COCIR 50TH ANNIVERSARY
AGE PROFILE EDITION 2009

DIAGNOSTIC MEDICAL IMAGING DEVICES
“THE CONTINUED NEED FOR SUSTAINED INVESTMENT”
INTRODUCTION

Innovative medical diagnostic imaging methods, technologies and IT-supported processes have proven their ability to enhance the efficiency of medical care. Yet the pace of technological change now far outstrips the pace with which new technologies enter into clinical practice and benefit patients.

Industry and Government departments responsible for regulation and reimbursement policy need to explore new initiatives directed at more rapid translation of technological innovation into patient benefits and healthcare efficiency.

The positive impact that technologies such as CT (Computed Tomography) and PET/CT (Positron Emission Tomography / Computed Tomography) are now having on cardiac care and cancer care is evident.

Other technologies with similar patient benefits are being developed and the speed at which they can be adopted requires dramatic acceleration. An environment where it takes ten or more years to derive the clinical benefits and economic efficiencies from new methods and technologies is a concern to patients, healthcare providers, and innovative industries alike.

COCIR is concerned about the slow progress made in certain European countries, to address the process of ageing of medical diagnostic imaging equipment, notably CT, MRI, PET-Nuclear Medicine and Xray-Angiography systems.

The slow progress is aggravated by sustained and strong cost containment policies in the healthcare sector in most European countries.

In this document COCIR provides information about the current Age Profile situation of CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment in a large number of European countries.

The geographical coverage of the 2009 Edition now includes a large number of central and eastern European countries, the Russian Federation, Turkey and more details on western-Europe.


The latest results confirm that the concerns about a lack of investment in medical technology, as reported in our previous studies, were and are still justified.

COCIR will continue to monitor the development of the age profile of medical diagnostic imaging equipment in Europe.

It is COCIR’s strong conviction that speeding up the translation of new methods and technologies into clinical practice will benefit:

- patients, because of earlier diagnosis, less burden and better outcomes;
- healthcare professionals, because of higher patient throughput and faster/safer decision-making;
- healthcare systems implemented by payers and governments, because of the potential to drive cost efficiencies.

Based on the experience of now 4 studies over a 12 years period, including the results of our 2009 edition study, we have strong indications that necessary new investments are still not being made in a sufficient and satisfying way.
THE AGE OF MEDICAL EQUIPMENT MATTERS: WHY IT MATTERS!

Modern medical equipment offers a broad range of possibilities for the improvement of healthcare. Technological innovation has multiplied the possible efficiency gains to be achieved by healthcare entities from the consequent use of medical technology as well as the potential benefits for patients.

New procedures are in general less invasive and pose less risks for patients. Diagnosis and therapy are more effective and accurate. Modern CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging technology improves the quality of healthcare services and offers many possibilities for rationalization.

Older equipment does not represent the current state of technology and is, in general, less suited to deliver the benefits associated with modern CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging technology as they are expected by patients, users and payers.

Older equipment also involves a higher risk of failures or breakdowns. This may lead to considerable delays for essential medical interventions while the equipment is out of service. It can also endanger the health and safety of patients and medical staff. Although this situation can partially be avoided through timely and regular maintenance, the operating cost of such equipment tends to be higher than that of up-to-date CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment. Insufficient investment in the replacement of equipment will thus lead to higher costs for the provision of medical services.

Older equipment thus increases the cost of the provision of health services, with the result that possible positive effects for patients will not be realised or will at least be reduced.

For all these reasons, the age profile of CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment is an important factor for the quality of medical services. A sound mix in the age profile of installed equipment is important.

For the purpose of the COCIR Age Profile studies, the above statements were turned into a set of “Golden Rules” at the time of our previous Age Profile reporting (available at: http://www.cocir.org/uploads/documents/17-17-ageprofile2003.pdf). These Golden Rules are meant to serve as a guideline for investment policies.

CONSIDERATIONS FOR THE EVALUATION OF MEDICAL EQUIPMENT AND SETTING OF THE GOLDEN RULES WERE:

- Equipment that is up to 5 years old reflects the current state of technology and offers opportunities for economically reasonable upgrade measures.
- Equipment which is between 6 - 10 years is still fit for use, but already requires replacement strategies to be developed.
- Equipment older than 10 years is no longer state-of-the-art. Replacement is essential.

