More than 80 years ago, a now famous scientist, Alexander Fleming, discovered penicillin, the first known antibiotic. This discovery has undoubtedly saved millions of lives and is just one example of how an advance in our understanding of how things in nature work can deliver enormous benefits to the human race.

Many people think that science and medicine now understand most of what can be understood, but this is incorrect. In fact, although it is difficult to estimate, it is probably closer to say that, if all the oceans represented the scale of a complete understanding of how all biology works, we may now have reached a level of understanding represented by the volume of a small bay.

Does this matter? It matters in all kinds of ways.

Usually, those who set the priorities for where money is invested in research do not come from a science or research background and tend to view the world through a business-type lens. They expect to see a measurable “output” for a short term investment. If one is not immediately visible, they regard it as a bad investment.

In the realm of medicine, a desirable output is something recognisable that can be immediately applied to improve patient treatment. For this reason, it has become increasingly popular to support “applied research”, meaning projects for which there is a short-term visible outcome that can (in theory) be put into practice soon after the project is completed.

There is of course high value in many of these projects, which can build upon what is already known and achieve important and substantial practical benefits. It is less likely, however, that the short-term focus of applied research will lead to quantum advances that will underpin major leaps forward in science, medicine and technology.

For example, there are two very nasty and increasingly well-known diseases in our ageing population - Alzheimer’s disease and motor neurone disease. Both are neurodegenerative conditions which are often fatal and which significantly diminish the quality of life of many individuals.

The cost of these diseases, both financially and emotionally, is devastating. Neither disease currently has an effective treatment, let alone prevention. This is because we are yet to understand, in sufficient detail, the underlying causes of these diseases.

At the Illawarra Health and Medical Research Institute, located on the University of Wollongong campus, studies are currently underway to understand the causes. Without an understanding of the cellular and molecular processes that directly lead to these diseases, how can we ever design an effective treatment to stop them?
Fleming saw that something released by a mould could kill bacteria. From that simple observation arose a range of antibiotics that defend us against bacterial infections to this day. Without being able to “see” what initiates and progresses diseases, such as those mentioned above, we will never know what to target and any drug discovery will be completely by chance.

Can we afford to wait that long?

This is the crux of the argument. Basic research is not about fine tuning an existing treatment or optimising anything we already do. It is about discovering, for the very first time, the processes that cause disease. From this, we can see a clear path towards developing a treatment that will actually stop the disease rather than just lessening the symptoms and perhaps extending a poor-quality life.

Basic research is called basic not because it is simple, but because it is what everything else is built upon. Without it, there will be no big advances in the years to come.

It is vital that the community support and understand the need to fund basic research in order to ensure those enormous benefits are realised.

*Professor Mark Wilson is a Research Director at the Illawarra Health and Medical Research Institute and Associate Dean Research (Science) at the University of Wollongong.*