basement of the Institute of Public Health, treating 16 000 wounded people in seven months. Currently East Mostar is served by a "container" field hospital in a storehouse on the edge of the city. "There are some changes in our minds and our hopes, but in reality not much," the director, Dr Imamović told me. The problem does not lie with the doctors themselves. "We have had a year of good cooperation between health workers on both sides. But in the middle are the check points and the police." Thus in spite of a European Union brokered agreement made a year ago, for freedom of movement of all health personnel, all the East Mostar staff had their identity cards confiscated one morning by the Croat police and have not been allowed back into West Mostar since. So they have only been able to visit the new centre for continuing medical education, established with international funding on the west side, in specially organised buses. "It has an excellent library and other facilities," Dr Imamović continued, "and today they are reopening it with a seminar on the use of electrocardiography in primary care, but our promised new identity cards have still not been issued, and we do not want to attend like prisoners. We would like the freedom to come and go as normal citizens."

There are other contentious issues, such as the billing by West Mostar for the treatment of citizens of East Mostar from the beginning of the war, including those interned. The issue remains unresolved. Imamović also points out the problem raised by the neutrality of some of the humanitarian agencies and the European Union. "There is a difference between the two sides, and if you are neutral in such a situation then you close your eyes and don't do the right thing. If money is given equally, we build a roof and they put in an elevator." The perception of bias is reinforced by the fact that most aid agencies, with the notable exception of War Child, have their main offices located in West Mostar because of the better facilities, in spite of the fact that most work is done in East Mostar.

But there are signs of hope. The mutual respect with which medical colleagues on both sides talked of each other was impressive. Women and children from East Mostar have had freedom of movement since the beginning of December, and Dr Vladimir Šimunović, head of the centre for continuing medical education, does not believe that access will be a problem for long. Mulabegović sees reunifying Mostar as "essential for the future of the federation and the Dayton agreement. If it does not work in Mostar then the whole European-American approach will fail." He hopes it will not. "The whole history of Bosnia is a history of three peoples. We have had hard wars before, and this is not the first time the Muslims have suffered genocide. But it is the future that is important. We must be together. It is our destiny even if it cannot be soon."

Individuals and institutions can help Bosnian doctors by donating up to date medical books and journals from any specialty published after 1990 to the Sarajevo University Medical Library appeal. For more information about what is needed and your nearest collection point please phone Pam Prior on 01803 654706 or Lynne Jones on 01223 301993.

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Statistics Notes

Logarithms

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This is the 16th in a series of occasional notes on medical statistics.

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Logarithms (or logs for short) are much used in statistics. We often analyse the logs of measurements rather than the measurements themselves, and some widely used methods of analysis, such as logistic and Cox regression, produce coefficients on a logarithmic scale. Here we shall give a brief summary of the properties of logarithms which make them so useful.

We shall start with logarithms to base 10. These are the common logarithms formerly widely used to do calculations for which we now use calculators and computers. The log to base 10 of a number a is b where $a=10^b$. We write $b=\log_{10}a$. Thus for example $\log_{10}(10)=1$, $\log_{10}(100)=2$, $\log_{10}(1000)=3$, $\log_{10}(10\,000)=4$, and so on. It is common to omit the brackets and write $\log_{10}a$, but we are using them for clarity.

If we multiply two numbers, the log of the product is the sum of their logs: $\log(ab)=\log(a)+\log(b)$. For example, $100\times1000=10^2\times10^3=10^{2+3}=10^5=100\,000$. Or in log terms: $\log_{10}(100\times1000)=\log_{10}(100)+\log_{10}(1000)=2+3=5$. Hence $100\times1000=10^5=100\,000$. It follows that any multiplicative relationship of the form $y=a\times b\times c\times d$ can be made additive by a log transformation: $\log(y)=\log(a)+\log(b)+\log(c)+\log(d)$. Likewise, the difference between two logs is the log of the ratio: $\log(a)-\log(b)=\log(a/b)$. As statistical methods cope with additive relationships much more easily than with multiplicative ones, logarithms have many uses. As we shall see in future Statistics Notes, working with the logarithms of data rather than the data themselves may have several advantages. Multiplicative relationships may become additive, skewed distributions may become symmetrical, and curves may become straight lines.

Most scientific calculators have a LOG key, which will give the logarithm of the number in the display. They usually have a 10^x key, too, which gives us the number of which the display is the logarithm. This is called the antilogarithm or antilog and is useful when dealing with the results of calculations on the log scale.

Many statistical computer programs do not use logs to base 10, but logs to the base e, called natural logarithms. Here $e=2{\cdot}7183\ldots$ is a mathematical constant, in much the same way that $\pi=3{\cdot}1412\ldots$. Mathematicians, and hence statisticians, almost always use logs to the base e because it simplifies many formulae. On a calculator this is usually given by the LN key, and the antilog by the e^x key. The numerical relation between logs to base e and base 10 is that $\log_{10}(e)\times\log_e(x)=\log_{10}(x)$. Natural logarithms are also written as $\ln(x)$, or often simply as $\log(x)$.

The base which is used for logarithms is a matter of convenience, depending only on the particular application. The base chosen affects the values of the logs themselves, but nothing else. Provided we use the correct antilog to return to the natural scale, it does not matter what base we use.