

Product Development Partnerships (PDPs) and Pharmaceutical Innovation

INTRODUCTION

- **Public and private investments** can be mutually beneficial and improve the **discovery and development of pharmaceutical innovations**.
- **There is an increasing trend** in the number of **Product Development Partnerships (PDPs)** seeking to discover and produce **new vaccines** and new medicines in response to the global health threat posed by **infectious diseases**.
- Yet, the **extant literature** has **not explored in depth** the **role of specific collaborations** - such as **PDPs** - aimed at new drug development.
- The **economic rationale of PDPs** rests on the **need to improve the economic incentives for the private initiative** in areas that have **low expected returns but high unmet need** (e.g., neglected tropical and emerging infectious diseases, and rare diseases).
- Thus, **PDPs arise as a potential solution** by creating partnerships that combine public and/or non-for-profit scientific institutions, including private investors.
- A partnership with public institutions and/or philanthropic funders means that the **risk of failure is spread** among collaborators, which lowers the **rate of return needed to attract private investment**.
- In this research, we examine the **impact of PDPs (legal entities, such as the Drugs for Neglected Diseases initiative)** on **stimulating pharmaceutical innovation**.

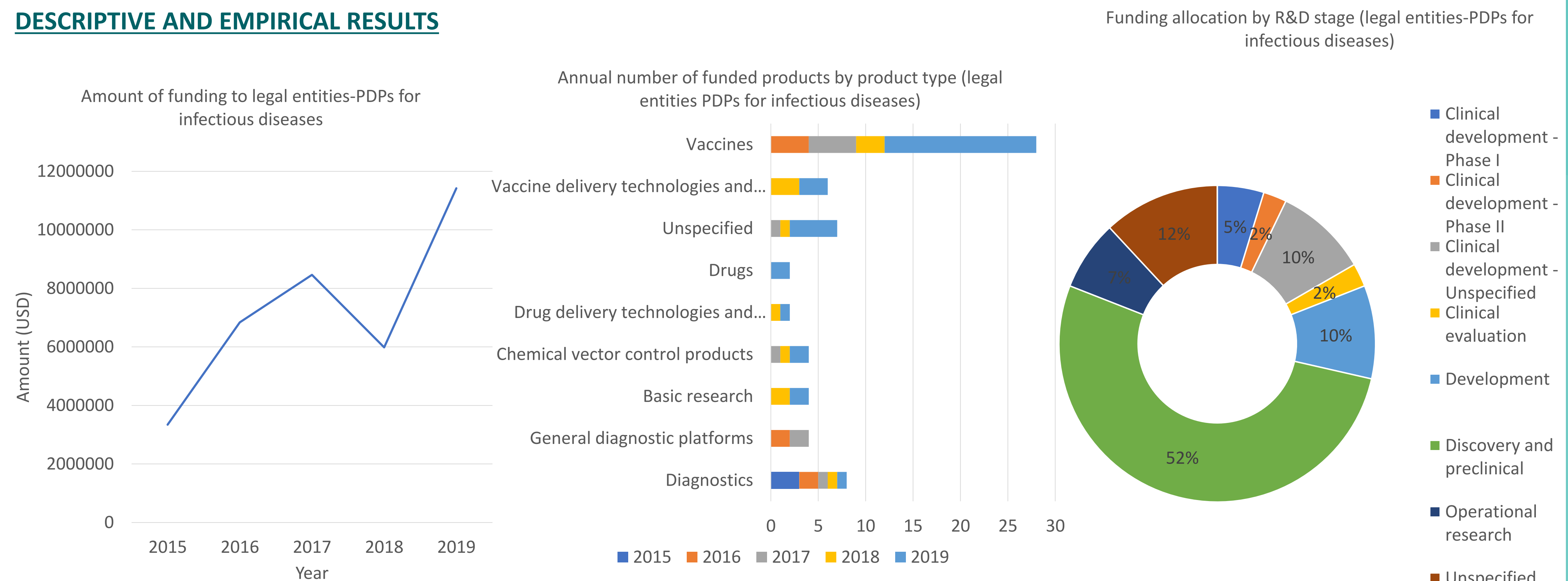
DATA AND METHODS

- We use the **G-Finder** and collect available data on legal PDPs for **infectious diseases** between 2015-2019.
- Additionally, we extract data from various other sources such as **PharmaIntelligence**, and **Pubmed** which include approval outcomes of new products and the scientific knowledge around the sub-disease area that the product aims to treat, respectively.
- We conduct a simple **OLS analyses** conditioned by data availability – that explores the relationship between the likelihood of approval of a product funded by a PDP and the type of PDP, controlling for **product and disease characteristics**, as suggested by relevant literature.

Legal entities- PDPs regression:

- $Likelihood\ of\ approval_i = \beta_0 + \beta_1 \ln R\&D_i + \beta_2 FunderType_i + \beta_3 DevStage_i + \beta_4 ProductType_i + \beta_5 Subdisease + \beta_6 Science_i + \beta_7 Prevalence_i + \beta_8 R\&D * FunderType + \beta_9 R\&D * DevStage + \varepsilon_i$

DESCRIPTIVE AND EMPIRICAL RESULTS



PDPs (legal entities) and product and disease characteristics	Type of relationship with likelihood of approval
Amount of R&D funding	+
Funder type: gov, philanthropic, S&T and multilateral agencies	+
Stage: discovery and pre-clinical	-
Product type: diagnostic platforms	+
Infectious sub-disease area	-
Science	-
R&D*Funder type (gov, philanthropic, S&T and multilateral agencies)	-
R&D*Development stage (discovery and pre-clinical)	+
Prevalence	+

DISCUSSION

- Results indicate that **non-private funding** is especially **beneficial in the early stages of drug development**.
- An **increase of the R&D levels** across different development stages facilitates successful product development.
- **Products in the early development stages are less likely to be approved**.
- Specific **funder and product types** are especially important for the **success of products funded by PDPs**.
- **PDPs including public sector R&D funds** are more common in **products with lower chances of being approved**.
- The lower the **scientific advances in sub-disease areas of infectious diseases are**, the **less likely a product is to be successful**.
- Overall, the implementation of **push policies and product focused policies in legal entities PDPs** is important for facilitating innovation.