Opinion

EMBO reports

Generation precarious

Frank Gannon*

They were among the best at High School. They got top marks in their science studies at university. They moved on to a PhD. Their first meeting poster was presented. Their first paper was accepted. They moved on for a postdoc at a laboratory that matched their interests and ambitions. More papers, more conferences, some honours students under their charge reflect their advance towards a professional research career. They started to apply for grants and get near misses. They started to apply for independent positions and found that they were losing out to others with their own funds. They eventually consider a shift from research-only to research and teaching but cannot find open positions. Their personal life now includes a family. But these joys are anchors that restrict their movement. They see how former classmates are enjoying a proper work–life balance while they sacrifice everything in the hope that they will finally get into the orbit they desire. COVID gave time for unaccustomed reflection: What is life really about? The change in routine that came from laboratories being closed broke a previously unquestioned pattern of behaviour.

They are generation precarious: they joined the world of scientific research with boundless enthusiasm and optimism and now realise that science is an insecure, poorly paid, insanely competitive job that demands sacrificing most of their lives in order to have a tiny chance to succeed. They eventually change their perspectives and ambitions, and another highly trained and motivated researcher leaves.

In Australia, where I live, I have witnessed this scenario many times. Success rates of 10% or less in the national funding schemes are routine. The Medical Research Future Fund (MRFF) recently announced the outcome of their special initiative to better support early to midcareer researchers: the success rate was a staggering 5.7%. Twenty-three lucky winners (one per million of the population) mean another 405 who remain generation precarious. The EU, with great fanfare, announced a 10 million Euro programme to support young scientists—out of the multiple-billion Horizon budget. At the same time, the EU noted that up to 90% of researchers have no social security or benefits in some countries. In California, students have gone on strike demanding more pay and better working conditions (Heidt, 2023).

Back in 1999, Max Perutz, who won the Nobel Prize for solving the 3D structure of myoglobin and who infrequently engaged in science policy, asked the question "Will biomedicine outgrow support?" (Perutz, 1999). He looked at the increasing numbers of scientists, the equally increasing costs to support them and the amount of funds likely to be available; not surprisingly, he found a growing gap between the supply of researchers and the demand as reflected in funding. This supply/demand ratio has even more deteriorated since and it is in dire need of attention in the interest of generation precarious.

Of course, the easiest solution is to ensure that young researchers are made aware of other career options beyond the role model of the head of laboratory where they work. Indeed, there is a rich variety of options open to bright, well-trained researchers. But the disappointment of not being able to reach their primary goal of running their own laboratory and pursuing their passion is palpable.

Going back to the unemotional concept of supply and demand, there may be some lessons to learn. Instead of focussing on the supply side—the limited amount of public funding—it could be looked at in the reverse sense: that researchers are in excessive supply. A corollary is that pay and working conditions remain poor. Job satisfaction can compensate but as uncertainty grows and as adult life realities such as children and mortgages come into play, that satisfaction quickly erodes.

Unlike some courses, notably medicine, universities generally do not limit the number of science students other than for practical reasons such as space. The selection system is based on merit, and everyone who reaches the required levels of performance can move on to the next career stage. Getting a place in a laboratory is defined by the availability of funds for new graduate students rather than any concerns about what will become of them after their thesis. Some laboratories, aware that they have excellent cheap labour, even do not encourage submission of the thesis until it becomes unavoidable. Frequently, the proud new PhD has to prolong their time in the laboratory to "finish some papers." A move to a postdoctoral position is merely a repeat of this process. There is the same lack of concern about the newly recruited lab member's career goals. Rarely are the discussions with the PI about matters other than the next paper and the ongoing work. The benefit of having an ambitious postdoc is all that counts.

There appears to be a similar lack of strategic thinking on the demand side. When/if governments reflect on why they spend tax money for research and development, they see this as a necessary investment to encourage industries to invest twice that amount. They may be aware that the Gross Expenditure on R&D appears on tables related to innovation and technical sophistication and nobody wants to be at the bottom. They know that a skilled workforce is an essential factor to attract businesses and industries and governments need good employment figures. But governments are unlikely to interfere with education and investigator-driven research and are equally unmoved by

QIMR Berghofer Medical Research Institute, Brisbane, QLD, Australia
*Corresponding author. E-mail: fgannon@qimrberghofer.edu.au
Frank Gannon is a regular columnist for *EMBO reports*
DOI 10.15252/embr.202357436 | EMBO Reports (2023) 24: e57436 | Published online 15 May 2023

the frustration of generation precarious who find the career pipeline blocked. And yet, the system works well, at least for the government. Diverse skills are available—see how quickly virologists, immunologists and PCR experts were found when COVID visited—industries invest and there are no votes lost in ignoring the problems of this small fraction of the population.

All of this demands a better balance of the supply/demand equation. It might eventually correct itself when the sorry fate of the vast majority of scientists who did not succeed in academic research becomes more widely known and the number of aspiring researchers shrinks. More money for science —at a realistic level—is crucially needed to guarantee the future of quality research. Group leaders should take their responsibilities to their staff more seriously. Mentoring by colleagues other than the principal investigator who has a vested interest should become standard. Finally, the essential work of the whole research team behind a good paper should be celebrated rather than some being dismissed as merely a middle author.

None of these suggestions are new. But the social context has changed: work/life balance, job security and career progression are being debated as work choices are made. Research gets low points on all of those criteria. As a consequence, the situation of an ever-increasing number of young scientists becomes increasingly precarious and with it the urgency to improve the system of academic research. If we continue with business as usual, science will see a major brain drain as the best and the brightest will go elsewhere.

Disclosure and competing interests statement

The author declares that he has no conflict of interest.

References

Heidt A (2023) Europe pumps €10 million into effort to combat brain drain. *Sci Business* https://doi.org/10.1038/d41586-023-00527-x

Perutz M (1999) Will biomedicine outgrow support? *Nature* 399: 299 – 301

