

The Working Dead? Why Longer Lives Can Seem Less "Productive"

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Disclosures: All authors are employees and CB and CSS are shareholders of F. Hoffmann-La Roche Ltd

Objective

With a growing emphasis on societal elements in health technology assessment, guidance on their practical implementation becomes crucial (Yuasa et al 2021, Basu et al 2018). Measuring societal costs involves productivity considerations (e.g. Krol et al 2006) which could be impacted by presentism (reduced productivity at work) and absenteeism (absence from work) typically measured either via the human capital or friction cost approach (Shephard et al 2026). This analysis aims to define and address the "productivity trap" in societal cost measurement from a practical implementation perspective. This phenomenon describes how enhanced drug effectiveness can, counterintuitively, result in higher productivity losses when measured with the human capital (HC) approach without implementing an external benchmark.

Methods

The study highlights that assigning productivity losses only to living patients can result in longer survival accumulating higher losses, particularly in health states with limited working ability. This concept is illustrated by considering a case study based on a more effective intervention in second line metastatic breast cancer as shown in Figure 1. In this case study we use a standard three health state oncology model (PFS, progression, death) populated with productivity losses derived with the HC approach focusing on absenteeism (working days lost, ability to work). Two solutions are proposed:

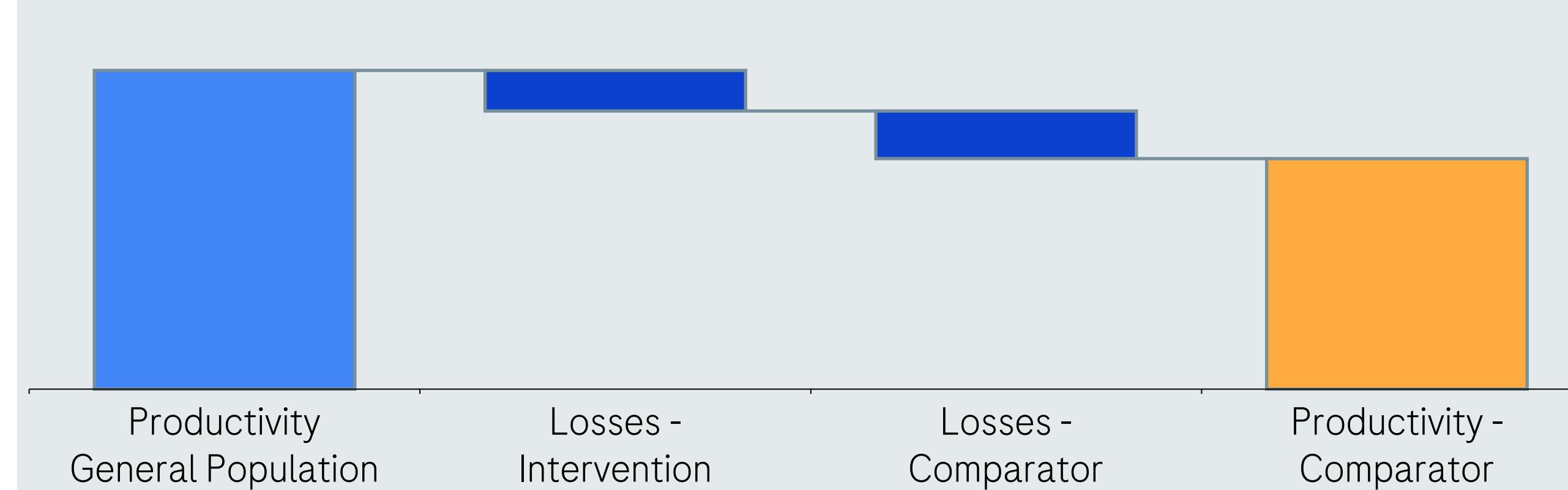
1. Calculating productivity losses against a common benchmark (e.g., general population)
2. Calculating productivity gains with or without a common benchmark (e.g., best supportive care (Bsc)).

Calculating Productivity Losses vs an External Benchmark

In this approach, productivity losses are calculated as the difference between the productivity of patients that are alive and on treatment and that of an external benchmark, e.g., the general population.

- ✓ Accounts for productivity losses of patients dying aligned with literature on forgone earnings to deaths (e.g. Pike et al 2018).
- ✓ Restores the logic that more effective treatments keeps patients alive for longer and able to work result in a smaller productivity impact.
- ✓ Clearly articulates that productivity losses are losses vs. a person not having the disease.

