

FOREWORD

In 2007, the Macedonian Academy of Sciences and Arts (MASA) celebrated its 40th Anniversary. In this period, MASA, the highest institution in the field of sciences and arts in the Republic of Macedonia, has contributed a great deal to the development of sciences and arts in the country, as well as to the affirmation and scientific recognition of the Republic of Macedonia in Europe and in the world.

Recent years have seen an extremely successful expansion of knowledge and product development in the realm of biotechnology, genetics and genetic engineering, nanotechnology, computer sciences and regenerative medicine. This has enabled the development of artificial organs, tissue engineered medical devices for regenerative medicine and stem cell therapeutics.

The common denominator of this new cluster of technology is the biologic approach to repair, replace and regenerate functional living tissues and possibly also organs.

Here is an overview of the organs replacement demography provided for 2007 (Table 1) from the previous 34th Congress of the European Society for Artificial Organs (ESAO) held in 2007 in Krems, Austria.

Over 50 million patients were sustained or supported worldwide by organ replacement therapy (ORT) (maintenance dialysis, pacemakers, stem cells, heart valves, oxygenators, large joint replacement and transplantation) in 2007.

1 in 5 individuals over 65 will receive ORT in the USA in the future. The annual demographic growth rate is 8–10 %. The economic value of these therapies is assumed to be around \$ 500 billion per year and is about 8% of the total health care expenditure (in the USA only).

Table 2 shows the increase in numbers of patients on dialysis worldwide.

Table 1 – Табела 1

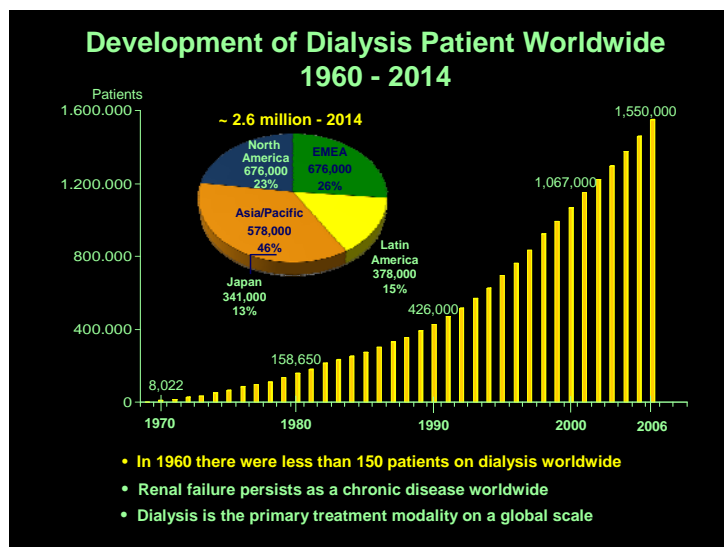
Organs replacement demography 2007
Демографија на заместителна терапија во 2007 година

Organ Replacement Demographics 2007		
	Incident Patients	Prevalent Patients
Stents (patients)	2,500,000	13,000,000
Pacemakers	1,200,000	11,000,000
Valves	400,000	3,500,000
CABG (on pump)	600,000	8,000,000
Large Joints	1,300,000	14,000,000
Dialysis	350,000	1,650,000
Organ Transplants	50,000	400,000

With kind permission of M Lysaght. ESAO Congress Krems, September 7, 2007.

Table 2 – Табела 2

Development of Dialysis Patient numbers worldwide between 1960 and 2014
Развој на бројот на пациенти на дијализа во светот помеѓу 1960 и 2014 година



With kind permission of M Lysaght. ESAO Congress Krems, September 7, 2007.

On the occasion of the celebration of the 40th Anniversary of the Macedonian Academy of Sciences and Arts, the European Society for Artificial Organs (ESAO), the Macedonian Society of Nephrology, Dialysis, Transplantation and Artificial Organs, the Macedonian Medical Association and the Section of Biological and Medical Sciences of the MASA organized a scientific Symposium, entitled: *Artificial Organs Today: From in vitro assessment to human therapies*.

The main topics of this Symposium were: artificial organs faced with ageing populations, system requirements for artificial organ technology (AOT), tools for AOT, extracorporeal blood circuits in organ replacement therapies and treatment options for blood purification therapies. Selected papers from this Symposium are collected in this issue of the MASA Journal *Prilozi*.

We still recall the exceptionally successful Symposium *Artificial Organs 2000* organized in the Macedonian Academy of Sciences and Arts, and its publication in the International Journal of Artificial Organs (vol. 25, No 5, 2002). We believe that this issue of *Prilozi* represents a supplementary and highly interesting overview of current aspects of scientific research in the field of artificial organs.

We hope that the papers published here will stimulate further scientific cooperation and foster mutual understanding between the Republic of Macedonia and other European countries.

Corresponding Author:

**Momir Polenakovic
Aleksandar Sikole
1000 Skopje,
Republic of Macedonia**

**Joerg Vienken
Bad Homburg, Germany**