DETERMINANTS OF THE COST-EFFECTIVENESS OF TELEMEDICINE: RESULTS FROM A SYSTEMATIC REVIEW AND MULTIVARIABLE ANALYSIS

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INTRODUCTION

Telemedicine holds the promise to increase access-to-care at a lower cost. Yet, for years, the evidence of telemedicine's cost-effectiveness has been scarce, explaining in part why the recourse to this type of medical delivery remained low.

We conducted a systematic screening of economic evaluations of telemedicine and regression analysis to determine: (1) the characteristics of telemedicine studies; (2) the determinants of economically efficient telemedicine interventions.

METHODS

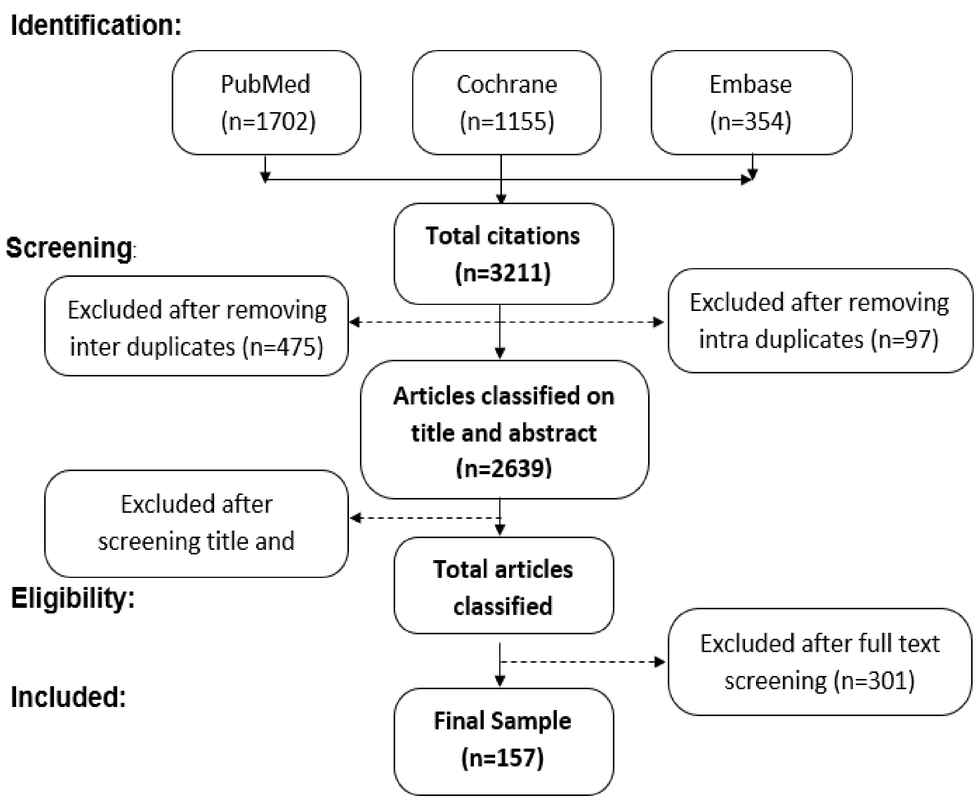
ARTICLE SELECTION

We reviewed all published economic evaluations of telemedicine from 2008 to 2018. Protocol available on PROSPERO (ref. CRD42019143032).

THE DATA

- We included 157 articles out of 2639 (acceptation rate: 5.9%).
- We collected study characteristics (type of intervention, medical domain…) and indicators of quality of medico-economic evaluations.
- The dataset was enriched using OECD data on medical density and socio-demographic controls at the country level.

Figure 1: Flow diagram of the different phases of the systematic screening process.



EMPIRICAL STRATEGY

We performed descriptive statistics on the full sample. Using Pearson's chi-square, we tested whether the distribution of these variables are significantly different for studies that found the telemedicine intervention dominant, compared to studies which found usual care dominant.

We explained the determinants of economically dominant telemedicine interventions using a multivariable logit model.

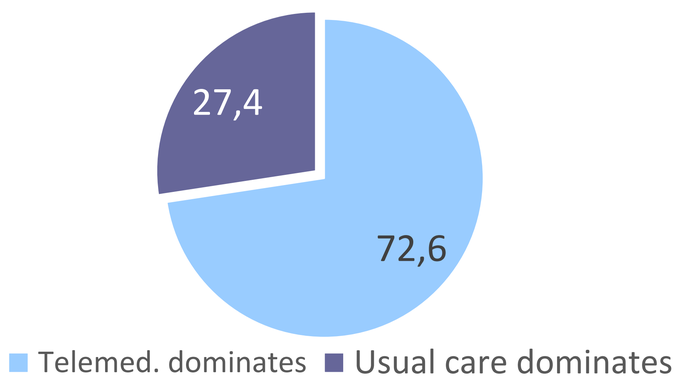
RESULTS

Table 1: Descriptive statistics of ten years of economic evaluation of telemedicine.

	Full Sample	Usual care dominates telemed.	Telemed. dominates usual care	
	Percent	Percent	Percent	Pearson chi2
Study Characteristics				
Telemonitoring	64.10	73.17	60.87	1.99
Chronic condition	70.51	82.93	66.09	4.12**
Mental condition	17.95	12.20	20.00	1.25
Cardiac condition	9.62	14.63	7.83	1.61
Respiratory condition	10.90	12.20	10.43	0.10
Societal perspective	28.21	17.07	32.17	3.40*
Publication Year				
Before and in 2012	16.03	17.07	15.65	0.05
After and in 2013	83.97	82.93	84.35	-
Impact factor	29.49	19.51	33.04	2.66
Indicators of quality				
Cost-effectiveness analysis	84.62	92.68	81.74	2.78*
Randomised	75.64	92.68	69.57	8.76***
Compared to usual care	87.82	95.12	85.22	2.77*
Sample size	59.62	80.49	52.17	10.06***

Note: P-values: ***<1%; **<5%; *<10%
Estimated effects are expressed using odd-ratios
Because of space, only a selection of variables are reported.

Figure 2: Dominance of telemedicine over usual care (%).



72.6% of economic studies report that the telemedicine intervention dominates economically the control group.

Table 2: Determinants of the cost-effectiveness of telemedicine interventions (in odd-ratios).

Study Characteristics	
Telemonitoring	1.162
Chronic condition	0.635
Mental health	3.073
Respiratory	4.386
Cardiac	0.618
Societal perspective	4.946**
Continent (Europe/North America)	1.747
Publication Year	3.332
Impact Factor	3.730**
Indicators of quality	
Cost-effectiveness analysis	0.300
Randomised	0.335
Compared to usual care	0.197
Sample size	0.289**

The cost-effectiveness of telemedicine is independent of the medical domain. We found no significant effect of the publication year, signifying that the nature of the evidence has not changed overtime.

All things equal, cost-effectiveness of telemedicine is significantly negatively associated with indicators of quality. Yet, reporting cost-effectiveness of telemedicine is, ceteris paribus, positively related to the odds of publishing in journals with high impact factors.

CONCLUSION

- In summary, published evidence has found that telemedicine is overall cost-effective, regardless of the medical field.
- Articles reporting telemedicine as a dominant intervention are more likely to be published in high impact factor journals.
- However, articles with higher standards of economic evaluation are less likely to report an intervention as being dominant.