

I have compared 100 consecutive recordings from the PC with simultaneous recordings from a Shiller AT-6 electrocardiograph. All 12 leads were compared. Recordings with pacemaker complexes, atrial fibrillation, atrial fluttering, and second and third degree atrioventricular block were excluded. The recordings were made at 50 m/s and 10 mm/mV, and I measured amplitudes and durations on averaged complexes with magnifying glass and compasses. I did not find any important differences (table). Some of the deviations are probably due to limitations in the methods of measuring.

The PC and printer that we use cost about £600 each in Sweden. The converter and the cables will cost about £200. A traditional electrocardiograph costs about £5000. The program could cost £1000–£2000. In Sweden, with 8 million inhabitants and about 4500 electrocardiographs in use, this could lead to a saving of around £10 million over ten years.

Department of Clinical Physiology,
Central Hospital,
S-651 85 Karlstad, Sweden

BIRGER WANDT

Surface coil magnetic resonance imaging of the fetal brain

SIR,—Magnetic resonance imaging (MRI) of the fetus has been of limited use because of artifacts created by fetal movements. Attempts to sedate the fetus with maternal morphine injections led to differing results.¹ Pancuronium bromide injections in the fetus either intramuscularly or into the umbilical vein resulted in temporary arrest of fetal movements and allowed conventional sequences of 3–6 min.² Another approach is fast imaging, which only requires several groups of 10 s, although details of brain anatomy are less consistently visualised than with classic MRI.^{3,4}

Due to the superficial situation of the fetal head at the end of pregnancy, we thought that surface coils could be used for imaging the fetal brain.⁵ Such coils give better resolution than classic body coils. Variables that are usually necessary to obtain good images, such as the number of measurements or the data acquisition matrix, may be reduced in number. The acquisition time we use of 1 min 36 s (TR 300 ms, TE 12 ms, acquisition matrix 160 × 160, two measurements) is brief enough to avoid most artifact motions. The

heterogeneity of the received signal, which is higher on the anterior side of the fetal head near the maternal abdominal surface, is resolved by the use of two surface coils that are connected; one is placed ventrally, the other on the corresponding dorsal area.

The images we obtain are not very different from postnatal studies and allow study of grey-white matter differentiation and myelination (figure). We have done 19 studies with this technique at a mean gestational age of 32.2 weeks. The quality of the MRI was good in 16 cases, especially for fetal brain study: size of the ventricles and the state of myelination could be assessed in all cases.

In our experience with surface coils and short gradient-echo T1 sequences, images can be obtained without any curarisation of the fetus. Sandwich surface coils allow study of fetal brain anatomy. This method could help in prenatal diagnosis to determine fetal prognosis related to brain evaluation.

MARIE PIERRE REVEL
JEAN CLAUDE PONS
CHRISTOPHE LELAIDIER
MICHELE VIAL
RENE FRYDMAN
DOMINIQUE MUSSET
MADELEINE LABRUNE

Hôpital Antoine Beclere,
92141 Clamart,
France

1. Dinh DH, Wright RM, Hanigan WC. The use of magnetic resonance imaging for the diagnosis of fetal intracranial anomalies. *Child Nerv Syst* 1990; 6: 212–15.
2. Daffos F, Forestier F, Macleess J, et al. Fetal curarization for prenatal magnetic resonance imaging. *Prenat Diagn* 1988; 8: 311–14.
3. Stehling MK, Mansfield P, Ordidge R, et al. Echo-planar imaging of the human fetus in utero. *Magn Reson Med* 1990; 13: 314–18.
4. Garden AS, Griffiths RD, Weindling AM, Martin PA. Fast-scan magnetic resonance imaging in fetal visualization. *Am J Obstet Gynecol* 1991; 164: 1190–96.
5. Revel-Dubois MP, Baton C, Tardivon A, Hauuy MP, De Laveaucoupet J, Labrune M. Imagerie IRM du fœtus in utero. *J Fr Radiol* 1991, November; 39.

