

# Changing clinical activity in Paediatrics in Malta, 1996-2011

Simon Attard Montalto, Miriam Gatt

## Abstract

**Aim:** This study reviews the clinical workload in paediatrics in Malta over a 16-year period.

**Methods:** National statistics for live birth rates were obtained from the Directorate of Health Information and Research. Data for paediatric (birth to 14 completed years) and neonatal admissions, day cases, outpatient visits, attendance at Paediatric Accident and Emergency and the Community-based Developmental Unit were obtained from the Annual Reports, Department of Paediatrics, for the period 1996-2011.

**Results:** During the study period, live births fell by 11% from 4,349 in 1996 to 3,857 in 2005, and recovered to 4,283 in 2011. Whereas neonatal admissions to NPICU remained constant at around 340( $\pm$ 22) per annum, inpatient admissions to the general Paediatric wards decreased by 19% (from 3,151 to 2,550), and casualty reviews dropped by 35% (11,831 to 7,773). In contrast, day care reviews increased by 66% (1,347 to 3,928), the total outpatient workload increased by 70% (13,500 to 22,998), and cases reviewed in the Community-based Child Developmental Unit increased by 184% from 413 to 1174. Changes observed in the clinical activity in Gozo General Hospital were similar but less marked.

**Conclusion:** Over a 16 year period, there has been a significant shift in the paediatric workload in Malta from an in-patient bias in 1996 to increased day care and outpatient reviews in 2011. This shift is largely the result of improved hospital and community day health care services, and can be increased further with augmented community care. Health resources and future paediatric health care programmes will need to take heed of these trends.

## Key words

changing clinical activity, Paediatrics

## Introduction

Several factors, both within the hospital setting and in the community, may influence the clinical workload in paediatrics and, in turn, may impact the Healthcare needs and planning requirements for this important service. Malta, the smallest island state within the European Union with a total population of 415,654 (August 2013), has a single Clinical Department of Paediatrics based within the main 825-bedded State Hospital. All hospital services are catered for in three paediatric wards (36 beds), a combined Paediatric and Neonatal Intensive Care Unit (NPICU, 33 cots), Day Care (12 beds), Emergency and Outpatient Departments, whilst Community care is based in a Child Development Unit and Health Centres, off-site from the main hospital. A small 7-bedded Paediatric Unit, in the 159-bedded state General Hospital on the sister island of Gozo, caters for approximately 6-10% of paediatric consultations, and a few children are born and/or admitted to privately run hospitals. Hospital admissions are more likely in children under 4 years of age. Infants (below 1 year of age) make up 28( $\pm$ 2)% of all hospital paediatric admissions, whilst 30( $\pm$ 1)% of hospital paediatric admissions include children between the age of 1-3 years. Hence, a change in number of births, with a subsequent change in the prevalence of infants and children below school age, would be expected to impact the clinical workload. Additionally, changing population demographics affected by immigration could affect clinical workload. The latter would include legal adoptions and irregular migration, in these cases both

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the total number and country of origin of adoptees/migrants may vary considerably over a period of a few years, thereby creating new health problems with different requirements on existing healthcare services. Finally, changing standards of health care, in-hospital sub-specialisation as well as improved community-based services and education are all potentially contributing factors that may alter the paediatric workload.

This study reviews the clinical workload in the Department of Paediatrics at a National level in the light of a changing birth rate, changing national demographics, and improved in-hospital and community services for children, over a 16-year period.

**Running title:** changing workload, paediatrics

## Methods

During the study period, paediatric cases were defined as all children from birth to 14 completed years (subsequently increased to 16 years in 2012). National statistics for livebirths were obtained from the Directorate of Health Information and Research, whereas figures for paediatric and neonatal admissions, day cases, outpatient visits and reviews in Paediatric Accident and Emergency were obtained from the Annual Reports, Department of Paediatrics, for the period 1996-2011. Chi squared test was used to compare changes in numbers of births to indigenous or non maltese mothers, assuming  $p \leq 0.05$  to achieve significance.

