

# SCIENCE WORKS

## Pharmaceuticals

Have you taken any medicine recently? A spoonful of cough syrup, some antacid for an upset stomach, or a traditional herbal infusion? All liquid medicines are solutions. Usually the active ingredient in the medicine is the solute. The solvent is just there to keep the medicine well mixed, easy to measure, and easy to swallow (Figure 1).



**Figure 1** Children often find it easier to swallow medicine as a liquid than as a pill.

Until the early twentieth century, most medicines were made by pharmacists in their own shops. Now, big drug companies have taken over this role. These companies employ teams of doctors, pharmacists, chemical engineers, and lab technicians to develop and manufacture the medicines (Figure 2).



**Figure 2** The development team makes sure that it is easy to take the correct dose.

Many liquid medicines contain water as the solvent. Sometimes, however, an active ingredient does not dissolve well in water. In that case, a different solvent has to be used, such as ethanol. The pharmaceutical industry selects solvents very carefully. They must dissolve the active ingredient without changing it, and the solvent must not be harmful to the person taking the medicine.

Besides medicines that you take by mouth, you might have seen pharmaceuticals in liquid form that can be administered in other ways: by injection, as topical applications, in eye drops or ear drops, or through nasal sprays or inhalers. For example, creams and ointments like sunscreen are often made with oily solvents. These solvents help the active ingredients to stay on your skin longer than they would if the solvent were water.

The pharmaceutical industry and Health Canada closely monitor the components and concentrations of most pharmaceutical solutions. This assures us that the medicines are safe and effective.

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