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## Background & Aim

Over the last 25 years, clinical practice guidelines have emerged to standardize and improve care. As pharmaceutical innovations emerge, guidelines update to incorporate new interventions. However, the extent to which pharmacotherapies are represented as treatment options in guideline recommendations has not been well elucidated.

This study aimed to quantify the role pharmacotherapy has played in clinical practice guidelines across a range of chronic diseases over the past 20 years.

## Methods

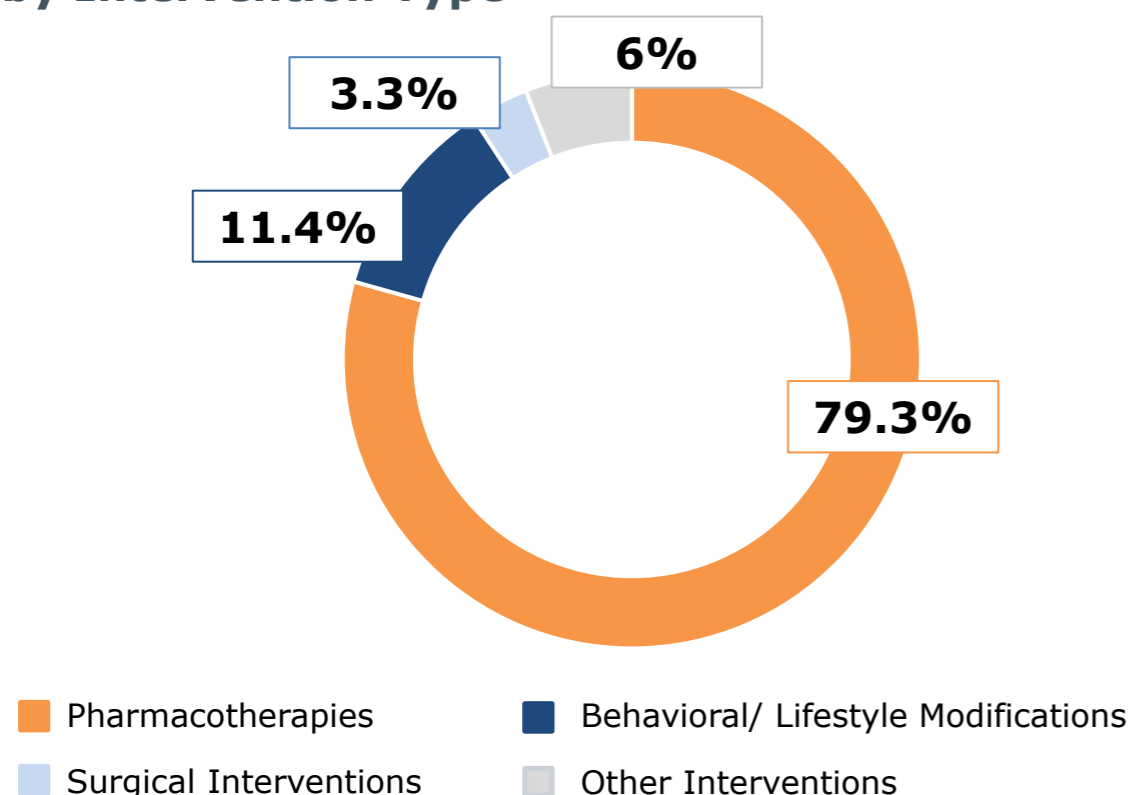
Clinical practice guidelines published during the years 2000-2021 by recognized American, European, and global professional healthcare organizations were identified for five chronic diseases listed by the World Health Organization among the top 10 causes of mortality in high-income countries<sup>†</sup>: ischemic heart disease (IHD), non-small cell lung cancer (NSCLC), chronic obstructive pulmonary disease (COPD), Alzheimer's disease (AD), and type 2 diabetes (T2D). Identified public domain guidelines were reviewed and data on treatment recommendations were collected, including the type of intervention recommended (e.g., behavioral or lifestyle, pharmacotherapy, surgical, or other), specified line of therapy, and, for pharmacotherapies, the year of regulatory approval and the year of inclusion in guidelines.