## Results

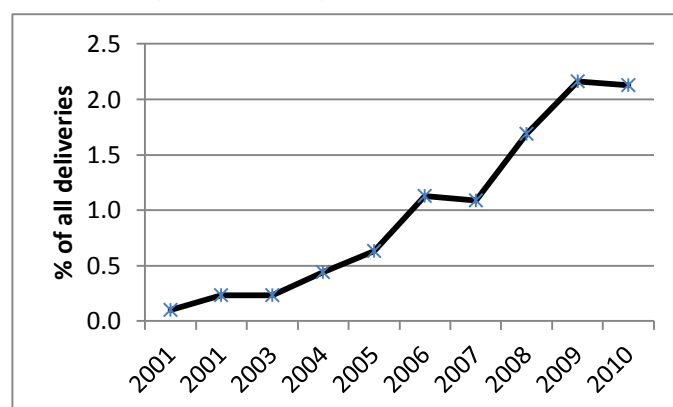
### *Changes in births, demographics*

The client base for paediatric services in Malta has been shrinking for more than half a century. Births in Malta and Gozo have been falling even before the study period from the peak of 11,304 in 1946 to a nadir of 3,536 in 2007 with some recovery since.<sup>1</sup> During the study period 1996-2011, the live births fell by 19% from 4,349 in 1996 to 3,536 in 2007, and recovered to 4,283 in 2011 (down 1.5% from 1996).<sup>1</sup> These rates have contributed to a reduction in the paediatric population (below the age of 14 years) recorded in the national census of 71,848 in 2000, to 59,414 in 2011.<sup>1</sup> Almost all of the births registered during the study period included those to indigenous maltese parents, and non maltese children below 14 years only amounted to 2,091 (3.5%) from the total of 59,414 in 2011.<sup>2</sup> Hence, relatively few non-Maltese children were added to the official population, and these included legal adoptions and irregular migrants.<sup>1-4</sup>

Prior to 1997, an average of 44 children were legally adopted every year, with  $12 \pm 1$  (28%) from Malta and  $32 \pm 7$  overseas, mostly from Romania (50%) and

Pakistan (13%). During the study period a mean of 65 children were legally adopted every year with  $16 \pm 7$  (25%) locally, and  $49 \pm 8$  from overseas, mainly from Russia (36%), Ethiopia (25%) and Cambodia (14%).<sup>2-4</sup> Concomitantly, approximately  $174 (\pm 83)$  children enter the country through irregular immigration per year, mostly from sub-Saharan Africa.<sup>3</sup> Furthermore, deliveries to mothers of Sub-Saharan African nationality have increased steadily and significantly from 0.1% (4) of all deliveries in 2001 to 2.13% (84 deliveries) in 2010,  $p < 0.001$  (Figure 1).<sup>5</sup>

**Figure 1:** Percentage of all deliveries in Malta occurring to mothers of Sub-Saharan nationality.



### *Changes in workload*

Over the 16 year study period 1996-2011, the total number of clinical events covering all areas of paediatric care in Malta increased by 27% from 30,582 to 38,763 per annum.<sup>6</sup> Whereas neonatal admissions to NPICU remained constant at around 340 ( $\pm 22$ ) per annum, in-patient admissions to the general paediatric wards decreased by 19% (from 3,151 to 2,550, Figure 2), and casualty reviews dropped by 35% (from 11,831 to 7,773, Figure 3).<sup>6</sup>

