REVIEW

Strengths and limitations of industry vs. academic randomized controlled trials

P.-F. Laterre[1] **and B. François**[2]

1) *Department of Critical Care Medicine, Saint Luc University Hospital, Université Catholique de Louvain, Brussels, Belgium and* 2) *Medical-Surgical Intensive Care Unit, Limoges University Hospital, Limoges, France*

Abstract

Clinical research has evolved substantially over the last two decades, but industry-sponsored research is still substantially superior to academic research in preparing, organizing and monitoring studies. Academics have to realize that conducting clinical research has become a real job with professionalism requirements. The primary objectives of research and development clearly differ between industry and academics. In the first case, new drug development is expected to generate profit, whereas in the latter case, research is aimed at understanding mechanisms of disease, promoting evidence-based medicine, and improving public health and care. However, a large number of clinical studies do not achieve their goals, and the reasons for failure may also differ between sponsored and academic studies. Industry and academics should develop better constructive partnerships and learn from each other. Academics should guide industry in study design and in investigator site selection, and academics should benefit from industry's expertise in improving monitoring and reporting processes. Finally, the existing database from former studies should be opened and shared with academics, to enable the exploration of additional scientific questions and the generation of new hypotheses. The two types of research should not be opposed, but should take the form of a constructive collaboration, increasing the chances of reaching each individual goal.

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Corresponding author: P.-F. Laterre, Department of CCM, St Luc University Hospital, Avenue Hippocrate 10, 1200 Brussels, Belgium
E-mail: pierre-francois.laterre@uclouvain.be

Introduction

Research driven by academics has often been considered to have conflicts with industry. Pharmaceutical companies probably have the image of developing new compounds for profit only. Therefore, research and studies carried out by industry are regularly criticized and perceived as potentially biased. However, collaboration between industry and academics has led to significant advances in drug and technical developments. Instead of opposing these two types of research, it would be more profitable to consider what can be learned from both approaches and how this can improve new study design and developments for the benefit of patients and healthcare. The aims of this article are to review the benefits and pitfalls of academic and industry research, to provide some explanations for the failure of studies, and to suggest some potential improvements for the future (Table 1).

Primary objectives of industry and academic research

Industry is likely to develop new drugs or devices that are expected to generate profits for the company and shareholders. After a new drug registration by the authorities, industry will perform further work on marketing strategies, to increase sales and thereby increase the return on investment. Companies may also develop new drugs for orphan disease with an expected high sale price, on the assumption that the healthcare system will often accept the charges, as it cannot be

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TABLE 1. Potential improvements for conducting academic and industry research

Academic	Industry
Improve study and ethics committee submission preparation	Study designed in collaboration with actively involved academics
Improve data-monitoring quality and learn from the industry	Phase III trials not defined by weak phase II signals to meet marketing targets
Safety reporting not restricted to unexpected events	Site selection based on objective metrics
Knowledge of regulatory authorities' policies and expectations	Redefine a more realistic agenda and support quality recruitment vs. volume
Study agenda to be better established	Consider the use of a clinical coordinating centre
Multicentre rather than single-centre studies	Access to study databank when completed

perceived as abandoning patients with no access to this unique care. On rare occasions, however, mainly because of public and healthcare pressures, companies may provide financial support by reducing their sales margins for difficult-to-access treatments for low-income populations or countries, in order to maintain a good public image.

Benefits for academics, even though they are different from those for industry, clearly exist. The career progression of academics is driven by their scientific production and publication metrics. It is therefore not surprising that all efforts are made by scientists to conduct studies aimed at rapid publication. This attitude may lead not only to the well-known data cheating, but also to research of limited interest and benefit for the improvement of patient care [1]. It must be recognized that some research and clinical studies have little relevance for a better understanding of disease mechanisms. Also, some academics, when involved in sponsored studies, may pay more attention to the expected impact of the subsequent associated publications than to the value of the conducted research. The publication policy of industry studies should often better defined before the conduct of a clinical trial, to more adequately reward the actual investment of active investigators.

Reasons for failure in academic and industry research

Study design and selected population

Despite the fact that the regulatory authorities are more likely to approve a new drug if it has shown superiority to a comparator used as part of the standard of care, numerous companies have designed non-inferiority studies to access the market. By evaluating the potential benefit of their new compound in a low-risk population, these trials were often unable to detect some clinical cure failures or even inferiority as compared with standard care. Numerous confirmatory trials or analyses of larger samples performed after market launching of a new drug have demonstrated the limitations of the initial studies that had resulted in its registration by the authorities [2]. Academics are more likely to explore the possible efficacy of an intervention or a drug in a more severe group of patients with comorbidities and a higher risk of death, without marketing objectives, but targeting a population with important unmet medical needs. Exploring antibiotic dosing regimens and associated outcomes in the critically ill provides one example of such academic studies. These studies have often supported the need to consider the original label for the most severe patients corresponding to a population for which more efforts should be made [3]. However, industry cannot always be blamed for this non-inferiority design approach. Indeed, recent examples of new antibiotic approvals by regulatory authorities are questionable, and may have been facilitated by political considerations, as the current era of bacterial multidrug resistance represents a threat to the community [4].

The tight agenda of industry research

Industry has a well-defined and tight agenda for a research plan. Drug development takes years, and the patent-restricted period after launching potentially limits the profits that a company can expect. Potential launching and marketing strategies have to be established well in advance, when a promising drug is under early development. Also, industry is responsible to shareholders, and needs to complete its clinical studies within a very short period. This agenda may significantly impact on study quality, by resulting in the enrolment of a suboptimal population. Indeed, industry is often confronted by the problem of slower recruitment than expected or not meeting the predefined targets. Sponsors may therefore potentially facilitate recruitment by unintentionally opening the window to an inadequate patient population for the initial primary objectives of the study, which is discovered later when the database has been locked, and the part of the industry team responsible for the trial has changed position in the company. Continuous monitoring of the enrolled population should be systematically implemented, in order to more rapidly detect inappropriate enrolments, and investigator sites should be warned, or even closed, if a suboptimal patient population is recruited on multiple occasions. Finally, the investigator fee and financial support offered by industry may bias the enrolment. Indeed, the amount of money provided by the sponsor per patient included in a study may far exceed the actual personnel cost. The associated positive balance may help an academic group in future non-sponsored development, but may, on the other hand, in some areas, directly benefit the researcher. The high cost associated with research and development has caused industry to move in the direction of emerging markets [5]. In addition to