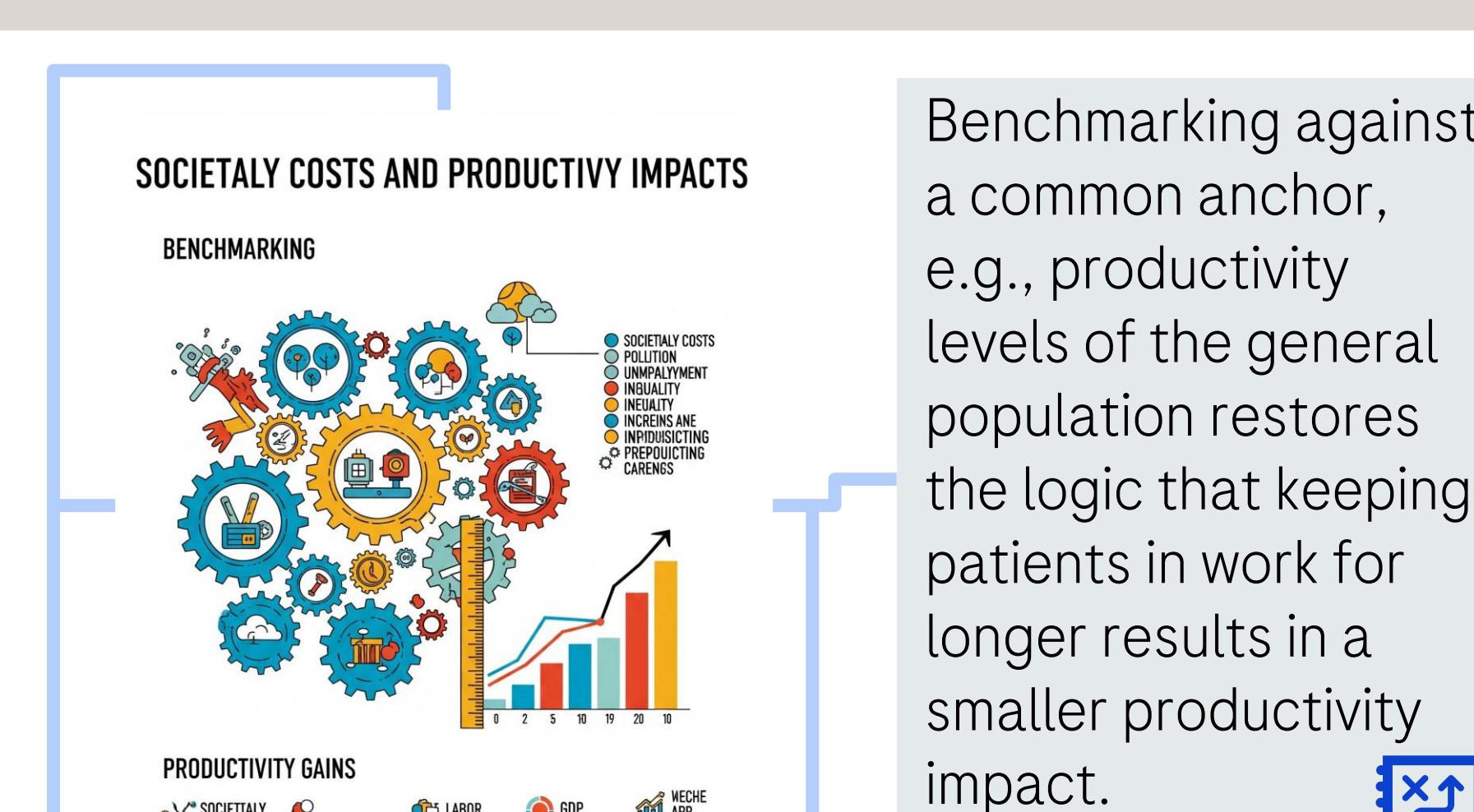
Figure 2: Conceptual Illustration of Productivity Losses with an External Benchmark



Conclusion

Societal costs measurement involves considering productivity impacts, e.g., using the human capital approach. Guidance on their practical implementation becomes crucial.

Longer survival for an intervention can paradoxically lead to greater productivity losses if mortality is not valued as a loss.



Benchmarking against a common anchor, e.g., productivity levels of the general population restores the logic that keeping patients in work for longer results in a smaller productivity impact.