**Figure 2:** General admissions, 1995-2011.

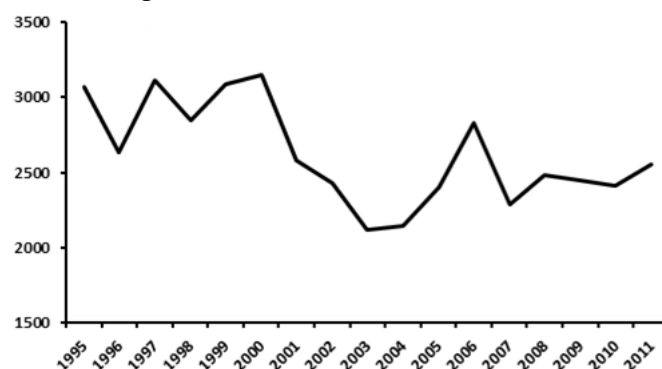
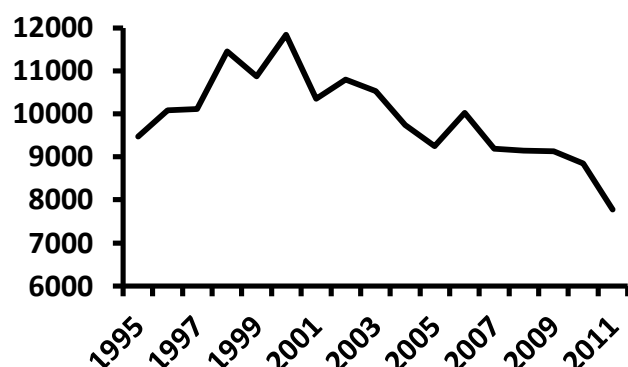
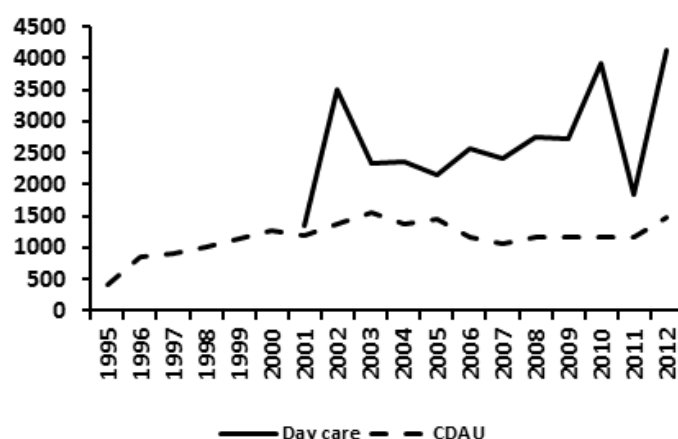


Figure 3: Casualty reviews, 1995-2011.



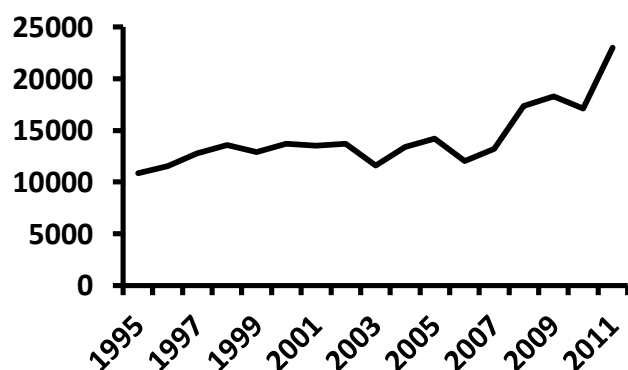
In contrast, day care reviews increased by 66% (1,347 to 3,928, Figure 4), cases reviewed in the Community-based Child Developmental Unit increased by 184% (from 413 to 1,174, Figure 4), and the total outpatient workload increased by 70% (13,500 to 22,998, Figure 5).<sup>6</sup>

Figure 4: Changes in Day and Community workload, 1995-2012.



\* Dip in 2011 reflects prolonged periods when day care unit was not available for use.

Figure 5: Changes in outpatient visits, 1995-2011.



Over the same 16-year period, the total number of clinical events covering all areas of paediatric care in Gozo General Hospital decreased from 4,098 to 3,385 per annum.<sup>6</sup> Although, over the same time period, live births in the sister island of Gozo decreased by 23% from 363 to 279,<sup>1,6</sup> the inpatient workload was unchanged from 664 to 676 cases, outpatient cases decreased 25% from 1852 to 1391 and casualty reviews decreased by 17% from 1,582 to 1,318.<sup>1,6</sup>

## Discussion

This study clearly shows that the paediatric workload in Malta, at a national level, has changed considerably over the past decade and a half. Overall, there has been an increase of 27% in the total number of 'all comer' clinical events recorded each year, despite a concomitant reduction in the national crude birth rate ranging from 13.1/1000 population in 1996 to 9.6/1000 population in 2010.<sup>1,6</sup> This increase is largely the result of a significant increase in day care (66%), outpatient (70%) and community (184%) workload, and is partially offset by a steady decrease in inpatient and casualty-based activity of 19 and 35% respectively, over the same time period.