THESE CONSIDERATIONS AND THE EARLIER COCIR AGE PROFILE EXPERIENCES THE FOLLOWING SET OF “GOLDEN RULES” WAS ESTABLISHED:

1. AT LEAST 60 PERCENT OF THE INSTALLED EQUIPMENT BASE SHOULD BE YOUNGER THAN 5 YEARS.
2. NOT MORE THAN 30 PERCENT SHOULD BE BETWEEN 6 - 10 YEARS OLD.
3. NOT MORE THAN 10 PERCENT OF THE AGE PROFILE SHOULD BE OLDER THEN 10 YEARS.
THE 2009 AGE PROFILE: RESULTS

Analysis of the 2008 and historical data on the basis of the proposed Golden Rules leads to the following results for the modalities covered by the study:

CT - WESTERN-EUROPE:

- Overall the observed CT age profile does satisfy the Golden Rules criteria, although the percentage of over 5 year old systems increased from 38% (2006) to 40% (2008).
- The CT age profiles of several individual countries, such as Germany, Italy and Spain, do however show significant and negative deviations from the Golden Rules criteria.
- The Italian CT age profile has even deteriorated compared to the 2006 situation, the percentage of over 5 year old systems increased from 43% (2006) to 47% (2008).
- The Spanish and Italian “6 years and older” parts of the age profile represent almost half (47%) of the installed equipment, thereby deviating significantly from the Golden Rules.
- The average CT density (number of systems in use per million inhabitants) in Western-Europe amounted to 23.6 systems. Higher than 30 systems/million population densities were observed in Austria (34.1), Switzerland (33.6), Norway (32.0), Germany (30.9) and Italy (30.6). Lower than 20 systems/million population densities were observed in France (18.1), Netherlands (12.0) and the UK (11.7).

CT - CENTRAL AND EASTERN EUROPE

- Overall the CT age profile just falls short of the Golden Rules.
- The age profile of several individual countries, Poland, the Czech Republic and the Baltic states (all combined) meet and surpass the Golden Rules.
- Romania’s modern age profile (70% less than 5 years old) largely exceeds “Golden Rule #1”, but falls short (11% older than 10 years) of “Golden Rule #3”. However, the density of CT systems is still amongst the lowest found in Europe. (see below)
- The age profile of several individual countries, Bulgaria, Slovakia, Slovenia, Ukraine and Hungary show very significant and negative deviations from the “6 years and older” Golden Rules.
- The average CT density (number of systems in use per million inhabitants) in Central and Eastern-Europe amounted to 8.2 systems, very significantly below the all-European average of 19.5 systems! The lowest densities were found in Bulgaria (7.3), Romania (6.8) and the Ukraine (3.0).

CT - RUSSIAN FEDERATION

- Despite significant investments in national procurement projects in recent years, the CT age profile shows that there still is some way to go before all the Golden Rules will be satisfied.
- The CT density observed, 8.0 systems/million inhabitants, is well below the all-European average of 19.5 systems as well as the average Central and Eastern-Europe average of 8.2 systems.

CT - TURKEY

- The Turkish age profile shows a significant modernisation, since 2006, of the age profile, but a relatively important part of the park is still older than 10 years.
- The CT density observed amounts to 9.8 systems/million inhabitants.
MRI - WESTERN EUROPE

- Overall the MRI age profile just falls short of the Golden Rules. The situation has however deteriorated compared to the previous (2006) study. In all, 46% of all installed MRI systems exceed 5 years of age versus 37% in 2006.
- Only 5 countries: Denmark, Belgium, France, Greece and Switzerland meet all Golden Rules criteria, although some of those show ageing of the age profiles compared with the previous study (2006).
- The age profile of several individual countries, Germany, Italy, Spain, Portugal and Netherlands, show very significant and negative deviations from the “6 years and older” Golden Rules. Notably the German and Dutch age profiles show rapid and extensive ageing since the 2006 study.
- The average MRI density (number of systems in use per million inhabitants) in Western-Europe amounted to 15.6 systems. Higher than 20 systems/million population densities were observed in Switzerland (29.2), Norway (27.3), Denmark (23.0), Germany (22.6) and Austria (20.7). A lower than 10 systems/million population density was observed in France (9.1).

