



## Review

# A systematic review of economic evaluation in pancreatic ductal adenocarcinoma



Claire Gérard <sup>a,b</sup>, Philippe Fagnoni <sup>c,d,e</sup>, Angélique Vienot <sup>f</sup>,  
 Christophe Borg <sup>b,g</sup>, Samuel Limat <sup>a,b</sup>, Franck Daval <sup>h</sup>, François Calais <sup>h</sup>,  
 Julie Vardanega <sup>a</sup>, Marine Jary <sup>b,g</sup>, Virginie Nerich <sup>a,b,\*</sup>

<sup>a</sup> Department of Pharmacy, University Hospital of Besançon, Besançon, France

<sup>b</sup> INSERM UMR 1098, University of Bourgogne – Franche-Comté, Besançon, France

<sup>c</sup> Department of Pharmacy, University Hospital of Dijon, Dijon, France

<sup>d</sup> INSERM UMR 866, University of Bourgogne – Franche-Comté, Dijon, France

<sup>e</sup> EPICAD LNC UMR 1231, University of Bourgogne – Franche-Comté, Dijon, France

<sup>f</sup> Department of Gastro-enterology, University Hospital of Besançon, Besançon, France

<sup>g</sup> Department of Medical Oncology, University Hospital of Besançon, Besançon, France

<sup>h</sup> University Library, University of Franche-Comté, Besançon, France

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## KEYWORDS

Cost-effectiveness analysis;  
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 Economic evaluation;  
 Pancreatic ductal adenocarcinoma;  
 Quality-adjusted life years

**Abstract Objectives:** The economic evaluation (EE) of healthcare interventions has become a necessity. However, high quality needs to be ensured in order to achieve validated results and help making informed decisions. Thus, the objective of the present study was to systematically identify and review published pancreatic ductal adenocarcinoma-related EEs and to assess their quality.

**Methods:** Systematic literature research was conducted in PubMed and Cochrane to identify published EEs between 2000 and 2015. The quality of each selected EE was assessed by two independent reviewers, using the Drummond's checklist.

**Results:** Our systematic review was based on 32 EEs and showed a wide variety of methodological approaches, including different perspectives, time horizon, and cost effectiveness analyses. Nearly two-thirds of EEs are full EEs (n = 21), and about one-third of EEs had a Drummond score  $\geq 7$ , synonymous with 'high quality'. Close to 50% of full EEs had a Drummond score  $\geq 7$ , whereas all of partial EEs had a Drummond score  $< 7$  (n = 11).

**Conclusions:** Over the past 15 years, a lot of interest has been evinced over the EE of pancreatic ductal adenocarcinoma (PDAC) and its direct impact on therapeutic advances in PDAC. To provide a framework for health care decision-making, to facilitate transferability and to

\* Corresponding author: Department of Pharmacy, University Hospital of Besançon, 3 Boulevard Alexandre Fleming, 25030, Besançon Cedex, France.

E-mail address: [vnerich@chu-besancon.fr](mailto:vnerich@chu-besancon.fr) (V. Nerich).

lend credibility to health EEs, their quality must be improved. For the last 4 years, a tendency towards a quality improvement of these studies has been observed, probably coupled with a context of rational decision-making in health care, a better and wider spread of recommendations and thus, medical practitioners' full endorsement.

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## 1. Introduction

Pancreatic ductal adenocarcinoma (PDAC) is the fourth leading cause of cancer deaths in Europe and the main pancreatic cancer type (i.e. >80% of cases), with an increasing mortality and incidence over the last several years, thereby constituting a major public health issue [1,2]. PDCA's treatments, and particularly anticancer drugs such as chemotherapies, mostly impact on the survival of patients and may have both positive outcomes (survival or quality of life benefit) and/or negative effects (adverse events, disease progression). Patients' quality of life (QOL) can be impacted, in terms of pain, fatigue, anxiety, physical and social functioning, etc [3–5]. These potential effects on QOL should be considered in clinical and policy decision making, as the economic burden of PDAC's management is currently assessed. In the context of rational decision-making in health care, being an integral part of health technology assessment (HTA), the economic evaluation (EE) of healthcare interventions has become a necessity. One of the major challenges is to provide cost-effectiveness data that are relevant to daily practices and may be required to optimise consumption of healthcare resources. Decision making for coverage and reimbursement of new drugs is being increasingly supported by EE in many countries including Australia, Canada and the United Kingdom (UK) [6,7]. The quality of EEs must be high in order to elicit trust in the results and help making informed decisions. There are a number of EE methods [8]. According to Drummond *et al.*, the classification of EEs is usually based on the ability of studies to answer both of the following questions: Is there a comparison of two or more strategies? Have both costs (inputs) and consequences (outputs) of alternative interventions been examined [9,10]? If both the costs and the consequences of two or more strategies are not compared, the EE is considered as partial. If both the costs and the consequences of two or more interventions are compared, the EE is considered full and partial otherwise. Full EE methods are the most common and recommended in HTA, and particularly cost-effectiveness analyses (CEA) and cost-utility analyses (CUA) [11]. The method selection depends also on the nature of the expected health effects of the interventions under study. CEA is required although health-related quality of life (HRQOL) is not identified as a relevant health effect of the interventions studied; health outcome

is measured by the length of life in life years (LY). Otherwise, CUA is the preferred method, even though HRQOL is identified as an important health effect of interventions; in this case, health outcome is measured by the length of life weighted by a valuation of the HRQOL, represented by health-state utility values (HSUV), to produce QALY (Quality-Adjusted Life Years). The HSUV is on a scale anchored by 1 (best imaginable health state, i.e. perfect health) and 0 (worst imaginable health state, i.e. death) using patient preference-based measures [12]. For examples, one QALY represents one life-year spent in perfect health and living 10 years with a chronic disease with an HSUV of 0.8 is equivalent to living 8 QALY. In oncology, CUA should be preferred to CEA, even more for the EE of PDCA's treatments, because of its special impact on the QOL. To improve the quality of future EE it is important to provide a thorough evaluation, which has not been done so far.

Thus, the objective of this present study was to systematically identify and review published pancreatic ductal adenocarcinoma-related EEs, and to assess their respective quality.

## 2. Method

### 2.1. Search strategy

A systematic literature search was conducted in PubMed and Cochrane to identify published economic evaluations. Articles were included if they:

- concerned only PDAC whatever the therapeutic process was (chemotherapy, targeted therapy, surgery of cancer, surgery other than surgery of cancer, chemoradiation, screening, diagnosis, endoscopy, surveillance);
- reported full or even partial economic evaluation;
- were written in English and published between January 2000 and December 2015.

### 2.2. Exclusion criteria

Articles were excluded if they

- did not concern only PDAC, or concerned with another cancer/disease;
- did not report EE, either full or partial;
- were a systematic review, editorial, comment, letter to the editor, practice point;

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