Several factors are likely to have contributed to the changing trend from in- to out-patient based work, including the expansion and improvements in existing services within the primary care setting, in line with similar trends overseas.<sup>7</sup> During the study period, the community-based Child Developmental and Assessment Unit was firmly established as a service provider and augmented by an increase of community-based consultant posts from one incumbent in 1996 to four in 2011. This, together with a general improvement in primary care services and an increasing number of paediatric-trained personnel working in primary care within both government and private sectors, have diverted a significant proportion of care away from the hospital setting. Improved care and disease prevention in children with, for example the achievement of >96% vaccine coverage against *haemophilus influenzae type b* (Hib) within the National Immunisation Programme<sup>8</sup> and an estimated figure of >75% for *Streptococcus pneumoniae* administered in the private sector, are likely to have had a significant impact on the health burden that these infections create. Indeed, in the UK, US and elsewhere, widespread and effective immunisation programmes for these two infections alone have resulted in far fewer cases requiring hospital admission.<sup>9-12</sup>

Simultaneously, there has been a steady trend toward in-hospital sub-specialisation, and the hospital-based consultant pool increased from five generalists in Malta and Gozo in 1996 to four generalists and six

subspecialists in 2011 (and seven in 2013). These have expanded existing and/or introduced several new services many of which include day care work such as endoscopy, endocrine testing, echocardiography, and gastro/cardiac/neuro-interventional procedures, amongst others. Invariably all these services, in turn, generate additional work mainly relating to imaging and investigations most of which are carried out as day cases. Other subspecialties, although not yet consultant-based, have also expanded along the same format, in turn creating their own demand on existing services whilst creating new services including focused outpatient clinics. Invariably these services are more complex and demanding than what was in existence beforehand. Indeed, these changes would, to some extent, explain the observed increase in children outpatient-based services in Malta compared with a corresponding drop of 25% in Gozo where subspecialisation has not occurred.

The rationale and benefits of visiting consultant clinics (VCCs) has been well documented,<sup>13,14</sup> and the introduction and expansion of the VCCs in paediatric specialties in Malta has continued to add to the outpatient workload.<sup>4</sup> In 1996, 7 visiting consultants carried out 8 clinics annually and, in 2011, this had increased to 9 consultants attending 22 clinics. This would translate into an increase in patient attendance from an average of 160 to 450 in all VCCs per annum, but would also have had a knock-on effect for subsequent day care work (e.g. for investigations) as instructed by the visiting consultant. Whilst providing a review service at a local level and helping to train local personnel, VCCs reduce the need for referrals for some groups of patients overseas, but also flag up other 'new' patients (and any accompanying health requirements including investigation and treatment), that were previously unrecognised. In many cases, for a given subspecialty, the overall number of patients reviewed and those referred abroad remains generally constant before and after the establishment of a VCC, albeit with the level of clinical excellence being raised.

Over the study period, increasing staff expertise, achieved through improved training carried out locally and overseas along well defined training programmes, better links with tertiary and quaternary service providers (including the VCCs), and well established training initiatives such ongoing continued medical education, symposia, travel for conferences, etc., are all likely to introduce more 'modern', time efficient and out-patient based practices.

Clearly, workload as perceived by number of patients alone is of limited value, and the actual burden on health services may be considerably greater if the increasing numbers also present with different and more complex diseases.<sup>15,16</sup> Hence, for example, in 2011 the

number of international adoptions and irregular migrant children entering the country per year had increased to a mean of 49 and 174, respectively.<sup>1-4</sup> Although arriving in relatively small cohorts, these children are more likely to have medical problems requiring attention and, although the impact in Malta is unknown, they have been estimated to add a significant burden to healthcare budgets in other countries.<sup>17-21</sup> Similarly, although outpatient care is generally cost effective compared with hospital admissions, new treatment modalities and 'modern' medicine particularly with regard to newer drugs remain, in many cases, very expensive regardless of whether these can be administered in an outpatient setting. For this reason, the clear shift from in- to outpatient care over a 16-year period has not been associated with a parallel reduction in the cost of care within Paediatrics in Malta.

## Conclusion

This 16 year review clearly demonstrates a significant shift in the paediatric hospital workload in Malta from an in-patient bias in 1996 to increased day care and outpatient reviews in 2011. This shift is largely the result of improved hospital day-care and community health services and can be increased further with augmented community care. Health resources and future Paediatric health care programmes will need to take heed of these trends and must be planned accordingly.