MRI - CENTRAL AND EASTERN EUROPE

- Overall the MRI age profile does satisfy the Golden Rules criteria, unfortunately incomplete data collection prohibit detailed per country analysis.
- The average MRI density (number of systems in use per million inhabitants) in Central and Eastern-Europe amounted to 2.6 systems, very significantly below the all-European average of 15.6 systems! The lowest densities were found in the Czech Republic (4.2), Poland (3.4) and Hungary (3.0). It should be noted that density details could not be collected for Bulgaria, Romania and the Ukraine. However, the collected data do suggest that the average density for these 3 countries is even lower than 2.6 systems.

MRI - RUSSIAN FEDERATION

- The observed MRI age profile shows that the significant modernisation investments in national procurement projects in recent years have been successful. The age profile study result shows that the Golden Rules criteria are virtually completely satisfied.
- The MRI density observed amounts to 2.1 systems/million inhabitants.
- It should be noted that the presented results understate the real Russian Federation market situation! The real MRI installed park does include equipment provided by non-COCIR members that did not participate in this study.

MRI - TURKEY

- The MRI age profile shows a continued modernisation of the age structure since the previous 2006 study. The study shows that the Golden Rules criteria are virtually completely satisfied.
- The MRI density observed amounts to 5.8 systems/million inhabitants.

XRAY ANGIOGRAPHY - WESTERN EUROPE

- Overall the ANGIO age profile falls substantially short of the Golden Rules, although some countries demonstrate minor improvements compared to the previous, 2006, study results.
- The average ANGIO density (number of systems in use per million inhabitants) in Western-Europe amounted to 12.9 systems. Higher than 18 systems/million population densities were observed in Norway (23.3), Germany (18.9), Switzerland (18.5), Sweden (18.2) and Austria (18.1). Lower than 10 systems/million population densities were observed in France (9.0), Spain (8.9), Greece (8.5) and Portugal (6.1).

XRAY ANGIOGRAPHY - CENTRAL AND EASTERN EUROPE

- Overall the ANGIO age profile falls short of the Golden Rules.
- Incomplete data collection prohibit exhaustive per country analysis.
The age profile results for the Baltic states (all combined), Poland and the Ukraine show that the age profiles in those countries can be characterized as “modern”.

The average ANGIO density (number of systems in use per million inhabitants) in Central and Eastern-Europe amounted to 3.2 systems, very significantly below the all-European average of 12.9 systems! The lowest densities were found in the Baltic states (all combined) (2.1), Romania (1.7) and the Ukraine (0.7). It should be noted that density details could not be collected for Bulgaria, and Slovakia. The collected data do however suggest that the average density for these countries is lower than 3.2 systems.

XRAY ANGIOGRAPHY - RUSSIAN FEDERATION

- Despite significant investments in national procurement projects in recent years, the age profile of the ANGIO age profile shows that the modernisations implemented still fall short of satisfying all the Golden Rules criteria.
- The ANGIO density observed amounts to 2.3 systems/million inhabitants.

XRAY ANGIOGRAPHY - TURKEY

- The ANGIO age profile demonstrates continued modernisation, however a relatively important part of the park is still older than 10 years.
- The ANGIO density observed amounts to 4.4 systems/million inhabitants.

PET NUCLEAR MEDICINE - ALL

- Only 3 COCIR members commercially offer PET Nuclear Medicine systems, data availability is therefore restricted to those countries were all are present.
- The observed PET age profiles do in general satisfy the Golden Rules criteria, this is due to the relatively recent widespread commercial availability of PET-Nuclear Medicine systems.
- Exception is the Russian Federation where only 36% of the PET systems installed are below 6 years of age.
- The average Western-European PET density observed amounts to 1.1 systems/million inhabitants, the average Central and Eastern-European PET density amounts to 0.2 systems.
- Highest PET densities are found in Ireland (2.3) and Austria (2.0).

THE 2009 AGE PROFILE: OBSERVATIONS AND CONCLUSIONS

From the study it becomes quite clear that no single modality fulfills the requirements of the Golden Rules in all countries that were part of this study.