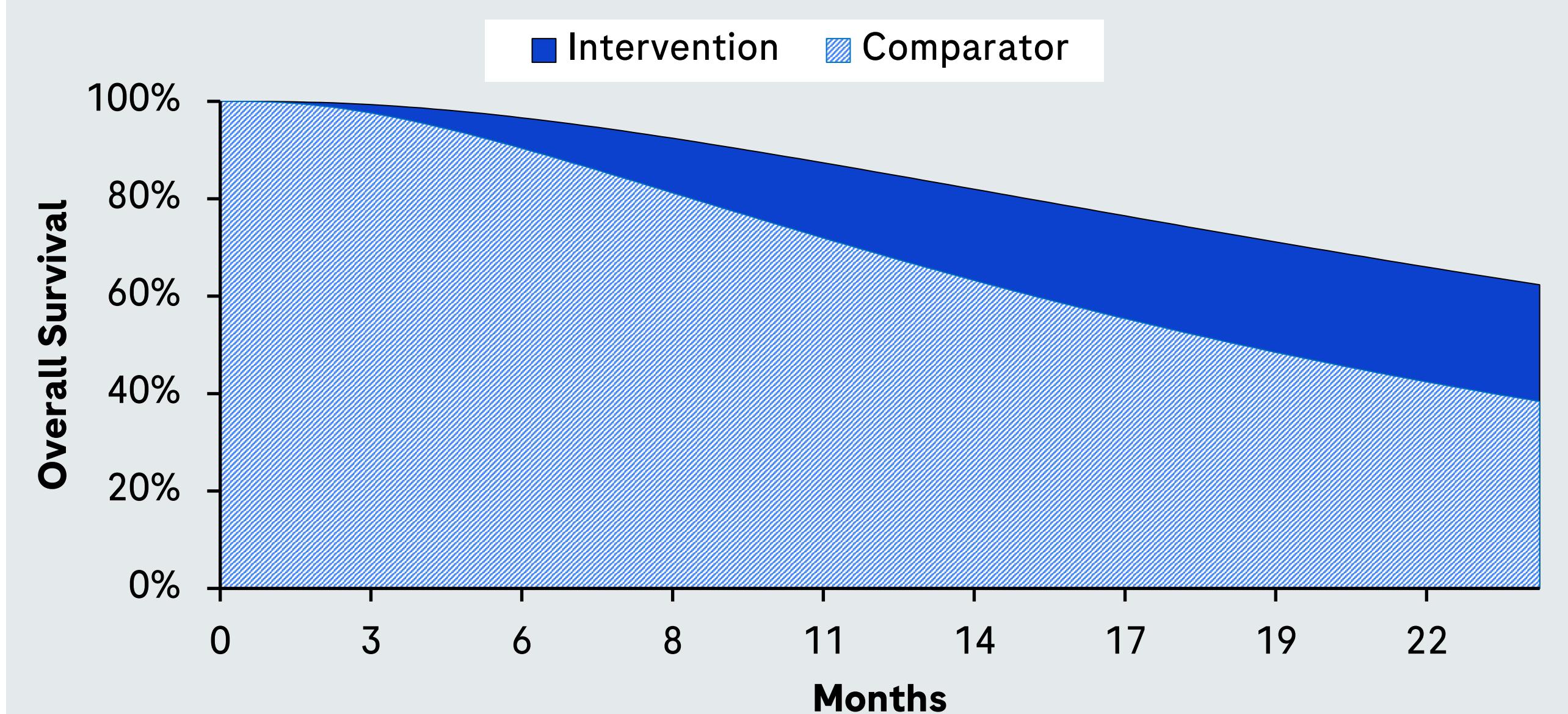
Further exploration across disease areas and working age populations would be of interest as well as the impact to ICER.

Analyzing productivity gains rather than losses is compatible with external benchmarks but does not rely on them.

Modelling Productivity in a Case Study

The effect takes place if a value for productivity losses is only assigned to patients that are alive. As can be seen in the graph below using our case study, the more effective drug keeps patients alive for longer and will therefore also accumulate greater losses (= the dark blue area under the curve). This effect is particularly pronounced when patients survive in a health state with limited modelled ability to work, e.g. progressive disease in oncology.