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## References

1. Demographic Reviews. National Statistics Office, Government of Malta, 1996-2011. Available from: <http://www.nso.gov.mt>.
2. Census on Population and Housing 2011. National Statistics office, Malta. Malta 2002-2012 (online). Available from: [http://www.nso.gov.mt/statdoc/document\\_file.aspx?id=3424](http://www.nso.gov.mt/statdoc/document_file.aspx?id=3424) Table14 [Accessed 21 December 2013].
3. Attard Montalto S, Grech K, Busuttill R. Trends and problems associated with adoptions over a 22 year period. Proceedings 7th Malta Medical School Conference. Malta Medical Journal, 2009 Nov 21(99): 68.
4. Migration. In Demographic Reviews under Population and Social Conditions. National Statistics office, Malta. Malta 2002-2012 (online). Available from: <http://www.nso.gov.mt/site/page.aspx> [Accessed 21 December 2013].
5. National Obstetric Information System, DHIR. Trends in Obstetrics - Malta 2001-2010 (online). Available from: [http://ehealth.gov.mt/HealthPortal/chief\\_medical\\_officer/health\\_infor\\_research/registries/births.aspx](http://ehealth.gov.mt/HealthPortal/chief_medical_officer/health_infor_research/registries/births.aspx) [Accessed 15 November 2013].
6. Attard Montalto S. Annual Reports, Department of Paediatrics, 1996-2011. Division of Health, Malta. 1996-2011.

7. Blair ME, Pullan CR, Rands LE, Crown N. Community Paediatrics moves on – an analysis of changing work pattern 1994-97. *Public Health* 2000 Jan; 114(1): 61-64.
8. Vaccination. In *Children under Population and Social Conditions*. National Statistics office. Malta 2002-2012 (online). Available from: <http://www.nso.gov.mt/site/page.aspx> [Accessed 21 December 2013].
9. Ladhani SN, Two decades of experience of the Haemophilus Influenzae serotype b conjugate vaccine in the United Kingdom. *Clin Ther* 2012 Feb; 34(2): 385-99.
10. Griffiths UK, Clark A, Geisner B, Miners A, Sanderson C, Sedjaningsih ER, Mulholland KE. Dose specific efficacy of Haemophilus Influenzae type b conjugate vaccine: a systematic review and meta-analysis of controlled clinical trials. *Epidemiol Infect* 2012 Aug; 140(8): 1343-55.
11. Gil E, Noursadeghi M, Brown JS. The clinical and ecological impact of childhood pneumococcal vaccination. *Br J Hosp Med* 2013 Apr; 74(4): 212-6.
12. Peters TR, Poehling KA. Invasive pneumococcal disease: the target is moving. *JAMA* 2007 Apr 25; 297(16): 1825-6.
13. Wagstaff MH, Rigby ML, Redington AN. Increasing workload and changing referral patterns in Paediatric Cardiology outreach clinics: implications for consultant staffing. *Heart* 1998 Mar; 79(3): 223-4.
14. Tracy R, Saltzman KL, Wakefield DS. Considerations in establishing visiting consultant clinics in rural hospital communities. *Hosp Health Serv Adm* 1996 Summer; 41(2): 255-65.
15. Thompson E, Todd P, NiBrockhain C. The epidemiology of general paediatrics outpatient referrals: 1988-2006. *Child Care Health Dev* 2013 Jan; 39(1): 44-9.
16. Schor EL. Reshaping paediatric practice. *Pediatrics* 2013 Feb; 131(2): 201-3.
17. Eckerle JK, Howard CR, John CC. Infection in internationally adopted children. *Pediatr Clin North Am* 2013 Apr; 60(2): 487-505.
18. Park H, Bothe D, Holsinger E, Kirchner HL, Olnerss K, Mandalalias A. The impact of institutional status and longitudinal recovery of motor and cognitive milestones in internationally adopted children. *Int J Environ Res Public Health* 2011 Jan; 8(1): 105-16.
19. Young CL, Hall WT, Collins J. Providing health and social services to illegal alien families: a dilemma for community agencies. *Soc Work Health Care* 1979; 4(3): 309-18.
20. Ohndorf W. Social effects on migration in receiving countries. *Int Migr* 1989 Jun; 27(2): 209-16.
21. Kullgren JT. Restrictions on undocumented immigrants' access to health services: the public health implications of welfare reform. *Am J Public Health* 2003 Oct; 93(10): 1630-3.