Only the CT age profile in Western-Europe and the MRI age profile in Central and Eastern Europe meet the COCIR Golden Rules, although large variations are observed between individual countries.

Equally important, the trends of the development of the equipment age profiles on a country by country level show either a very moderate improvement or a deterioration of the modernisation since 2006. As a noticeable example, the German age profile of all modalities severely deteriorated since 2001.

This supports COCIR’s observation that new investments made during the last 5 years were either meager or insufficient to sustain or create a modern equipment age profile.
Only for CT and MRI do some countries manage to fulfill the most basic, third, “Golden Rule” (not more than 10% of the age profile should be older than 10 years). The ANGIO age profile of none of the studied countries ever fulfills the basic third Golden Rule.

As a rule of thumb, CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment has a reasonable economic life expectancy of between 6 and 10 years, depending on the type of equipment and the technical progress in this field. In recent years, technological progress has continuously reduced the life cycle time of modern CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment.

Consequently, a high share of equipment aged 6 years and older indicates a poor age profile. The required replacement of such equipment will increase the benefit to patients and improve the quality, safety and efficiency of healthcare services.

Given the high importance of CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment for effective and efficient healthcare, the influence of an unfavorable age profile on the cost of healthcare provision should not be underestimated.

It is sometimes claimed that an isolated analysis of the age profile would not give the true picture. Software upgrades, especially for the more recent technologies like CT and MRI, and hardware upgrades are supposed to be able to bring this kind of equipment back to a more recent “state-of-the-art” status.

But even such upgrades cannot bridge real leaps in technology. Such developments require specific equipment specifications, which are difficult to achieve through upgrade measures.

THE 2009 AGE PROFILE: RECOMMENDATIONS

COCIR urges healthcare stakeholders to put greater emphasis on a sustainable age profile of CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment.

This study shows that a significant part of the age profile of equipment in certain countries is already ten or more years old, this statement applies notably to X-ray Angiography systems. In the majority of cases, these devices have to be replaced immediately.

More attention should be given to early and consistent investment strategies. COCIR recommends that governments, politicians, hospital administrators and medical practitioners keep the technological progress in mind when the investment in CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment is planned and decided upon.

Based on the present study and historical trends an alarming final statement is justified:

All studied countries are in clear need of comprehensive, coherent and sustained investment and deployment strategies for all medical imaging equipment modalities and related healthcare IT equipment and services.

COCIR urges all those responsible for the quality of healthcare and the well-being of patients to take immediate action to correct this situation.

If the current trend is not reversed, European healthcare systems will be unable to meet the challenges of the next decade, including the ageing of its population and workforce, the increase of chronic diseases, patient security and quality expectations and healthcare system sustainability in the widest sense.
Note on Data and Description of the Data Collection:

The present brochure follows up on three earlier studies assessing the age profile of CT, MRI, PET-Nuclear Medicine and Angiography medical diagnostic imaging equipment in European countries for 1998, 2001 and 2006 (hitherto unpublished). The data in this edition present the situation as of December 2008.

The historical studies are not always directly comparable with each other as far as the absolute number of units is concerned due to a refinement in our procedures and considerable changes in market profiles. For that reason we report in percentages rather than absolute numbers. COCIR is convinced that the age profile situation as a whole is correctly represented.

THE DATA FOR THIS STUDY HAVE BEEN COLLECTED BY THE FOLLOWING COMPANIES THAT ARE ACTIVE IN ALL THE COUNTRIES COVERED BY THIS STUDY:

- General Healthcare Europe, France
- Philips Healthcare, The Netherlands
- Siemens Healthcare, Germany
- Toshiba Medical Systems Europe, The Netherlands

The data represented are those available in these companies for the installed equipment in the countries covered by this study. All data present the state as of December 2008.

The absolute number of installed units may differ from the data possibly available from other sources, because the study only covers the installed equipment of the participating companies.

However, the data have been carefully evaluated by a COCIR Focus Group that includes experts from the companies involved. In addition, the 4 earlier mentioned companies involved represent a high share of the total age profile in the reported countries. We are therefore sure that the trend expressed by the figures is correct.

