

The significance of academia-industry interaction in translational research: a survey of over 200 UK PIs receiving industry funding.

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Introduction

- The first gene therapy was administered to a human patient over 25 years ago¹
- Recent clinical success in several diseases and the approval of Glybera (UniQure) in 2012 have heralded a new wave of investment from the private sector, and the formation of several high profile academia-industry collaborations^{2,3,4}
- As the frequency of such interactions increase, understanding the role of industry in the development of academic discoveries is increasingly important.
- The University of Oxford received more than 20% of total industry funding awarded to all UK universities between 2008-13⁵, more than any other UK university.

Aim: To understand the characteristics of academia-industry interaction at the University of Oxford, in terms of the type of interaction, phase of clinical development, and key barriers to collaboration.

Results

- Response rates to the survey exceeded 77%.
- 80% of respondents have a professorial title, 37% hold both MD and PhDs, and 75% were male.
- 86% of respondents agree that universities should strive to increase and encourage collaboration with industry.

Figure 1. Barriers to Collaboration

Barriers are factors that prevent, disrupt, or delay collaboration between academia and industry. Figure 1 shows how a list of 17 different barriers identified by the literature were ranked by academics who have received industry funding.

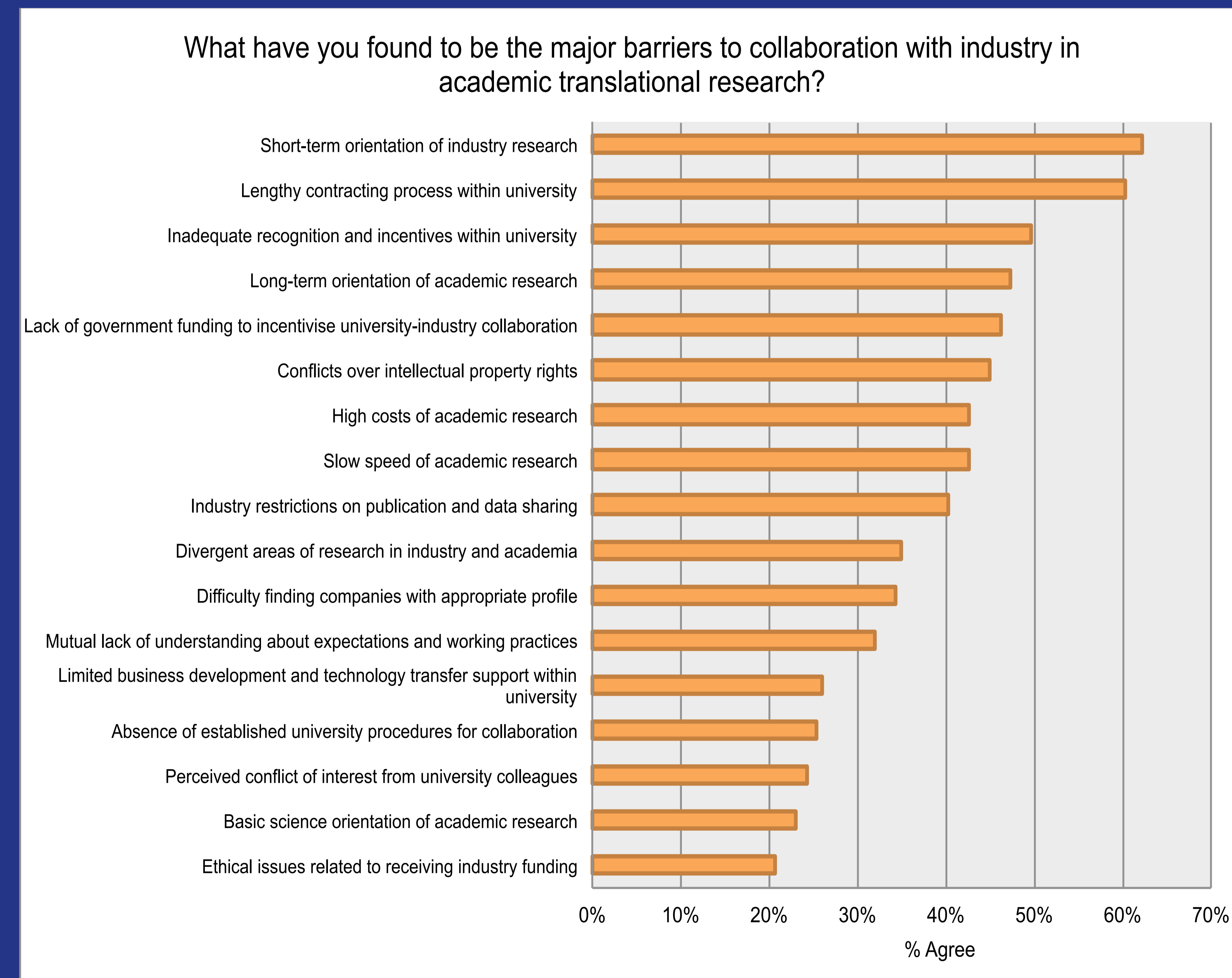


Figure 1. Ranking of barriers to collaboration

- Short-term orientation of industry research and lengthy contracting processes were identified at the most significant barriers to collaboration.
- Ethical issues and conflicts of interest were seen as less significant barriers to collaboration.