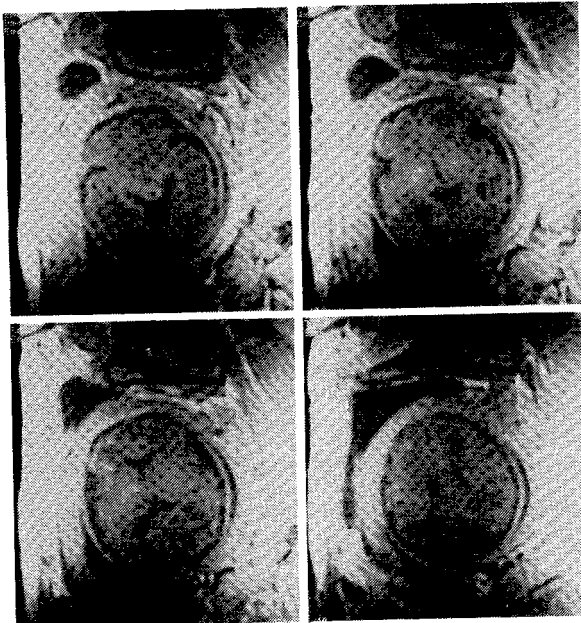
Public health consequences of the civil war in Somalia, April, 1992

SIR,—In April, 1992, to plan a targeted intervention, Médecins Sans Frontières requested Epicentre to assess the health status of the displaced population in Merca and Qorioley, south of Mogadishu, Somalia, where a civil war has taken place since January, 1991.¹

690 households (4169 individuals) were surveyed between April 18 and 28. The estimated population of the area is 103 000 (73 000 residents, 23 000 displaced in towns, 7000 displaced in camps). In the 12 months before interview, 497 deaths occurred. The adjusted crude mortality rate (ACMR) was 67.1 per 1000/year. The CMR was higher among children under 5 and among the displaced population living in camps (table). In this population, 1 child under 5 out of 4 died during the 12 months preceding the survey. Of 497 deaths, 279 (56%) occurred between January and April, 1992. Malnutrition was the leading cause of death in each group, being responsible for 41.6% of the total deaths among the displaced living in camps. The second most common cause of death, in each group, was war casualties (9.5–13.3%).

The adjusted prevalence of children aged 6–59 months surveyed who had a middle upper arm circumference (MUAC) below 12.5 cm was 46.4% (95% CI, 43.4–49.1), 42.7% (38.3–47.1) among the 487 residents, 47.2% (41.2–53.1) among the 267 displaced in towns, and 75.6% (71.9–79.3) for 512 children displaced in camps. Of these 1266 children, 22% had a MUAC under 11 cm (adjusted prevalence 14.4% (12.5–16.3): 12.3% (9.4–15.2) in residents; 13.5% (9.4–17.5) in towns; and 35.7% (31.5–39.9) in camps. 24 h food consumption recall showed that 14.2% (12.3–16.1) of the population ate nothing the day before survey (22% in the camps). 31.3% (28.8–33.9) ate only "garass", a local wild fruit. Only 43.6% (40.8–46.3) had eaten either rice, meat, or maize the day before. Very small portions were eaten. On average, 8.3 litres water were available per person per day (11.6 litres for residents and 4.5 litres in camps).

More than 100 000 Somalians are now living in severely poor health and sanitary conditions. The CMR identifies the displaced population as a major focus for intervention. The CMRs are higher than those in Ethiopia and Sudan in 1985,^{2,3} Mozambique in 1989,⁴ Angola in 1990,⁵ Liberia in 1990,⁶ and the Touareg population in



Surface coil MRI of fetal brain at 35 weeks' gestation.

Top left: axial view through upper brainstem; cerebral peduncles, aqueduct of sylvius, mamillary bodies are well demonstrated. Top right: axial section of third ventricle; sylvian fissure separates frontal and temporal lobes. Bottom left: frontal and occipital horns of ventricles and corpus callosum are visible. Bottom right: upper section showing body of lateral ventricles. Non-myelinated white-matter is hypointense, cortex is hyperintense.

