

How Rapidly Gastroenterology has Evolved Over Time: A Review of Four Decades of Published Research

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Abstract

Medicine evolves with time. What was once accepted dogma often becomes supplanted by newer concepts. Our aim was to quantitatively assess the evolution of practices in gastroenterology. Research published in the journal *Gastroenterology* between 1971-2010 were reviewed by two independent assessors (GCH, DC). Data was analysed in 5-year time periods. Studies were deemed to be either valid or outdated based on present-day practice. A total of 245 studies were analysed; 94 were diagnostic and 151 were therapeutic. A steady increase in relevance of published studies over time is observed. Fewer than 50% of research studies in diagnostics published prior to 2000 are still relevant, and fewer than 30% of studies in therapeutics published prior to 1995 are still relevant. A nadir in the relevance of research in therapeutics in 2001-2010 could be accounted for by the discovery of novel Hepatitis C antiviral treatment, which rendered prior trials obsolete.

Introduction

Healthcare is a rapidly evolving field. In gastroenterology, advances in both diagnostic testing and therapeutic options have become incorporated into routine clinical practice. Indeed, innovations in gastroenterology have led to many societal benefits over the past few decades¹. It is widely accepted that some practices have become outdated over time as new tests and treatments evolve².

Many seminal developments in gastroenterology and hepatology have emerged over recent decades. These include the evolution of biologics and their use in treating inflammatory bowel disease³. We have also seen the introduction of potent antiviral therapies allowing for the eradication of hepatitis C with as little as twelve weeks of therapy⁴.

Progress in luminal endoscopic technologies such as wireless capsule endoscopy now permit the entirety of the gastrointestinal tract to be viewed without the need for invasive endoscopy³. Advances in radiology with computed tomographic colonography and Magnetic resonance enterography have also facilitated greater accuracy in characterising the extent and severity of luminal bowel disease³.

Little evidence exists in the medical literature to address the pace at which adopted practices become obsolete. We aimed to characterise the evolution of clinical gastroenterology practice by evaluating the current relevance of original research published over a forty year time period in the highest impact factor journal in the specialty – Gastroenterology.

Methods

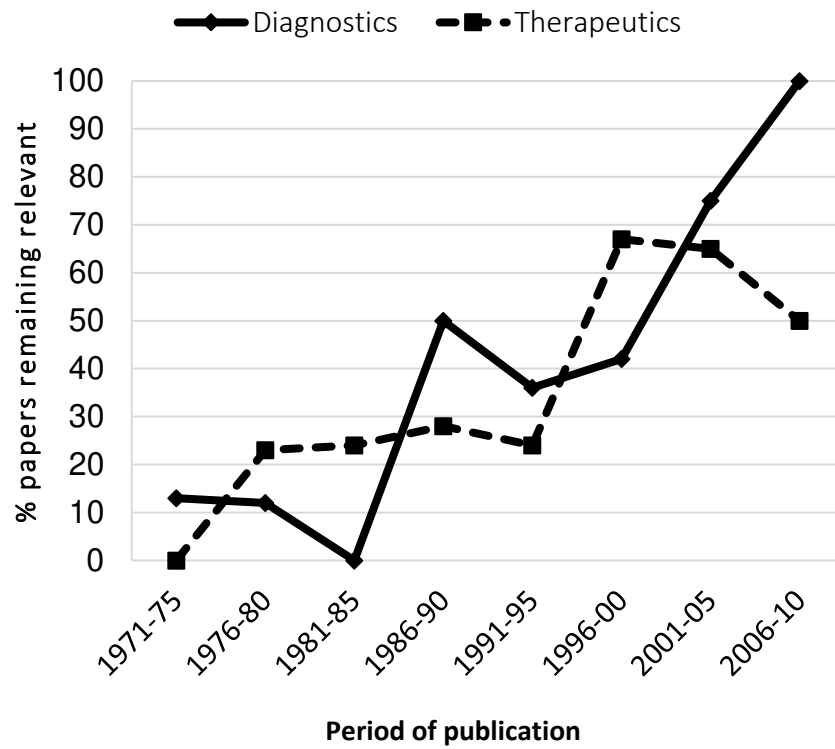
Original research articles from the January and July issues of Gastroenterology, the flagship journal of the American Gastroenterology Association, between 1971 and 2010 were reviewed to characterise the relevance of historical research to present-day clinical practice.

