Working in vaccines, a primer

Considering a career in vaccines? Novartis Vaccines & Diagnostics' medical director provides a run-down of the top issues in this exciting field.

by Dr Chris Worth

Vaccines are a very exciting area to be working in - now more than ever. In fact, according to the Communicable Disease Center in Atlanta: "Vaccines are hailed as one of the most important public health achievements of the 20th century."

There are emerging vaccines for infectious diseases, therapeutic vaccines, different age groups to be targeted and different forms of administration. So what are the main developments in vaccines today?

From a public health point of view, vaccines are used to prevent something - most usually the occurrence of an infectious disease. Vaccines have been used in this way for over 200 years. In fact, almost everyone living today in the UK has been vaccinated against something, most probably in our childhood.

For travel, an increasing number of vaccines are recommended or obligatory. In recent years, the huge increase in world travel has led to more people having vaccinations before - and after - departure.

Although, the use of vaccines has increased, as yet there is still not a vaccine for every infectious disease. For example, mass killers such as malaria and HIV still don't have a vaccine to treat them. The pharmaceutical industry is striving to change this.

Therapeutic vaccines

In recent times, a newer strand has emerged - therapeutic vaccines. Some vaccine companies are working on early development trials to produce vaccines to immunise against certain forms of current diseases, for example, some cancers, Alzheimer's disease and diabetes. It will only be a few years before the first successful vaccines start to filter through in some of these therapy areas, making this a very exciting opportunity - both scientifically and for patient public health.

The global perspective on infectious diseases is that they are still major killers. Preventing these through mass vaccination is a medical and ethical issue and many vaccine companies are making significant product contributions to developing countries.

Administering vaccines

Work has also progressed in broadening the way vaccines are administered. No longer are they always given as an intramuscular 'jab'. Companies are now looking at other forms of administration such as intranasal, oral, aerosols, transdermal and subcutaneous.

A key driver in this is finding the most convenient and effective way to receive a vaccine. Although giving a ‘jab’ has been traditionally convenient and routine, it is not always popular with younger patients (or their parents) resulting in a lower than desirable uptake. Work is underway to address this.

Wider age range
The age range is broadening in terms of ‘target populations’ receiving vaccines. In the UK, a range of vaccines is given automatically to children and also to the elderly who receive annual free flu jabs. Now other age groups are being targeted. For example, from September the Human Papilloma Virus (HPV) vaccine has been offered to girls in their mid to late teens to prevent cervical cancer, in the process generating much debate.

Adolescents will increasingly be eligible for other vaccines - including Meningitis C. Although the MenC vaccine has been part of the routine childhood immunisation programme since 1999, young adults 20-24 are still at risk and encouraged to come forward. Undoubtedly, over the next few years we will see significant developments in terms of target populations for vaccines, as new vaccines are launched.

Supply and demand
There is, however, an issue over the availability of vaccines to meet demand. Despite all the warnings, the vaccine for pandemic flu, for example, could not be produced in the quantities required within the 6-9 months after a pandemic virus spreads. Even when a vaccine is produced and rushed through the regulatory process, there is no way there will be sufficient supply to meet global demand. In fact, there is no way that the current vaccine producers could cover the requirements in Europe, let alone globally.

There is still a great deal to be done with vaccine production and availability. Companies should increase and spread production, as supplies for some vaccines are simply inadequate.

Cost-benefit analysis
Cost is also an issue in terms of international health policy. Governments can take a preventative health approach, but are they happy to treat the results of not providing vaccinations? The preventative approach is not free, and development work also has to be paid for.

Safety issues
As the use of vaccines increases, safety has become an important issue. For example, it took several years for the safety scare over the measles, mumps and rubella (MMR) vaccination to be disproved and parents’ fears to be eased. Safety fears are also fuelled by anti-vaccine groups, arguing that there are hidden dangers in some vaccines which can be more serious that contracting the disease in the first place.

As a result, some parents have chosen to opt out of the social contract for their child to be vaccinated. There is a negligible risk of succumbing to the danger of the disease, but pockets of intentionally unvaccinated children can provide a potential

breeding ground. This could lead to a comeback for diseases such as measles, mumps and whooping cough, even in advanced countries with well-developed public health programmes.

Co-ordinated strategy

Governments all over the world are working to maintain public health and they have an important role to play with industry to establish which disease areas - infectious or therapeutic - should be addressed. To date most developmental work has been in the area of vaccines to combat infectious diseases. As the industry moves more into the therapeutic arena, it is not clear why some specific disease areas are being targeted, rather than others. Some argue that the profit perspective might be the primary driver rather than, perhaps, meeting public health disease targets.

All vaccine and pharmaceutical companies have to spend several years undertaking developmental work to reach a licensed product or vaccine. If Government and industry start to think and plan in a co-ordinated and joined up way, the next generation may see the benefits with major areas such as diabetes and Alzheimer's disease being tackled through alternative and innovative vaccine approaches.

Dr Chris Worth is UK & Ireland Medical Director at **Novartis Vaccines & Diagnostics** and this article was produced in association with Harten Group. For more information, go to **www.hartengroup.co.uk**