THE STUDY COVERS THE INSTALLED UNITS FOR THE FOLLOWING TYPES OF EQUIPMENT:

- Computed Tomography (CT) equipment
- Magnetic Resonance Imaging (MRI) equipment
- X-ray Angiography (ANGIO) equipment
- Positron Emission Tomography (PET) Nuclear Medicine equipment

THE REPORTED DATA DIFFERENTIATE BETWEEN THREE AGE GROUPS:

- Older than 10 years,
- 6 to 10 years old, and
- Up to 5 years old.

Details can be found by looking at the charts for the modalities covered by this study, giving information by country and in relation to historical studies.

Results are presented in detail in a number of annexes:

COMPUTER TOMOGRAPHY - CT:

- Table showing Age Profile 2008 - 2006 - 2001 - 1998 including annual rating versus Golden Rules.
- Bar graph showing 2008 Age Profile per country.
- Bar graph showing 2008 Age Profile for EU-27 countries (please note that the displayed results for country names including the attribute "[Estim.]" are based upon partially estimated age profile data).
- Bar graph showing end 2008 CT density [units] per country per million inhabitants.
MAGNETIC RESONANCE IMAGING - MRI:
- Table showing Age Profile 2008 - 2006 - 2001 - 1998 including annual rating versus Golden Rules.
- Bar graph showing 2008 Age Profile per country.
- Bar graph showing 2008 Age Profile for EU-27 countries (please note that the displayed results for country names including the attribute “[Estim.]” are based upon partially estimated age profile data).
- Bar graph showing end 2008 MRI density [units] per country per million inhabitants.

XRAY ANGIOGRAPHY - ANGIO:
- Table showing Age Profile 2008 - 2006 - 2001 - 1998 including annual rating versus Golden Rules.
- Bar graph showing 2008 Age Profile per country.
- Bar graph showing end 2008 ANGIO density [units] per country per million inhabitants.

PET NUCLEAR MEDICINE - PET:
- Bar graph showing end 2008 PET density [units] per country per million inhabitants.
### COCIR AGE PROFILE 2009

#### Diagnostic Medical Imaging Devices / The Continued Need for Sustained Investment

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- Baltic States: Latvia, Lithuania, Estonia
- Bulgaria
- Czech Republic
- Hungary
- Poland
- Romania
- Slovakia
- Slovenia
- Sweden
- Spain
- Portugal
- Italy
- Malta
- Denmark
- Finland
- France
- Germany
- Greece
- Netherlands
- Switzerland
- Cyprus
- Russia
- Turkey
### COCIR AGE PROFILE 2009

**Diagnostic Medical Imaging Devices / The Continued Need for Sustained Investment**

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## Age Profile - Installed Base Analysis - Participants: GE, Philips, Siemens, Toshiba

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*Rating:* 
- **Red** = does not at all meet Golden Rules 
- **Yellow** = close but not matching Golden Rules 
- **Green** = equal or better than Golden Rules
GENERAL INFORMATION ABOUT COCIR

Founded as a non-profit trade association in 1959, COCIR represents the Radiological, Electromedical and Healthcare IT industry in Europe. As such, our members play a driving role in developing the future of Healthcare both in Europe and worldwide.

COCIR is committed to supporting its members and communicating with its partners in Europe and beyond on issues which affect the medical technology sector and the health of EU citizens.

COCIR also works with various organisations promoting harmonised international standards and fair regulatory control that respects the quality and effectiveness of medical devices and Healthcare IT systems without compromising the safety of patients and users.

We encourage the use of advanced technology to support Healthcare delivery worldwide.

COCIR’s key objectives include promoting free worldwide trade of medical devices and maintaining the competitiveness of the European health sector.

COCIR COMPANY MEMBERS:

AGFA Healthcare  ALOKA  BOSCH  Canon

Carestream Health  Dräger Medical  Elekta  Fujifilm  GE

Hitachi  HealthVista  Iba  IBM  Intel

iSoft  Medison  Philips  Siemens  Toshiba

NATIONAL TRADE ASSOCIATIONS MEMBERS:

AGORIA  FHTA  snitem  ZVEI

SPECTARIS  ASSOBIOMEDICA  Holland HealthTech

TIP GÖRDER  AXrEM

WELCOME TO RECENT COCIR MEMBER