American Journal of Biomedical Science & Research

www.biomedgrid.com
ISSN: 2642-1747

Mini Review

Innovative Doctors in Oncology: Between Practice and Entrepreneurship

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To Cite This Article: *Pr S Sakhri spse Boulhart*. Innovative Doctors in Oncology: Between Practice and Entrepreneurship. Am J Biomed Sci & Res. 2025 25(6) AJBSR.MS.ID.003371,* **DOI:** 10.34297/AJBSR.2025.25.003371

Received: February 02, 2025; **Published:** February 12, 2025

Introduction

Innovation in oncology does not rely solely on laboratory researchers or big pharma. Increasingly, physicians themselves are becoming agents of change, bringing innovative ideas from the bedside to the marketplace. This chapter explores the journeys of these "physician-innovators," their motivations, successes, and the obstacles they face.

"Innovation in medicine requires patience and long-term vision. But seeing a patient benefit from a technology we have developed is an inestimable reward."

Keys to Success for an Innovative Doctor

a) Collaboration with technology experts: No doctor can innovate alone. Establishing partnerships with engineers and researchers is essential.

b) Access to financing: Developing a medical innovation is expensive. Between clinical trials and regulatory validation, it is crucial to surround yourself with investors or obtain subsidies.

c) Scientific and regulatory validation: Unlike other sectors, medicine requires rigorous validation steps before an innovation is placed on the market.

d) Managing conflicts of interest: Being a doctor and an entrepreneur is not always well perceived. You need to know how to communicate transparently about your activities to avoid any suspicion of commercial interests [1,2].

Challenges and Obstacles

a) Lack of time: Between clinical practice and research, it is difficult to dedicate time to entrepreneurship.

b) Administrative burdens: Clinical trials and regulatory approval are long and complex processes.

c) Financial risks: Not all projects find investors and some innovators must self-finance their approach at the beginning.

Ethical Challenges

The introduction of new technology in medicine raises questions about its accessibility, cost and impact on the doctor-patient relationship [3,4].

Collaboration with Industry and Research Institutes

Partnerships with the pharmaceutical industry, biotechnology and research institutes are essential to transform an idea into a viable solution. Some collaboration models include:

a) Technology licenses: The doctor-inventor transfers his intellectual property rights to a company which takes care of development and marketing.

b) Co-development: Medical start-ups work closely with hospitals to validate innovations in real conditions.

c) Academic spin-offs: Universities support the creation of start-ups founded by physician-researchers, by facilitating access to laboratories and helping to raise funds.

Financing Medical Innovations

Financing is one of the biggest challenges for a physician-innovator. Several options exist:

a) Public subsidies: Organizations such as The European

Union funds research and innovation projects.

b) Private investors: Specialized healthcare venture capital funds invest in promising medical start-ups.

c) Medical Crowdfunding: Some platforms allow you to raise funds directly from the general public or other doctors.

d) Partnerships industrialists: Some companies fund the development of innovations in exchange for commercial exclusivity on the technology [5-7].

Regulation and Authorization of Medical Devices

Any innovation in oncology must go through strict regulation before being put on the market. The main steps are:

a) Preclinical validation: Laboratory and animal model tests to prove the efficacy and safety of the device.

b) Clinical trials: Studies on volunteer patients to demonstrate therapeutic benefits.

c) Approval: Obtaining the necessary certifications such as CE marking in Europe or FDA approval in the United States.

d) Post-marketing surveillance: Monitoring of side effects and continuous device improvements.

Impact of Innovations on Patients

Innovations in oncology are radically transforming patient care, improving not only their life expectancy but also their quality of life.

a) Increased treatment precision: Targeted therapies and adaptive radiotherapy allow tumors to be attacked more effectively while reducing side effects.

b) Earlier, less invasive diagnosis: Liquid biopsy and AI-assisted imaging offer faster and more accurate ways to detect cancers at an early stage.

c) Expanded access to care: Digital platforms and telemedicine enable patients, even in remote areas, to benefit from medical advances.

d) Better personalization of treatments: Advances in genomics and artificial intelligence make it possible to design treatments adapted to the genetic profile of each patient, thus increasing the chances of success.

e) Patient Empowerment: Through connected devices and monitoring applications, patients can better understand and manage their disease, promoting more proactive care.

Recent Technological Innovations in Oncology

Innovation in cancer research is experiencing unprecedented acceleration thanks to technological advances. Here are some of the most recent advances:

i. Messenger RNA (mRNA)-based therapies

ii. Liquid biopsy diagnosis

iii. Robot-assisted surgery and augmented reality

iv. Artificial intelligence and medical imaging

v. New generations of CAR-T cells

vi. Smart medical implants and devices

vii. Advances in adaptive radiotherapy

Conclusion

Physician innovators are essential to advancing cancer care. By combining clinical expertise, entrepreneurial vision and the ability to collaborate with industry, they are able to transform ideas into real-world solutions for patients. This path is demanding, but it paves the way for more effective and personalized oncology. Those who dare to take the plunge become the pioneers of tomorrow's medicine.

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