Supplementary Materials

Supplementary Table 1. Six examples of different levels of disclosure from discontinued R&D efforts

Company (Date of Discontinuation)	**Drug and Indication**	**Reasons for Discontinuation (Direct Quotes from the Public Release)**	**Intent to Disclose Trial Results Based on Initial Public Release**	**Status of Results Disclosure[a] (Jul 19, 2021)**
PhaseBio[b] (Oct 23, 2020)	Drug: pemziviptadil Indication: COVID-19 patients at high risk for rapid clinical deterioration	"VANGARD trial discontinued due to evolving COVID-19 treatment landscape, recent feedback from FDA regarding regulatory and development path, and interim analysis of trial data"	Unclear	Not available
Merck[c] (Jan 25, 2021)	Drug: V590 V591 Indication: COVID Vaccine	"This decision follows Merck's review of findings from Phase 1 clinical studies for the vaccines. In these studies, both V590 and V591 were generally well tolerated, but the immune responses were inferior to those seen following natural infection and those reported for other SARS-CoV-2/COVID-19 vaccines."	Yes "Merck and its collaborators plan to submit the results of the Phase 1 studies for V590 and V591 for publication in a peer-reviewed journal."	Not available

[a] We conducted a rapid, targeted literature search using PubMed, ClinicalTrial.gov, and Google search engines. Thus, it is possible that we missed publications from other sources such as conference presentations.

[b] URL - https://investors.phasebio.com/node/7706/pdf

[c] URL - https://www.merck.com/news/merck-discontinues-development-of-sars-cov-2-covid-19-vaccine-candidates-continues-development-of-two-investigational-therapeutic-candidates/

Merck[d] (Jan 20, 2021)	Drug: bintrafusp alfa Indication: Stage IV non-small cell lung cancer that have high expression of PD-L1	"the Independent Data Monitoring Committee recommended on January 19, 2021 to discontinue the clinical trial. Based on this recommendation, Merck KGaA, Darmstadt, Germany has made the decision to discontinue the clinical trial, as the study is unlikely to meet the co-primary endpoint, specifically progression-free survival."	Unclear	Not available
Takeda & Zinfandel Pharmaceuticals Inc. [e] (Jan 25, 2018)	Drug: pioglitazone Indication: cognitively normal individuals projected to be at high risk of mild cognitive impairment due to Alzheimer's disease	"The decision to discontinue the trial was based on a planned interim futility analysis, which showed an inadequate treatment effect with the investigational drug pioglitazone 0.8 mg SR in delaying the onset of mild cognitive impairment (MCI) due to Alzheimer's disease (AD). This decision was not related to safety of the investigational product or study procedures."	Yes "Results from the TOMMORROW trial will be presented at a future scientific meeting and efforts will be made to share the primary data with the scientific community."	Yes
Janssen[f] (Sep 2, 2020)	Drug: pimodivir	"This decision is based on recent results from pre-planned interim analyses of the pimodivir Phase 3 trial in hospitalized patients with influenza A, that found	Unclear	Yes

[d] URL - https://www.biospace.com/article/merck-kgaa-discontinues-trial-of-cancer-drug-co-developed-with-gsk/
https://www.emdgroup.com/en/news/bintrafusp-alfa-037-update-20-01-2021.html

[e] URL - https://www.takeda.com/newsroom/newsreleases/2018/takeda-tommorrow-trial/

[f] URL - https://johnsonandjohnson.gcs-web.com/static-files/e175eddf-f6a7-47dd-9f72-34d25f69d13e

	Indication: Hospitalized Participants with Influenza A Infection	pimodivir in combination with the standard of care (SOC) was very unlikely to demonstrate added benefit in hospitalized patients with influenza A compared to SOC treatment alone."		
Novartis, Amgen, and Banner Alzheimer's Institute[g] (Jul 11, 2019)	Drug: umibecestat Indication: prevent or delay the onset of Alzheimer's in people at high risk for development symptoms based on their age and genetic status	"An assessment of unblinded data during a regular pre-planned review identified worsening in some measures of cognitive function. Given these findings, the sponsors concluded that the potential benefit for participants in the studies did not outweigh the risk."	Yes	Yes

[g] URL - https://www.novartis.com/news/media-releases/novartis-amgen-and-banner-alzheimers-institute-discontinue-clinical-program-bace-inhibitor-cnp520-alzheimers-prevention

Supplementary Table 2. Literature Search Strategy and Results (MEDLINE)

Set #	Searched for	Results
1	((failed) OR (failure)) AND ((r&d) OR (innovation)) AND ((pharmaceutical) OR (drug)) AND ((spillover) OR (learning))	220
2	((economics[MeSH Terms]) OR (efficiency[MeSH Terms]) OR (drug industry[MeSH Terms]) OR (competition, economic[MeSH Terms]))	682,855
3	S1 and S2	17
4[h]	Number of relevant articles (from Set 3)	0

Supplementary Table 3. Literature Search Strategy and Results (IDEAS)

Set #	Searched for	Results
1[i]	((failed) OR (failure)) AND ((r&d) OR (innovation)) AND ((pharmaceutical) OR (drug)) AND ((spillover) OR (learning))	6
2[g]	Number of relevant articles (from Set 1)	2[j]

[h] We reviewed the articles identified from the step above to determine whether they are relevant to the research question of interest.
[i] IDEAS is the largest bibliographic database dedicated to economics, and the MeSH terms were not used in this search.
[j] Chiou et al. (2012) and Chiou et al. (2016) were the two articles identified and included.