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### Economic crisis and primary healthcare in Greece: 'disaster' or 'blessing'?

The current economic crisis hit Greece more severely than any other European country, posing a direct threat to health, but also offering the Greek health system a 'questionable' advantage – an opportunity to redesign the whole approach to healthcare. The political will to confront the interests of professional and social groups has been strengthened by the economic threats. The implementation of deep, strategic changes is critical, with the key targets being 'value for money' and effective and efficient allocation of the scarce resources.

What has been the response of the government to date? The most radical change was the merging of health insurance funds and the establishment of EOPYY, (National Organization for Healthcare Provision), a monopolistic purchaser with enhanced negotiating powers.<sup>1</sup> The formulation of a common package of benefits has offered the means to eliminate social inequalities. The next most important measure was the launch of an electronic prescribing system, which enables monitoring of doctors' behaviour. Clinical practice guidelines for common diseases were developed, aiming to provide evidence-based and safe practice. Other measures were imposed to tighten control over pharmaceutical expenditure.

What still needs to be done? Health coverage must become a universal right based on citizenship, rather than an employment benefit – this is essential while the unemployment rates rise. Re-orientation of the health system to primary care and public health is now more necessary than ever. A primary care network must be established which functionally integrates public and private providers. The 'family doctor' system must be implemented, with respon-

sibility for referring patients to other health services, ensuring continuous care. Citizens must have free choice of their personal doctor. The lack of GPs can be addressed by attracting specialists to retrain 'on the job' as GPs. Physicians' compensation by the public sector must be fair, otherwise they will not abandon opportunistic practices. Changing the compensation system offers the opportunity to offer incentives to physicians to be more productive and effective. Family doctors could be reimbursed by a hybrid system of 'capitation' and 'pay for performance', linking payments to outcomes, and specialists could be paid by a combination of 'fee for service' and 'global budget'. This would foster competition among physicians, but would also discourage them from inducing demand and promote better geographical distribution in the country. The introduction of electronic medical records is critical for the enhancement of efficiency of the system and also for monitoring physicians' behavior and conformity with clinical guidelines. Auditing mechanisms are necessary. Finally, more resources should be allocated to prevention and health promotion policies – unhealthy lifestyles are popular in Greece and hamper the efficiency of the system.<sup>2,3</sup>

Budget cuts without major reforms will lead to a Greek 'health tragedy', but I strongly believe that the opportunity to re-engineer health service, thereby treating the inefficiencies of the past, can offer the entire population access to quality healthcare while keeping the cost in check.

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### Risk of developing acute kidney injury (AKI) following the administration of iodinated contrast medium

Editor – We were pleased to see the article entitled 'Acute kidney injury: top ten tips' by Prescott, Lewington and O'Donoghue and its logical pragmatic advice for protecting patients from in-hospital acute kidney injury (*Clin Med* August 2012 pp328–32). However, we were disappointed by the missed opportunity to alert physicians to the potential renal injury caused by iodinated contrast medium (CM). While large volumes of CM are used for angiographic imaging and intervention, by far the largest volume of CM is used for enhanced computed tomography (CT). We estimate in our hospital alone, we give over 600 litres of CM to patients undergoing CT annually. Even with modern low osmolar and iso-osmolar CM, there is a risk of generating contrast induced nephropathy (CIN) in patients with already limited renal function. CIN is defined as an increase in serum creatinine of >25 µg/l over baseline, or an absolute rise of >44 µg/l. Patients with GFR <60 ml/min are at risk, which rises sharply when GFR falls below 40 ml/min.<sup>1</sup>

The demand for CT is steadily rising. Most radiology departments experience CT demand increasing by approximately 10% annually at present. While the high radiation dose of body CT has been a disincentive to its use, CT machine manufacturers are working hard to improve image quality, while limiting or reducing radiation dose. This means that CT will be more widely used for the assessment of acute thoracic and abdominal pathology. Cancer staging and the follow up of chronic conditions such as inflammatory bowel disease will further increase the need for CT. Barium enema is obsolete – its place is taken by CT colonography. These factors will increase demand for CT in an ageing population and physicians referring patients for imaging must be aware of the risk posed to their patients by CM administration. Good guidelines for the

pre-procedural management of patients are available.<sup>2</sup> We need not reiterate what is already published, but would urge physicians to familiarise themselves with the risk associated with CM administration and pre-emptive measures aimed at mitigating these.

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## Response

Thank you for your letter highlighting the risk of developing acute kidney injury (AKI) following the administration of iodinated contrast medium. We agree that this is an important cause of AKI and one that all physicians should be aware of. The primary purpose of our article was to provide an overview of the processes that need to be implemented to improve the recognition and response to patients at risk of, or who develop, AKI. The recommended processes include the development of local guidelines that should include the prevention of contrast induced AKI (CI-AKI).

The incidence of CI-AKI is estimated at 1–2% in patients with normal kidney function, even in those with diabetes. However, it is the third most common cause of in-

hospital AKI after renal hypoperfusion and nephrotoxic medication.<sup>1,2</sup> Furthermore, the incidence of CI-AKI increases significantly in patients with risk factors and is associated with increased mortality. It can occur within 72 hours of receiving iodinated contrast media as a result of afferent arteriolar vasoconstriction and direct toxicity of the contrast to the kidney tubular epithelial cells.

The international guideline group, Kidney Disease: Improving Global Outcomes (KDIGO), recommends that CI-AKI is defined as a rise in serum creatinine by  $\geq 26 \mu\text{mol/l}$  within 48 hours, or a rise in serum creatinine by  $\geq 1.5$  fold from baseline value (which is known or presumed to have occurred within one week) or a urine output of  $< 0.5 \text{ ml/kg/hr}$  for more than six consecutive hours.<sup>3</sup> This will allow harmonisation of the definition of CI-AKI with all forms of AKI.

Prevention of CI-AKI is essential as there is no specific treatment. The Renal Association recommend baseline kidney function be assessed and other risk factors for CI-AKI identified prior to imaging with iodinated contrast media.<sup>4</sup> Risk factors for CI-AKI include chronic kidney disease ( $\text{eGFR} < 60 \text{ ml/min/1.73m}^2$ ), older age ( $> 75$  years), cardiac failure, nephrotoxic medication, hypovolaemia, sepsis and the use of large volumes of contrast. While the estimated glomerular filtration rate can be used to assess kidney function in stable outpatients, serum creatinine should be used for acutely ill patients and those with AKI.

In patients identified as being at high risk of CI-AKI, alternative forms of imaging, such as ultrasound scan or magnetic resonance angiography, should be considered. Where alternative imaging techniques are not appropriate, the risk of developing CI-AKI should be minimised by appropriate volume expansion with intravenous 0.9% sodium chloride or isotonic sodium bicarbonate at a rate

of 1 ml/kg/hr for 12 hours pre- and post-procedure, withholding potentially nephrotoxic medications, and minimising the dose of contrast appropriately. Kidney function should be checked 48–72 hours post-procedure and further exposure to iodinated contrast media delayed until full recovery of kidney function.<sup>4</sup>

As you state in your letter, the demand for enhanced computed tomography (CT) in everyday clinical practice is increasing and with this the exposure of increasingly complex and acutely ill patients to iodinated contrast media. We would urge all hospitals to develop local guidelines for the prevention of CI-AKI.

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