Methods

- The University of Oxford was selected as a crucial case study to understand characteristics of industrial collaboration in translational medicine.
- A list of PIs who have received industry funding in translational medicine was compiled from data submitted to the Higher Education Statistics Agency (HESA) and assessed for inclusion criteria.
- A survey instrument to assess the experiences of these PIs was designed, validated and piloted, encompassing both closed and open-ended questions.
- A literature review revealed the primary barriers to collaboration in engineering and aerospace fields. These barriers were assessed by academics to quantify their presence in translational medicine.
- Survey results were statistically analysed using SPSS software, and qualitative data from open-ended questions were analysed thematically using NVivo.
- Participants were invited to participate in semi-structured interviews to add further detail to points of interest.

This project was approved by the Central University Research Ethics Committee (ref: SSD/CUREC1A/14-220).

Figure 2. Types of Interaction

The type of funding represents the goal or purpose of the collaboration as defined by D'Este et al. It comprises 6 different types of interaction, as seen in Figure 2.

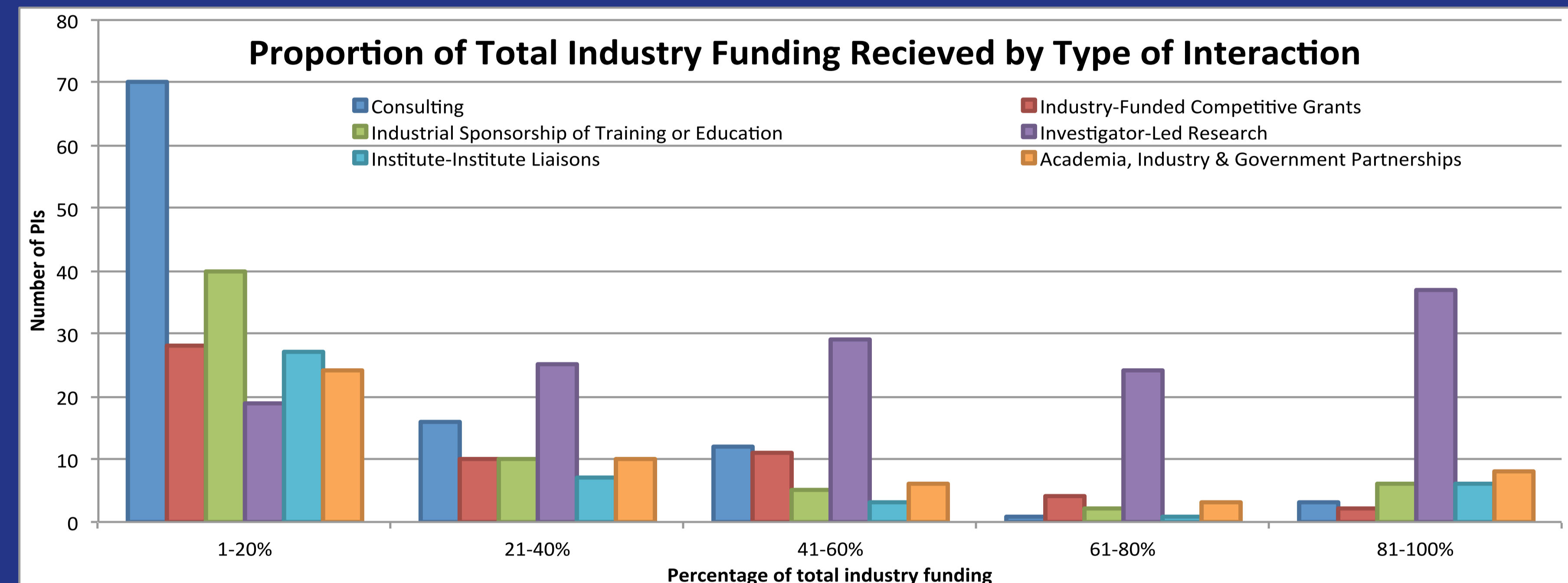


Figure 2. Distribution of industrial interaction by type.

- 60% of PIs receiving industry funding engage in consulting activities (dark blue bar). Of these, income for consulting comprises 20% or less of total industry funding for 69% of PIs. This shows that while many PIs do receive funds for consulting, many of them are engaged in other interactions with industry.
- Industry funding of investigator-led research (purple) is the most common type of interaction, with 80% of PIs involved in this type of activity. Of those engaging in this interaction, it makes up 81-100% of total industry funding for 28% of PIs.

