Oxford vaccine group statement on Aluminum (spring 2017):  

Aluminium (an adjuvant)  
Many vaccines contain aluminium salts such as aluminium hydroxide, aluminium phosphate or potassium aluminium sulphate. They act as adjuvants, strengthening and lengthening the immune response to the vaccine. Aluminium salts slow down the release of the active ingredient from the vaccine once it is injected, and stimulate the immune system to respond to the vaccine. They also absorb protein well, and stop the proteins in the vaccine sticking to the walls of a container during storage.  
The amount of aluminium present in vaccines is extremely small - less than 2 milligrams of the salts, and less than a milligram of actual aluminium. After vaccination there is a temporary increase in the amount of aluminium in the body, but this is not a lasting effect. The body gets rid of most of the aluminium in just a few days. There is no evidence that this causes any risk to babies and children. Aluminium is a very common metal in the environment, and it is also found naturally in breast milk, formula milk, some foods and drinking water. Small amounts therefore accumulate naturally in children's bodies. Two studies from 2002 and 2011 compared the impact of aluminium from diet and vaccines in infants. Both of these found that the total amount of aluminium absorbed from both sources is significantly less than the recommended safe maximum amount. Read the abstracts of these studies here (2002) and here (2011).  
Rarely, aluminium adjuvants may cause small itchy lumps (granulomas) to form at the injection site. A 2014 Swedish study found that this happened in a small number of children (fewer than 1 in 100) after vaccination with the 5-in-1 vaccine (Infanrix) and pneumococcal vaccine (Prevenar). Granulomas are not dangerous but can be irritating and last for months or even years. The study found that children with granulomas often developed an aluminium contact allergy. However, most children recovered from their symptoms.  
It is now considered that there is no relationship between aluminium and Alzheimer's disease. There is no evidence to suggest that exposure to aluminium increases the risk of dementia.  
Aluminium salts are found in these vaccines used in the UK:  
- 5-in-1 vaccines: Pediacel and Infanrix IPV+Hib  
- PCV (pneumococcal conjugate vaccine): Prevenar 13  
- Pre-school Booster vaccines: Repevax, Infanrix IPV and Boostrix-IPV  
- HPV vaccine: Gardasil  
- Teenage Booster vaccine: Revaxis  
- HepB vaccine: HBVaxPro  
- MenB vaccine: Bexsero  

The Children's Hospital of Philadelphia has a useful page which lists the actual amounts of aluminium found in vaccines used in the USA.