The abstracts of all clinical research relating to diagnostic testing or novel therapies in human subjects were independently reviewed by two academic gastroenterologists (GCH, DC). Both assessors have been consultant gastroenterologists for at least ten years, with broad exposure to all aspects of gastroenterology. The conclusions of each study were classified as either being still relevant to current medical practice (i.e. still considered standard of care) or outdated (ie test/therapies have become superseded over time). Research was categorized as either assessing diagnostic modalities or therapies and also categorised by subspecialty (luminal gastroenterology, hepatology, pancreatico-biliary and other). Both reviewers were blinded to each other's reviews and to the year of publication of the study.

Results

Overall, 941 abstracts were reviewed of which 94 were research in diagnostics and 151 in therapeutics; the other 696 abstracts were excluded from analysis as they were not pertaining to clinical research in human subjects. The majority of both diagnostic (86%) and therapeutic (86%) research was related to luminal gastroenterology. The two reviewers' verdicts (still relevant/ outdated) were concordant in 244 of 245 studies, $r=0.9$; consensus agreement was reached after joint review in the single discordant study.

Fig 1: Relevance of research published 1971-2010.



As shown in Figure 1, the relevance of historical research has risen sharply over time. Fewer than 50% of papers on diagnostics published prior to 2000 are still relevant to modern practice; fewer than 30% of therapeutics publications prior to 1995 are still relevant.

Although there has been a steady rise in the relevance of published studies in diagnostics since 2001, the relevance of therapeutic studies rose up to 2000 reaching 65% and then declined subsequently to 50%. Interestingly however, when hepatology research was excluded from analysis, the relevance of therapeutic research increased from 50% to 75% for the 2006-10 time period supporting the influence of obsolete hepatology therapeutic trials on reducing overall relevance of the published research.

Discussion

As a specialty gastroenterology has witnessed several seminal breakthroughs over recent decades – including Hepatitis B and C therapies, Inflammatory bowel disease treatments and progression of therapeutic endoscopic techniques. A reason we found for the nadir in the last decade was many hepatitis C therapy studies have since been rendered obsolete by novel antiviral treatments⁵. The evolution of direct-acting antiviral therapies has not only allowed for a reduction in all-cause and liver-related mortality, but also hopes of elimination of hepatitis C by 2030 by the World Health Organisation⁴.

These findings illustrate the rapid progress made in the field of clinical gastroenterology practice with less than half of what was accepted practice for diagnostics or therapeutics twenty years ago still holding true. Gastroenterology isn't the only specialty to have seen such changes. Other specialties such as oncology have seen advances and significant shifts in management as more is understood about the pathology and specific genetics involved in different malignancies. In fact, a record number of novel oncology drugs was launched in 2018 changing the face of specific cancer management ⁶. In the management of Merkel Cell carcinoma over 15 years, use of radiotherapy and chemotherapy decreased from 75% to 49% and from 42% to 4%, respectively. At the same time, we saw the rise in immunotherapy from 0% to 24% of patients ⁷.

One of the interesting findings of our study is that unlike the progressive, predictable rise in the relevance of research in diagnostics, research in therapeutics rose to 2000 and then plateaued and declined slightly over the next decade. Much of this decline can be attributed to rapid advances in the field of Hepatitis C treatment. Newer antiviral regimens have rendered interferon and ribavirin (state of the art treatments back in the early 2000s) obsolete. When hepatology studies were excluded, relevance for this period increased to 75%. This obsolescence of hepatology therapeutics research reflects the wave of novel antiviral hepatitis treatments discovered since 2010 that have become standard of care ⁸.

Limitations of this study include the limited data pool in that only one journal was analysed and only two issues per year (Jan and July) were selected. This may therefore not be a true representation of research in the entire field of gastroenterology. In addition, some of the more ground-breaking gastroenterology studies were published in high impact factor general medical journals such as the New England Journal of Medicine with regards to Infliximab treatment in Inflammatory Bowel disease ⁹ and HCV antiviral therapy ¹⁰. Although these were not directly captured by our data set, subsequent studies which arose as a result of these similar papers often appeared in Gastroenterology.

In conclusion, our findings highlight the importance of remaining open minded to changes in practice and indicate that many of our current standard practices are unlikely to endure over time as the specialty continues to evolve. Gastroenterology as a field has evolved significantly over the last four decades. Things we consider now to be gold-standard practice could easily become outdated by the next decade. Medicine is an ever evolving field. As these advances continue to occur, we must keep abreast of recent developments to inform best clinical practice.

Declaration of Conflicts of Interest:

There are no conflicts of interest to declare for any authors.

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