Figure 1: Overall survival

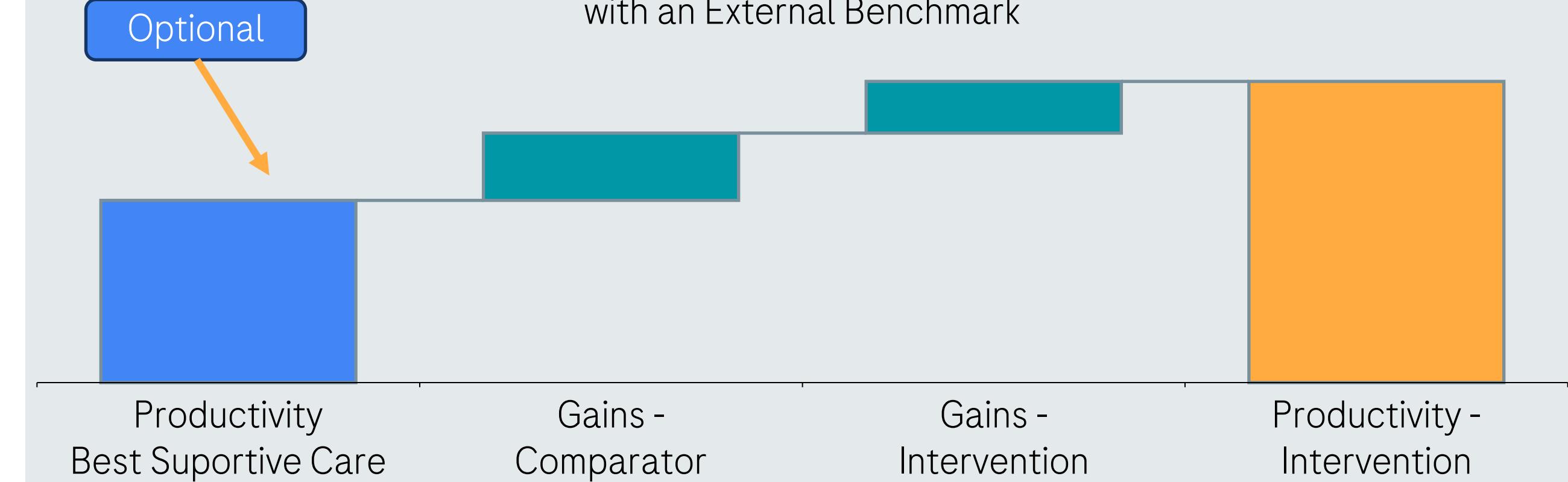


Calculating Productivity Gains With & Without External Benchmark

The advantage of this approach is that no external benchmark is needed as absolute gains can be calculated and will only account for added productivity. It can be combined with a benchmark (e.g. Bsc) to avoid accounting gains for the intervention that would exist in any case.

- ✓ Accounts for productivity losses of patients dying.
- ✓ Restores the logic that more effective treatments keeping patients alive for longer and able to work result in a smaller productivity impact.
- ✓ Can also be used without an external benchmark (simpler to implement) while the incremental effect between interventions is the same as with losses.

Figure 3: Conceptual Illustration of Productivity Gains with an External Benchmark



Limitations

- Adding an external benchmark requires availability of such information, e.g. productivity of the general population.
- Calculating gains requires additional transposing of calculations to ensure the result is a loss.

References

Yuasa A, Yonemoto N, LoPresti M, Ikeda S. Use of Productivity Loss/Gain in Cost-Effectiveness Analyses for Drugs: A Systematic Review. *Pharmacoeconomics*. 2021 Jan;39(1):81-97. doi: 10.1007/s40273-020-00986-4.

Anirban Basu, Understanding Productivity Benefits and Related Future Research Needs in Cost-Effectiveness Analysis, *Value & Outcomes Spotlight* July/August 2018.

Krol M, Brouwer W, Sendi PO. Productivity costs in health-state valuations: does explicit instruction matter? *Pharmacoeconomics* 2006;24(4):401-414.

Shephard, C et al., Three Methods for Measuring Productivity Losses Due to Health Related Presenteeism in Economic Evaluations, *Value in Health*, 2016, Volume 19, Issue 7, A364 - A365.

Pike J, Grosse SD. Friction Cost Estimates of Productivity Costs in Cost-of-Illness Studies in Comparison with Human Capital Estimates: A Review. *Appl Health Econ Health Policy*. 2018 Dec;16(6):765-778. doi: 10.1007/s40258-018-0416-4.

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