MORTALITY RATES AMONG SOMALIAN POPULATION, MERCA AND QORIOLEY, APRIL, 1991, to APRIL, 1992

Setting; age (yr)	Sample	Deaths	CMR/1000 (95% CI)
Residents			
<5	442	51	115.4 (85.6-145.2)
5-14	571	33	57.8 (38.7-76.9)
≥15	817	21	25.7 (15.6-37.8)
Total	1830	105	57.4 (46.7-68.0)
Displaced in towns			
<5	232	20	86.2 (50.1-122.3)
5-14	223	20	89.7 (52.2-127.2)
≥15	332	13	39.2 (18.3-60.0)
Total	787	53	67.3 (49.8-84.9)
Displaced in camps			
<5	586	141	240.6 (206.0-275.2)
5-14	754	126	167.1 (140.5-193.7)
≥15	709	72	101.6 (79.3-123.8)
Total	2049	339	165.4 (149.4-181.5)
Total*			
<5	1260	212	117.5 (99.7-135.3)
5-14	1546	177	73.3 (60.3-86.3)
≥15	1860	108	32.8 (24.7-40.8)
Total	4666	497	67.1 (59.9-74.3)

*CMRs adjusted for population distribution characteristics (residents, displaced in towns and displaced in camps).

Mauritania in 1992.⁷ The increasing death rate during the past three months indicates a worsening of the situation. Food supply was insufficient and irregular until the end of April and the ration is obviously lower than the recommended 1900 kcal per person per day.⁸

SERGE MANONCOURT
BRIGITTE DOPPLER
FRANÇOIS ENTEN
ABDULLAH ELMI NUR
AHMED OSMAN MOHAMED
PATRICK VIAL
ALAIN MOREN

Epicentre,
8 rue Saint-Sadin,
75011 Paris, France;
Médecins Sans Frontières,
and Somalian Ministry of Health,
Mogadishu, Somalia

1. Curdy A. Nutritional surveys: ICRC mission report, March 1992.
2. Toole MJ, Waldman RJ. An analysis of mortality trends among refugee population in Somalia, Sudan, and Thailand. *Bull WHO* 1988; 66: 237-47.
3. Toole JM, Waldman RJ. Prevention of excess mortality in refugee and displaced population in developing countries. *JAMA* 1990; 263: 3296-302.
4. Péccou, Cohen O, Michelet MJ. Mozambique: mortality among displaced persons. *Lancet* 1990; 335: 650.
5. Desportes V, Coulombiers D, Tessière M. Mortality and nutritional survey, Kapupa, Angola, 1990. Epicentre/Médecins sans Frontières internal report.
6. Hilderbrandt K, Durand A. Joint nutrition and mortality survey, Monrovia, Dec, 1990. Médecins sans Frontières internal report.
7. Paquet C. Rapid health assessment of the Touareg population of Bassikounou, Mauritania, May, 1992. Epicentre/Médecins sans Frontières internal report.
8. United Nations. Consolidated inter-agency 90-day plan of action for emergency humanitarian assistance to Somalia, April, 1992.

Emergence in Ontario, Canada, of multiresistant *Salmonella typhi* from South Asia

SIR,—Multiple antimicrobial resistance in *Salmonella typhi* is uncommon in Ontario, Canada.¹ During the past 6 months, however, we have isolated strains from travellers to India and Bangladesh and from contacts of these individuals with resistance to ampicillin, chloramphenicol, trimethoprim, streptomycin, sulphamethoxazole, cotrimoxazole, tetracycline, ticarcillin, and piperacillin. The minimum inhibitory concentrations (MICs) of trimethoprim and sulphamethoxazole were over 1000 and over 1024 mg/l, respectively, and over 2.0/38.0 mg/l for cotrimoxazole. Ampicillin, chloramphenicol, streptomycin, tetracycline, ticarcillin, and piperacillin all had MICs above 128 mg/l.

All resistance determinants were transferred by conjugation en bloc to recipient *Escherichia coli* K-12 strain W3110,² indicating plasmid mediation of antimicrobial resistances. Resistance in these isolates is mediated by plasmids belonging to the H1 incompatibility group.³ The size of the plasmid in the transconjugant strains was about 80 kilobases. A similar type of plasmid was reported by Rowe et al⁴ from travellers to India and

Pakistan, and multiresistant isolates have also been found in Bahrain,⁵ linked to expatriate workers from India. Clearly, these resistant *S typhi* strains are spreading.

Chloramphenicol was the first drug shown to be effective in typhoid fever and remains the drug of choice in many parts of the world.⁶ Ampicillin was used as an alternative, but later, with the emergence of isolates of *S typhi* resistant to both chloramphenicol and ampicillin, cotrimoxazole became the drug of choice.⁷ R factors coding for resistance to chloramphenicol, ampicillin, and cotrimoxazole therefore pose a definite treatment challenge and alternative forms of antimicrobial therapy become necessary.

