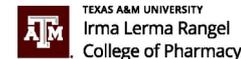
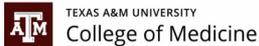


Cost-Effectiveness of CDK 4/6 inhibitors in Treating Breast Cancer: A Systematic Review

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Background

- Breast cancer is the most common cancer among US women
- Economic burden imposed by breast cancer has been estimated to be \$20 billions
- CDK 4/6 inhibitors, such as ribociclib, palbociclib, and abemaciclib, have recently been approved for treatment of HR+/HER2- advanced or metastatic breast cancer

Purpose

To systematically assess the cost-effectiveness evidence of CDK 4/6 inhibitors in the treatment of HR+/HER2- advanced breast cancer from a US societal/payer's perspective

Methods

A systematic literature review was conducted to search for articles on pharmacoeconomics evaluation of CDK 4/6 Inhibitors. This study followed the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) 2020 Guidelines. Data Source: PubMed

Two independent reviewers with additional third to resolve discrepancies. Each study was:

- screened using the title/abstract and assessed for full text to determine whether studies met inclusion/exclusion criteria;
- rated for quality using Drummond checklist and
- was reviewed to extract pertinent information relevant to the outcome

Criteria	Inclusion	Exclusion
Population	Patients with breast cancer	None
Intervention	Any of the FDA approved CDK4/6 inhibitors	None
Comparator	Standard of care, placebo, or alternative treatment	None
Outcomes	Incremental cost-effectiveness ratio, net benefits, net costs, cost savings, benefit-cost ratio, cost-benefit ratio, etc.	Other than listed under inclusion criteria
Study design	Original economic analysis including cost-minimization analysis, cost-benefit analysis, cost-effectiveness analysis, cost-utility analysis, and budget-impact analysis	Case studies, randomized control trials, review articles, expert opinions

Table 1: Inclusion and Exclusion Criteria

Results

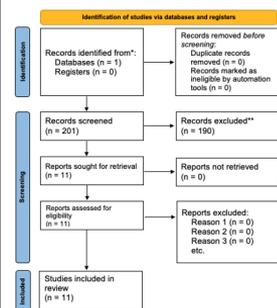
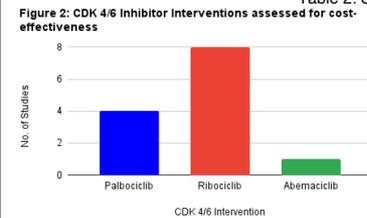


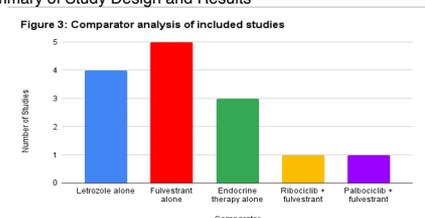
Figure 1: PRISMA flow chart of article selection process

Study	Population	Intervention	Comparator	Outcome	Drummond Checklist Score
Mansory et al. (2017) (1)	Postmenopausal women with HR+/HER2- ABC	Palbociclib + letrozole for treatment naive patients Palbociclib + fulvestrant for patients with prior endocrine treatment	Letrozole alone or Fulvestrant alone	PAL+LET: \$18 9.5/96QALY fulvestrine naive women PAL+FUL: \$918 166QALY	9.5
Mistry et al. (2018) (2)	Postmenopausal women with HR+/HER2- ABC or MBC	Palbociclib + letrozole	Letrozole alone	RIB+LET: \$10 5210,369QALY	10
Mistry et al. (2018) (3)	Postmenopausal women with HR+/HER2- ABC or MBC	Ribociclib + letrozole	Letrozole alone	\$118.11 per member treated per month	10
Zhang et al. (2019) (4)	Postmenopausal women with HR+/HER2- ABC	Palbociclib + letrozole	Letrozole alone	PAL+LET: \$634,000/QALY	8.5
Zhang et al. (2019) (5)	Patients with HR+/HER2- ABC	Palbociclib + fulvestrant	Fulvestrant alone	RIB+LET: \$440,000/QALY \$ 488,584/QALY	9.0
Yang et al. (2020) (6)	Postmenopausal patients with HR+/HER2- ABC	Ribociclib + fulvestrant	Fulvestrant alone	\$813,132/QALY	10
Huang et al. (2021) (7)	Premenopausal women with HR+/HER2- ABC	Ribociclib + endocrine therapy	Endocrine therapy alone	\$539,357.95/QALY	10
Joung et al. (2021) (8)	Premenopausal women with HR+/HER2- ABC	Ribociclib plus endocrine therapy	Endocrine therapy alone	\$382,996/QALY	10
Jiang et al. (2021) (9)	Postmenopausal patients with HR+/HER2- ABC	Ribociclib plus fulvestrant	Fulvestrant alone	\$1,073,526/QALY	10
Le et al. (2021) (10)	Premenopausal patients with HR+/HER2- breast cancer	Ribociclib + endocrine therapy	Endocrine therapy alone	\$124,313/QALY	10
Wang et al. (2021) (11)	Women with HR+/HER2- ABC/MBC who had progressed after receiving previous endocrine therapy	Abemaciclib + fulvestrant	Ribociclib + fulvestrant fulvestrant alone	\$19,140/QALY (ABE+FUL when compared to RIB + FUL) \$229,010/QALY (ABE + FUL when compared with PAL+FUL) \$311,850/QALY (ABE+FUL when compared to FUL)	9.5

Table 2: Summary of Study Design and Results



8 out of the 11 studies included ribociclib as the CDK 4/6 inhibitor intervention whereas 4 studied palbociclib, and 1 studied abemaciclib.



Fulvestrant alone and letrozole alone were the most commonly studied comparators

Results (cont.)

- Each study determined cost-effectiveness by comparing their calculated incremental cost-effectiveness ratio (ICER) with a willingness-to-pay (WTP) threshold.
- 4 out of 11 studies showed CDK 4/6 inhibitors to be cost-effective.
- The remaining 7 out of 11 studies found CDK 4/6 Inhibitors not cost-effective with high drug costs as the main cost driver.

Discussion and Conclusion

- Studies varied by population, cost components, and perspectives.
- CDK4/6 inhibitor drug costs are the main driver of ICERs.
- Drugs account for about 20% of total costs for cancer care and are rapidly increasing
- Patients who have to pay high out-of-pocket expenses are less likely to adhere to their treatment plan
- Cost-effectiveness evidence is important for formulary decision and can facilitate evidence-based and value-based practice
- Healthcare stakeholders and policy makers need to incorporate cost-effectiveness evidence in patient care decision making

References

- Huang X, Lin S, Rao X, et al. First-line Treatment with Ribociclib plus Endocrine Therapy for Premenopausal Women with Hormone-receptor-positive Advanced Breast Cancer: A Cost-effectiveness Analysis. *Clin Breast Cancer.* 2021;21(4):e479-e488. doi:10.1016/j.cbcc.2021.01.019

Disclosure

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