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PRESS RELEASE: CHASING THE PERFECT STORM: HOW NHS SCIENTISTS ARE CATCHING UP WITH THE FLU

How biomedical science is used to create vaccines to combat the Aussie flu

Flu season comes around every year, but beyond that it is notoriously hard to predict.

There is a multitude of factors at play, from the strains in circulation, to the efficacy and coverage of immunisations - even the weather plays a part.

Some years the 'perfect storm' of flu factors comes together.

So far hospitalisations and deaths from flu are higher than what's typical for this time of year, with a significant surge in the first part of 2018.

The latest figures from Public Health England show a total of 1,938 hospitalised confirmed influenza admissions across the country this winter – more than one in five of which was the A(H3N2) strain – dubbed Aussie flu after it fuelled the country's worst flu season in two decades.

The other prevalent A strain is H1N1, as well as influenza B, which has accounted for the majority of the hospitalisations this season.

The ever-changing virus

Each year vaccines are created based on the strains in circulation the previous season – but influenza is hard to pin down.

The flu's illusive nature lies with the process of antigenic drift - small changes which occur in the genome of influenza viruses as they are replicated inside a carrier's cells.

These tiny genetic mutations accumulate over time and result in viruses that are slightly different - which is why you can catch the flu more than once, and why the composition of the flu vaccine is updated every year to keep up.

Dr Sarah Pitt Chief Examiner on the Virology Advisory Panel at the Institute of Biomedical Science (IBMS) and a Principal Lecturer at Brighton University explains: 'It takes about six months to develop the vaccine, and in the meantime the virus has trotted off for winter somewhere in the southern hemisphere – Australia for example - and while it's there it's undergoing slight little mutations.

'Aussie flu is the same strain that was around last year and it is included in the vaccine, but it is that little bit more virulent, so the elderly and people with impaired immunes systems are more vulnerable - it's a bit more dangerous.

‘The vaccine we are using now was developed for whatever the prevalent strains were like last winter, but it has come back to us a little bit different to the exact strain we are protected against, so the vaccine is less effective. The vaccine is normally between 40% and 60% effective, but against Aussie flu it’s probably 40% or less.’

Trying to catch the flu

So how do we keep tabs on this ever-changing adversary? It’s up to NHS biomedical scientists analysing swabs from patients who end up in hospital, or those that come through GP sentinel swabbing schemes.

‘We will test to determine if it is flu A or B, and in some situations, we will do a full sequence of the genome to determine the exact strain. If there are any changes to the sequence compared to the previous sequence we would see them.

‘These lab tests are really important and give us valuable data, so it is so important to make sure the service is there, and there are enough staff to do it.

‘When we were dealing with swine flu in 2009 for example, we were running 24-hour shifts – the labs were open all the time we were testing so many samples.

‘The information we get not only helps determine the type of antiviral treatment a patient might get, but is also collated centrally by The Respiratory Virus Unit at Public Health England.

‘This surveillance and collating of all the strains is how we keep tabs on the flu and where we get the information for next year’s vaccine.’

Flu Facts

As well as antigenic drift, there is another process which can occur in A strains of influenza called antigenic shift. This occurs when more than one strain of the flu is present in the same carrier, in the same cell, and during replication their genetic material mixes – resulting in a new subtype of the virus. The new combination is more dangerous because most people have little or no protection against it. This is what happened with Swine flu in 2009, resulting in a global pandemic.

Type A viruses undergo both kinds of changes; influenza type B viruses change only by the more gradual process of antigenic drift.

Type B viruses are only found in humans. They are not classified by subtype and they do not cause pandemics – although they can still make you extremely ill.

There is also type C influenza, but is it usually very mild.

ENDS

About the Institute of Biomedical Science (IBMS)

The Institute of Biomedical Science is the leading professional body for biomedical scientists, support staff and students. For over 100 years we have been dedicated to the promotion, development and delivery of excellence in biomedical science within all aspects of healthcare, and providing the highest standards of service to patients and the public.

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For more information visit the IBMS website.

Our profession

The term 'Biomedical Scientist' is a legally protected title. Anyone using the title must meet Health & Care Professions Council (HCPC) standards and be HCPC registered to protect public safety.

Biomedical scientists mostly work in healthcare laboratories, they diagnose diseases and evaluate the effectiveness of treatment by analysing fluids and tissue samples from patients. In the UK alone, healthcare laboratories are involved in over 70% of diagnoses in the NHS, handling over 150 million samples every year.