All our Ontario isolates were susceptible to the fluoroquinolones norfloxacin and ciprofloxacin, and to the cephalosporins cephalothin, cefamandole, cefotaxime, and cefoxitin. The quinolones are effective for typhoid fever,^{8,9} except in children in whom adverse effects on developing bones may occur.¹⁰ Third-generation cephalosporins are also effective in treating multiresistant salmonellae, especially in children where quinolones are contraindicated.¹¹

N. HARNETT
S. MCLEOD
Y. AU YONG
S. BROWN
C. KRISHNAN

Department of Clinical Bacteriology,
Central Public Health Laboratory,
Ontario Ministry of Health,
Toronto,
Ontario, Canada M5W 1R5

1. Grant RB, DiMambro L. Antimicrobial resistance and resistance plasmids in *Salmonella* from Ontario, Canada. *Can J Microbiol* 1977; 23: 1266-73.
2. Heffron F, Bedinger P, Champoux JJ, Falkow S. Deletions affecting the transposition of an antibiotic resistance gene. *Proc Natl Acad Sci USA* 1977; 74: 702-06.
3. Smith HW. Thermosensitive transfer factors in chloramphenicol-resistant strains of *Salmonella typhi*. *Lancet* 1974; ii: 281-82.
4. Rowe B, Ward LR, Threlfall EJ. Spread of multiresistant *Salmonella typhi*. *Lancet* 1990; 336: 1065-66.
5. Wallace M, Yousif AA. Spread of multiresistant *Salmonella typhi*. *Lancet* 1990; 336: 1065-66.
6. Woodward TE, Smadel JE. Management of typhoid fever and its complications. *Ann Intern Med* 1964; 60: 144-57.
7. Butler T, Rumas L, Arnold K. Response of typhoid fever caused by chloramphenicol susceptible and chloramphenicol-resistant strains of *Salmonella typhi* to treatment with trimethoprim-sulfamethoxazole. *Rev Infect Dis* 1982; 4: 551-61.
8. Eykyn SJ, Williams HK. Treatment of multiresistant *Salmonella typhi* with oral ciprofloxacin. *Lancet* 1987; ii: 1407-08.
9. Hooper DC, Wolfson JS. The fluoroquinolones: pharmacology, clinical uses and toxicities in humans. *Antimicrob Ag Chemother* 1985; 28: 716-21.
10. Tauxe RV, Puhf ND, Wells JG, Hargrett-Bean N, Blake PA. Antimicrobial resistance of *Shigella* isolates in the USA: the importance of international travellers. *J Infect Dis* 1990; 162: 1107-11.
11. Soe GB, Overturf GD. Treatment of typhoid fever and other systemic salmonellosis with cefotaxime, ceftriaxone, cefoperazone and other newer cephalosporins. *Rev Infect Dis* 1987; 9: 719-36.

Vitamin A deficiency and childhood mortality

SIR,—Dr Sommer's report of the Bellagio meeting¹ may give readers the impression that the controversy over vitamin A administration and child-mortality reduction is now settled. It practically dismisses the contrary conclusions arrived at in the studies conducted at the National Institute of Nutrition, India, and by the Sudan-Harvard group. Scientists and health administrators of developing countries, grappling with problems of poverty and undernutrition among their peoples, should not be misled into believing that the Bellagio statement represents a globally accepted view.

That vitamin A is a key nutrient and that vitamin A deficiency is an important public-health issue in several developing countries are not in doubt. The case for improving vitamin A nutritional status of population groups rests on solid grounds; and bad arguments should not be allowed to spoil that good case. The logical way to ensure vitamin A nutrition is through dietary improvement, and fortunately the countries afflicted with vitamin A deficiency have an abundance of natural food resources to combat it. These countries must be helped to harness their food resources for this purpose; and they should not be misled, through exaggerated claims, into relying perpetually on periodic medication with massive doses of synthetic vitamin A—an approach that was initially adopted purely as a short-term measure.

According to Sommer's report, "a meta-analysis of the pooled data from several studies has shown an overall reduction in