

Assessing the Pricing Trends of Repurposed Medicines in the United Kingdom

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Background

- Drug repurposing refers to the re-development of existing active pharmaceutical ingredients and includes adding new indications (drug repositioning), new formulations (drug reformulation) or combining existing medicinal products (drug combination).
- There has been increased focus on the benefit of repurposing in recent years, particularly given the repurposing of medicines during the COVID-19 pandemic, however, there is limited research assessing the impact of repurposing on pricing.
- This study sought to evaluate pricing trends for a sample of medicines before and after repurposing in the UK.

Methodology

- A set of 24 repurposed medicines was identified from published literature.
- Pricing data was extracted from the British National Formulary (BNF) for the years 2007 and 2021.
- Prices were compared within a single year (2021) and over time (2007-2021) for original and repurposed products.
- Using a published regression analysis,¹ the expected price change of each medicine was reviewed in relation to specific factors, such as orphan designation or reformulating vs repositioning. These were then compared to the real-world price changes observed.

An Overview of Medicine Repurposing

Drug Repositioning

Extending use of existing medicine to a new therapeutic indication

Examples

- Aspirin repositioned from an analgesic to an antiplatelet agent²
- Thalidomide repositioned from an antiemetic to management of leprosy complication and oncological indications²

Drug Reformulation

Creating new formulations for existing medicines

Examples

- Amiodarone, reformulated from oral to intravenous³
- Cyclosporine A reformulated from oral to microemulsion oral³
- Valproate reformulated from tablets to oral solution³

Drug Combination

Combination of existing products for original or novel indications

Examples

- Bupropion in combination with naltrexone for obesity³
- Hydralazine and isosorbide dinitrate for treatment of heart failure³