Figures 3. & 4. Phase of Translation

The phase of research is indicative of how translationally developed or close to the clinic it is. As detailed by Waldman & Terzic, this was divided into 6 translational phases (Figure 4). For the purpose of this analysis, T0 research is defined as the 'pre-clinical' stage, involving the discovery and description of targets, biomarkers, genes and mechanisms, and T1-5 represent clinical and post-clinical research. The distribution of funding across translational phases is outlined in Figure 3.

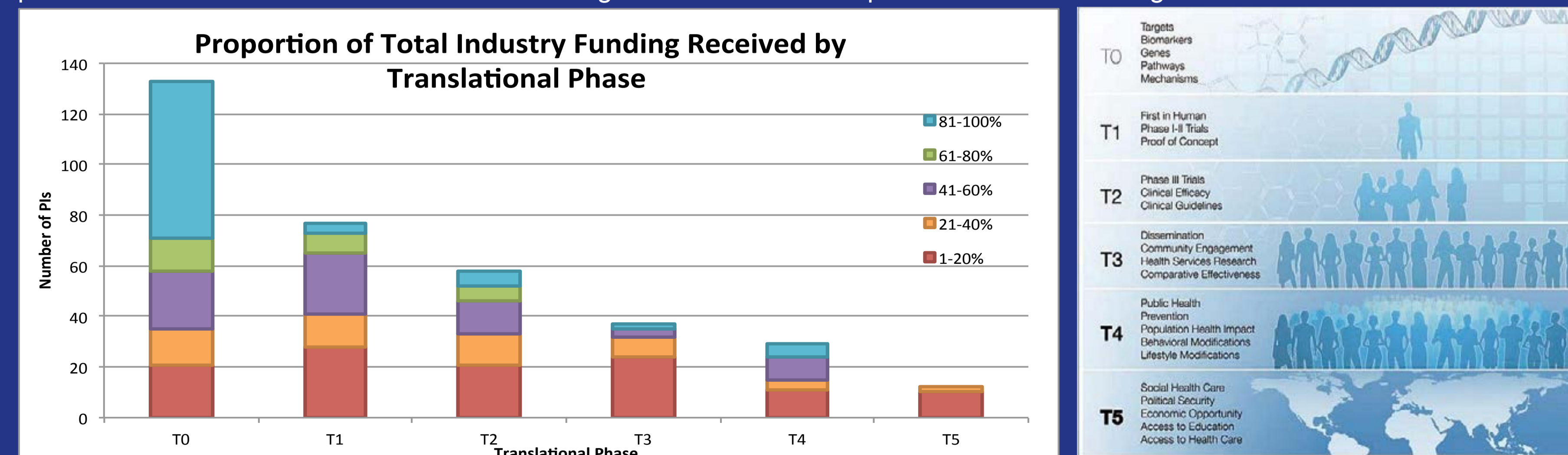


Figure 3. Distribution of industrial interaction by phase.