## Results

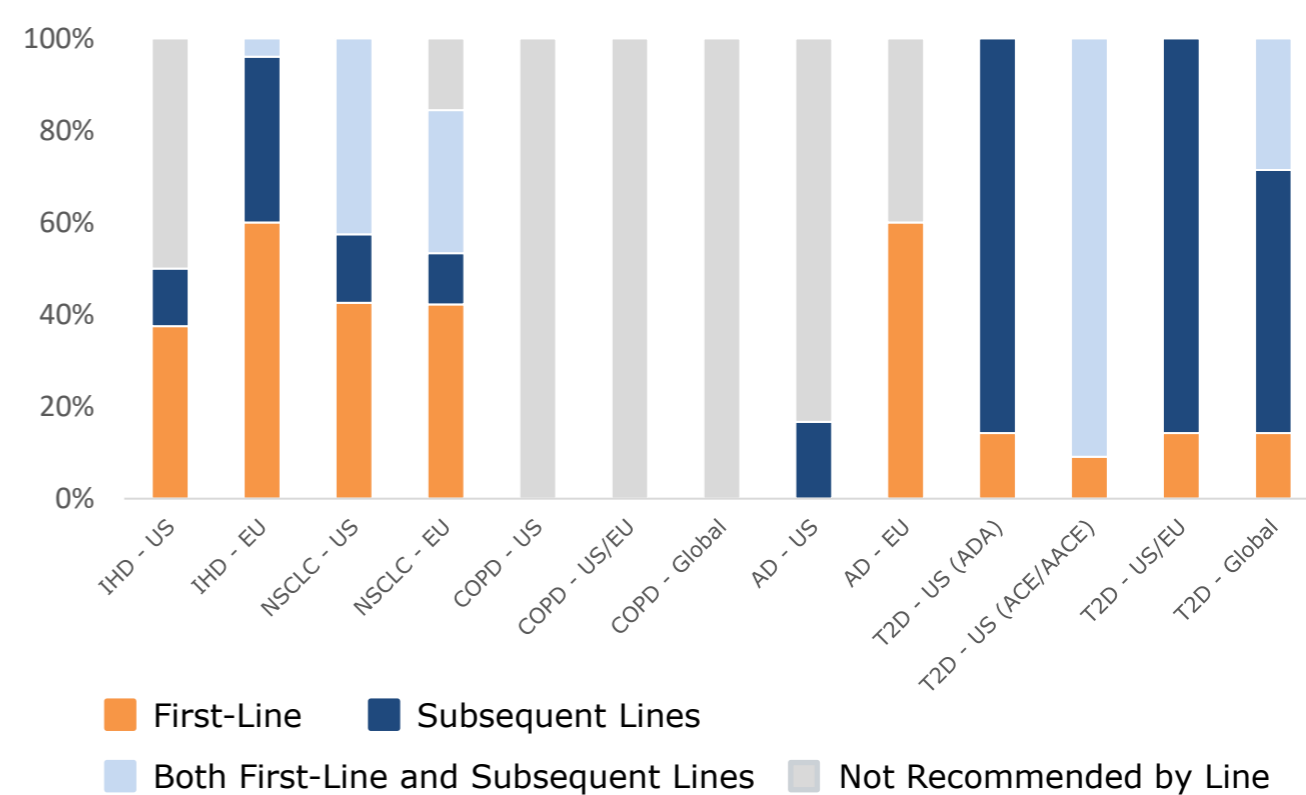
92 clinical practice guidelines were reviewed across the five disease areas. There were more US guidelines issued than EU or global guidelines (US: 47; EU: 24; Global: 21), with considerable nuance within each disease area.

Among 184 discrete recommended interventions across five diseases, 146 (79.3%) were medicines, 21 (11.4%) were behavioral modifications, 6 (3.3%) were surgical interventions, and 11 (6%) were 'other' type. (Figure 1)

**Figure 1. Proportion of Guideline Recommendations by Intervention Type**



**Figure 2. Proportion of Pharmacotherapies Recommended by Line of Treatment**



\*Data represent line of therapy a pharmacotherapy was ever recommended for. For example, if a pharmacotherapy was first recommended for first-line and was then later recommended for subsequent lines, it is counted as recommended for both first and subsequent lines.

IHD = Ischemic heart disease; NSCLC = Non-small cell lung cancer; COPD = Chronic obstructive pulmonary disease; AD = Alzheimer's disease; T2D = Type 2 diabetes; ADA = American Diabetes Association; ACE = American College of Endocrinology; AACE = American Association of Clinical Endocrinology; US = United States; EU = European Union

Only behavioral and lifestyle modifications and pharmacotherapies were recommended in first-line. Of the 6 surgical interventions across the 5 disease areas, only those for IHD (EU only) were specified by line of therapy, none of which were recommended in first-line.

Pharmacotherapy recommendations were more nuanced: all T2D guidelines, and most NSCLC and IHD guidelines included line of therapy recommendations. Some guidelines for AD specified line of therapy, while COPD guidelines did not. Overall, 29.5% of pharmacotherapy recommendations were for first-line, 20.7% were either first or subsequent lines, and 17.6% were for subsequent lines. The remaining 32.2% were not specified for line of therapy. (Figure 2)

Recommendations evolved across guidelines as new evidence and additional therapies emerged. The time from regulatory approval of novel medicines to inclusion in guidelines varied by disease and geography.

## Conclusions

Behavioral interventions and medicines are critical components of clinical practice guidelines and represent the most significant proportion of treatment recommendations. New treatments have been incorporated into clinical guidelines with varying speeds. Given the increasing pace of medical innovation, timely updates to clinical practice guidelines are critical to evolving the standard of care and delivering the best outcomes for patients.

## References

<sup>†</sup> World Health Organization. The top 10 causes of death 2020 [Available from: <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>]

## Acknowledgments

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