had several limitations. First, only 12 medical journals of the thousands available were evaluated and for only one 10-year block of time. These journals, and this time period, may not be representative of the wider medical literature. Second, some manuscripts were admittedly challenging to neatly fit into one of the four categories of case reports. Final classification for a small number of manuscripts could have been different. This classification issue was not common enough to have changed the robust finding that more than half of all published case reports are of the diffusion type while the fascination type is rare. Lastly, while citations were used to measure the contribution to the medical literature, citations are not the only measure that can or should be considered to assess

a case report’s value.

Future research should evaluate how useful this typology is for authors submitting case reports and editors determining which to publish. While ours was a crosscutting study of many specialties, future research could dig deeper into multiple journals of individual specialties. The findings of this study somewhat suggest that different specialties may think about and value case reports differently.

## PRESENTATIONS

Some preliminary data were presented at the North American Primary Care Research Group Annual Meeting in San Francisco, California, in November 2023.

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