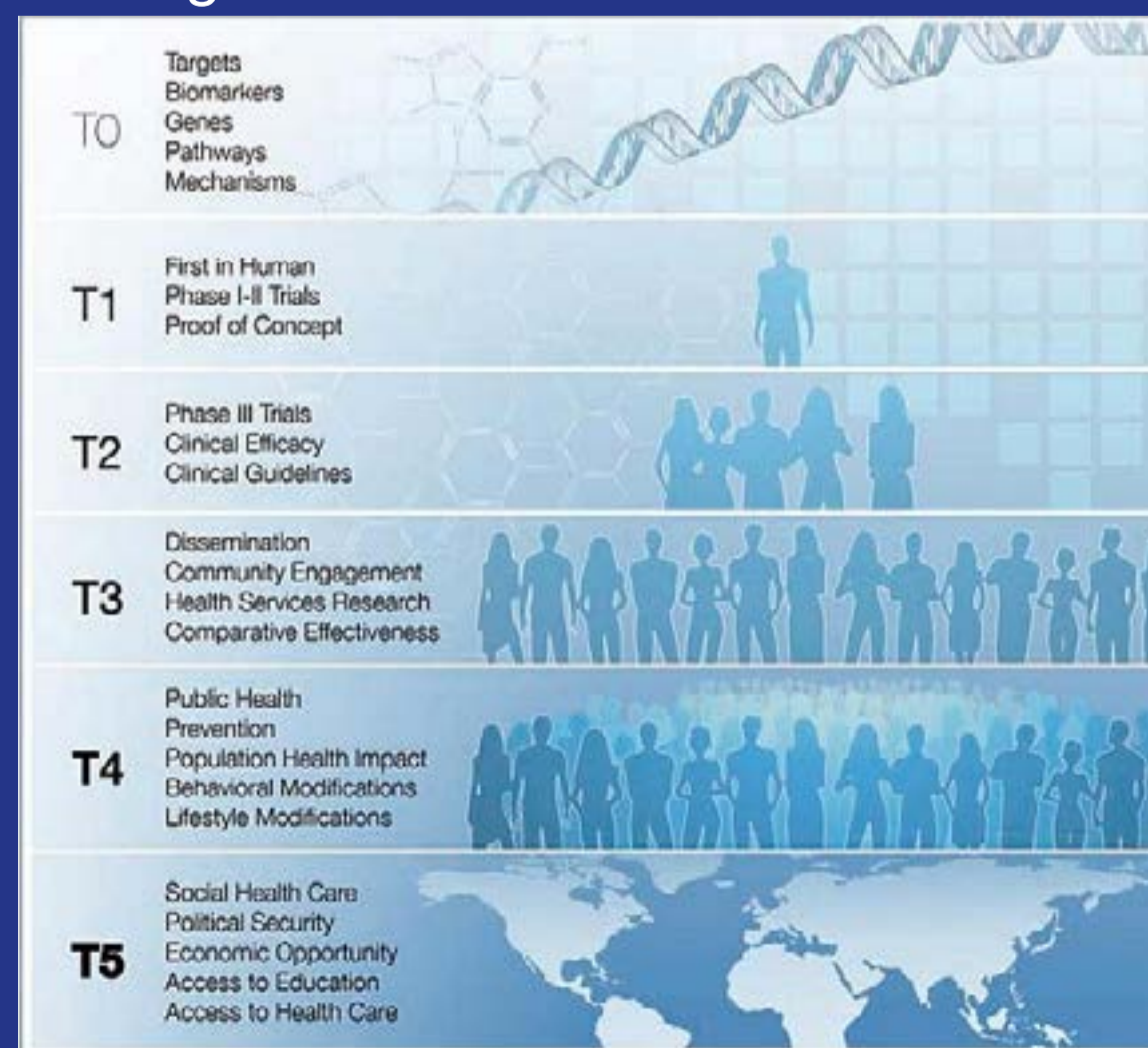


Figure 4. Translational Phases by Waldman & Terzic.

- The majority (79%) of PIs receive some funding for T0 research, making it the most commonly funded translational phase. Of those funding, it comprises 81-100% of total industry funding for 47% PIs.
- As research progresses through the translational process, the incidence of industry funding decreases.

Conclusions

- Short-term industry research and extended contracting process were the most significant barriers to collaboration.
- The most common type of interaction funded by industry is investigator-led research, with many academics also receiving funds for consultancy, although this generally makes up a smaller proportion of total industry funding received.
- Most PIs receive some funding for pre-clinical or early phase clinical research.
- There are fewer incidences of industry funding in later phases of translation, and very few PIs received all of their industry funding for research in these phases - only 4% of PIs received 100% funding for T3, T4 and T5 combined.

Discussion

- This crucial case study provides an insight into the nature of academia-industry interaction at the University of Oxford.
- The key barriers that identified concern mismatches in the expected timing of both groups (i.e. short term industry focus and long contracting processes). Interviews indicate that these issues can be encountered together, i.e. a short 'window' of interest from industry is further aggravated by lengthy contracting processes, although further work is needed to identify links between barriers.
- The high incidence of consulting as low percentage of total industry income indicates that it may be a 'gateway' activity that leads to further industry funding. This may be because academics who consult have an insight into the culture and practices of industry, in addition to forming the contacts required for future collaboration.
- Most academic funded industry research is at the T0 stage of development. This is surprising, because the potential return on investment for this type of research is many years away. This conflicts with the expectation that industry fund research that is close to the clinic, and where they can make a quick return. This may be because academics working in T0 are doing work that contributes to enabling technologies, such as target and biomarker identification or assay development.
- Further work is needed in this area to understand the reasons behind these trends.

Future Plans

- Conduct semi-structured interviews with academics and industrialists in gene therapy to identify key themes.
- Identify how developed academic work needs to be to warrant industry interest and investment.
- Explore how investment from industry impacts the development of a novel field.
- Develop strategies and test strategies to improve or increase collaboration in novel technologies or disease areas.

How you can help

I am looking for academics and industrialists to interview at ASGCT and via skype at later dates. No previous experience of collaboration is required. If you would be willing to participate please contact natasha.davie@ndcls.ox.ac.uk to arrange a 30 minute interview. Thank you!

References

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⁵Available online with registration at <https://heidi.hesa.ac.uk/>
⁶Waldman & Terzic. Clinical and translational science: from bench-bedside to global village. *Clin Trans Sci* (2010)

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