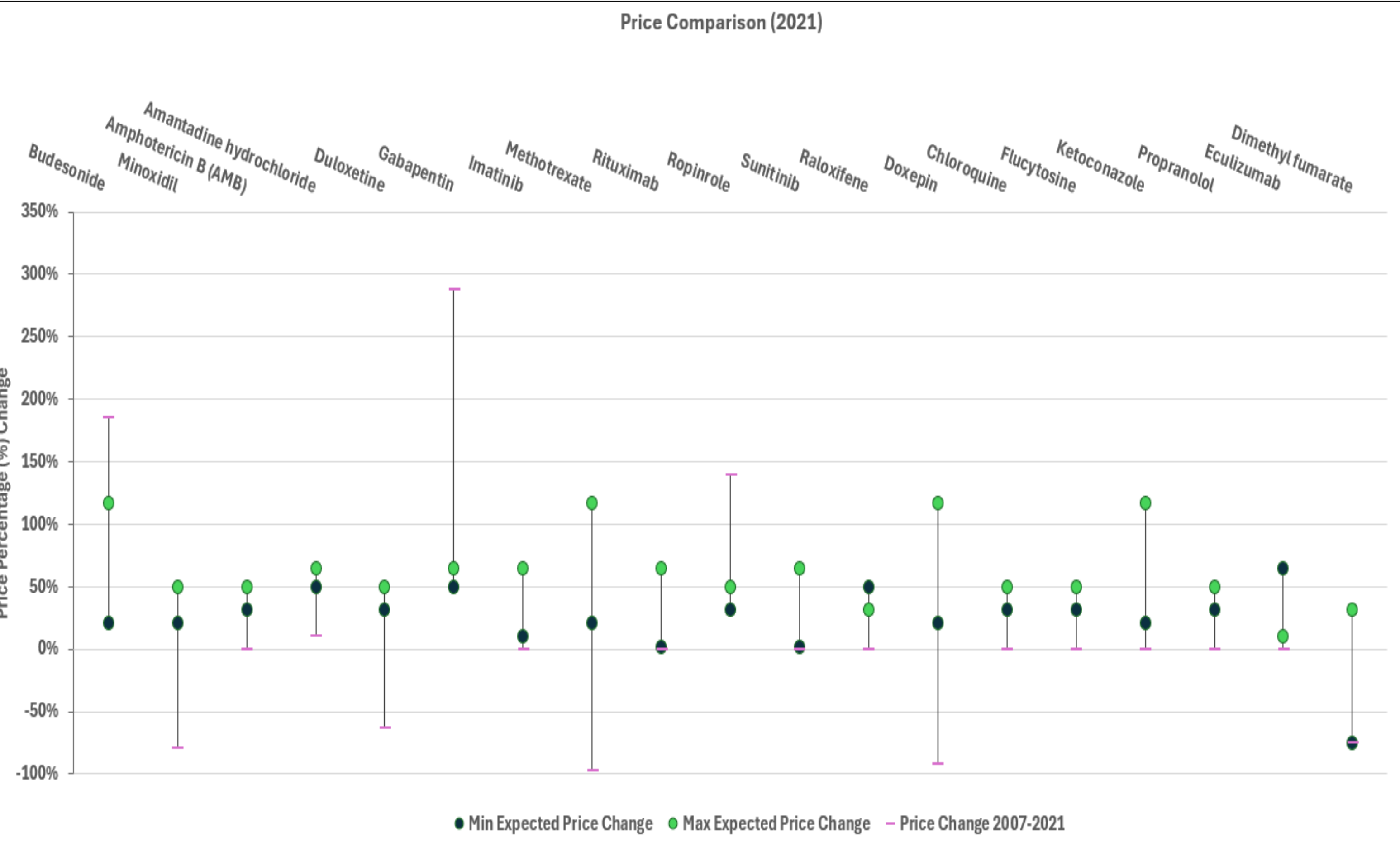
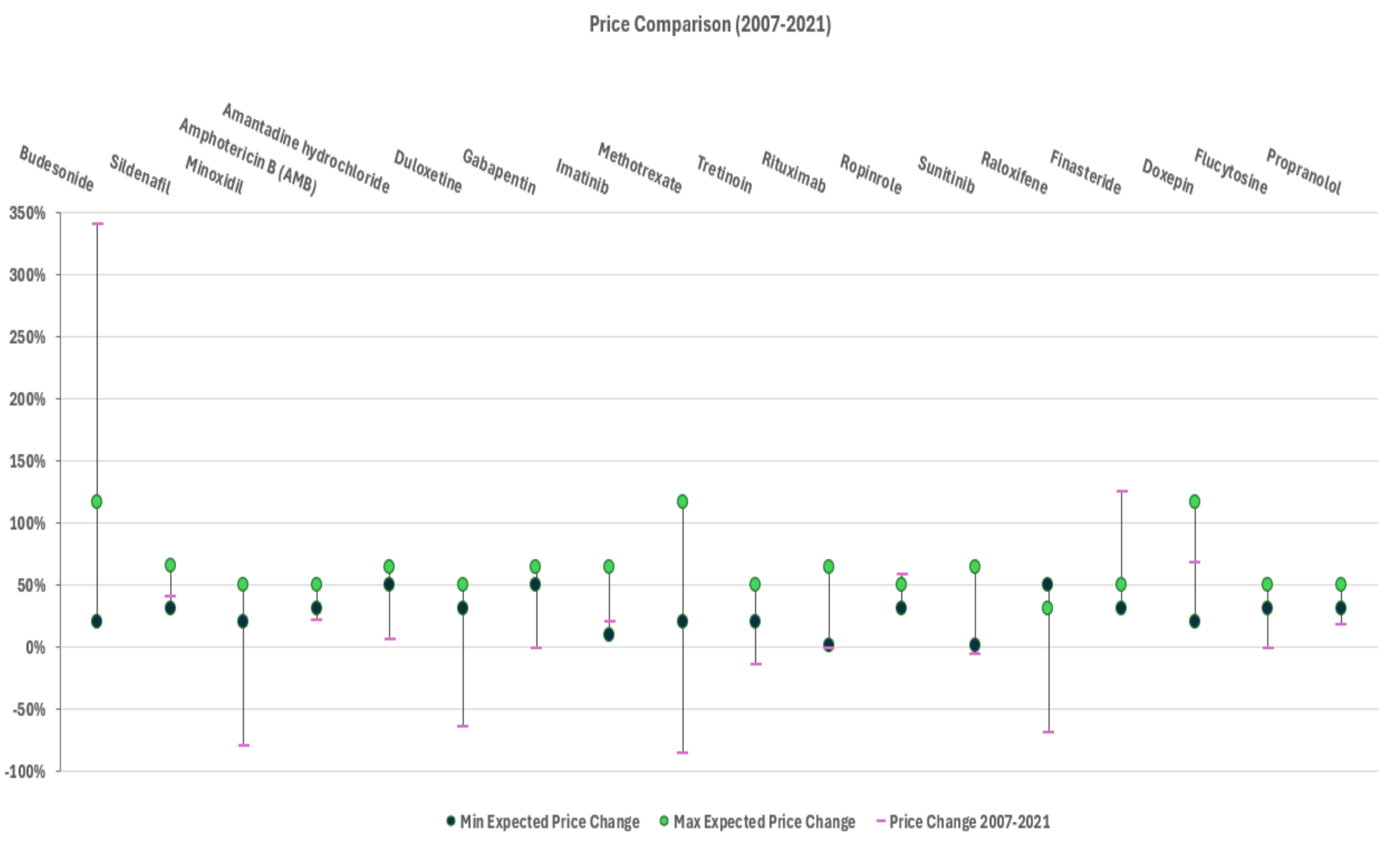
Results

Price Comparison 1 (2007 – 2021)

- Of the 24 identified repurposed medicines, pricing data was available in 2007 and 2021 for 22 source and repurposed products.
- Four of these products showed significant price increases over time (> 600%) and are not presented in the graphs below to aid readability.
- For the remaining 18 products, **12** had a lower price change than expected when repurposed, based on the minimum and maximum price change from the published regression analysis. **Three** products had a price change greater than expected and **3** showed a price change within expected bounds.

Price Comparison 2 (2021)

- The second pricing comparison explored price changes between source and repurposed products within a single year (2021).
- Pricing data was available in 2021 for 19 products.
- Three medicines had significant price increases between source and repurposed products (>2,000%) and are not presented in the graph below to aid readability.
- For the remaining 16 medicines, **6** had a lower price change than expected when repurposed, based on the minimum and maximum price change from the published regression analysis, **11** products had a price change greater than expected, and **2** showed a price change within expected limits.



Conclusions

Price Variability

- This research explored the changes in price with drug repurposing in England at two timepoints.
- There were no clear pricing trends as some products increased in price when repurposed, while others decreased, and some remain unchanged. This result is unsurprising given the highly variable types of products included (different therapeutic areas, different types of repurposing, etc).
- In general, most price changes did not align with the expected price changes generated from the coefficients of the published regression analysis¹. However, as this analysis was published 10 years ago, the coefficient values should not be seen as a definitive benchmark of possible price changes.

Future Research

- While the benefits of drug repurposing are gaining greater focus, there is limited information on the commercial implications for companies who may consider launching a repurposed product.
- Drug repurposing has often occurred through serendipitous discovery of new uses, therefore more systematic approaches are now being explored (such as use of artificial intelligence to identify potential repurposing targets⁴).
- Given the likelihood of higher numbers of potential repurposing candidates in the future, more information is required on the commercial realities for companies launching repurposed products.

References:

1. Murteira, S., Millier, A., & Toumi, M. (2014). Drug repurposing in pharmaceutical industry and its impact on market access: market access implications. *Journal of market access & health policy*, 2, 10.3402/jmahp.v2.22814. <https://doi.org/10.3402/jmahp.v2.22814>
2. Jourdan, J. P., Bureau, R., Rochais, C., & Dallemagne, P. (2020). Drug repositioning: a brief overview. *The Journal of pharmacy and pharmacology*, 72(9), 1145–1151. <https://doi.org/10.1111/jphp.13273>
3. Murteira, S., Ghezaiel, Z., Karray, S., & Lamure, M. (2013). Drug reformulations and repositioning in pharmaceutical industry and its impact on market access: reassessment of nomenclature. *Journal of market access & health policy*, 1, 10.3402/jmahp.v1i0.21131. <https://doi.org/10.3402/jmahp.v1i0.21131>
4. Tanoli Z, Vähä-Koskela M, Aittokallio T. Artificial intelligence, machine learning, and drug repurposing in cancer. *Expert Opin Drug Discov*. 2021 Sep;16(9):977-989. doi: 10.1080/17460441.2021.1883585. Epub 2021 Feb 12. PMID: 33543671.



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