

Australian children lack the basic movement skills to be active and healthy

L. M. Barnett^{A,F}, L. L. Hardy^B, D. R. Lubans^C, D. P. Cliff^D, A. D. Okely^D, A. P. Hills^E and P. J. Morgan^C on behalf of the Physical Activity and Sedentary Behaviour Stream of the Australasian Child and Adolescent Obesity Research Network (ACAORN)

^ASchool of Health and Social Development, Faculty of Health, Deakin University, 221 Burwood Hwy, Burwood, Vic. 3125, Australia.

^BPrevention Research Collaboration, School of Public Health, University of Sydney, Lvl 2 K25 Medical Foundation Building, 92 Parramatta Rd, Camperdown, NSW 2050, Australia.

^CUniversity of Newcastle Priority Research Centre in Physical Activity and Nutrition, Faculty of Education and Arts, University of Newcastle, University Dve, Callaghan, NSW 2308, Australia.

^DInterdisciplinary Educational Research Institute, Faculty of Social Sciences, School of Education, University of Wollongong, Northfields Ave, Wollongong, NSW 2522, Australia.

^ECentre for Nutrition and Exercise, Mater Research and Griffith Health Institute, Griffith University, South Brisbane, QLD 4101, Australia.

^FCorresponding author. Email: lisa.barnett@deakin.edu.au

Received 5 December 2012, accepted 4 June 2013, published online 18 July 2013

Just as children need to be taught their ABCs to read and write, they also need to be taught fundamental movement skills (FMS), such as running, jumping, throwing and kicking, to provide the strongest foundation for a physically active lifestyle. Children who are proficient at FMS are more likely to be physically active and have adequate cardiorespiratory fitness, and are less likely to be overweight or obese compared with children who are not proficient.^{1,2} In addition, FMS-proficient children are more likely to become adolescents who are more active³ and with higher cardiorespiratory fitness levels.⁴

So what does FMS ‘proficient’ mean? There are two primary methods to assess children’s motor skills: ‘product’ or ‘process’ oriented. Product assessments measure, for example, how fast a child can run, whereas process assessments involve the use of observational criteria to determine whether the child moves their body to run efficiently, or in a ‘proficient’ manner. For example, a process assessment of running may look for components such as the whether the arms move in opposition to the legs and with the elbows bent; if there is a brief period where both feet are off the ground; and whether the non-support leg bends approximately 90°.⁵

Regrettably, preschools and schools are limiting children’s opportunities to learn and develop proficiency in FMS. Ideally, children should develop FMS proficiency during early childhood and primary school through a range of opportunities, including unstructured active play,⁶ interactions with parents, siblings

and caregivers,^{7,8} quality physical education,^{9,10} school sport and community-based programs.¹¹ Yet, many children are entering secondary school lacking proficiency in many FMS. Approximately two-thirds of Year 6 children in NSW are not proficient at locomotor skills (e.g. running, jumping and hopping) and two-thirds of girls and one-quarter of boys have low object control skill proficiency (e.g. ball-handling skills, such as throwing and kicking).¹ With 85% of Australian adolescents not meeting the National Physical Activity Recommendations of at least 60 min of moderate to vigorous physical activity per day,¹² insufficient physical activity (PA) among youth is a global health issue.¹³ Furthermore, one-quarter are either overweight or obese¹² and one-third do not have adequate cardiorespiratory fitness.¹⁴ Therefore, urgent action is needed to ensure all Australian children are provided with the opportunity to develop competence and confidence in FMS that will help them be active, fit and of a healthy weight.

Schools are universally recognised as important institutions for the promotion of PA in young people, with Health and Physical Education (HPE) and school sport programs being key potential vehicles for the promotion and provision of PA opportunities. However, several recent and significant independent reports have addressed the issue of low levels of PA in Australian children and the role of schools in this. In 2009, the Crawford Report¹⁵ highlighted the important role of schools, in particular the need to reinvigorate HPE and school sport in Australian schools. The report states:

It was concerning to learn from experts Australia-wide that the education system no longer reliably provides the platform upon which much of the nation's sporting activity is based. It no longer consistently carries out the vital role of introducing children to PA and organised sport.¹⁵

The Crawford Report¹⁵ identified a lack of teacher training, poor facilities and a low priority for PA in schools as major issues. Recommendations pertaining to the school learning context were that sport in schools should be an ongoing priority, physical education a stand-alone learning area and the national curriculum should be implemented as soon as possible.¹⁵ In the same year, the National Preventive Health Task Force recommended that a key strategy within HPE should be to promote FMS and to ensure sufficient time was available during school for sport and recreation.¹⁶ These findings echoed those of a Senate Inquiry into Sport and physical education conducted more than 20 years ago.¹⁷

The link between FMS, health outcomes and the low competency levels found in Australian children and adolescents, coupled with the independent reports focusing on these issues and the impending release of the HPE national curriculum, should provide a catalyst for change. Unfortunately, there exists a policy situation that does not reflect the importance of children developing confidence and proficiency in FMS. For preschool-aged children, the National Physical Activity Recommendations state, 'it is important to provide opportunities to practice locomotor, stability and object control skills',¹⁸ but the Australian Government Healthy Eating and Physical Activity Guidelines for Early Childhood Settings and national quality standards for early childhood education do not specify FMS development as a curriculum requirement.^{19,20} Given the clear evidence of the importance of developing FMS proficiency during childhood, and its importance as a foundation for a physically active life, we strongly recommend that, within the broader mandate for increasing the PA of Australian children, FMS development be more clearly specified in all relevant policy documents.

Although policy is important, it is only the first step. We need to take urgent action and implement change through both early childhood and school education settings. Assisting the early childhood sector to include FMS development programs is prudent to ensure all children enter school with basic FMS proficiency. We have good available evidence-based programs targeting FMS development that are efficacious, translatable and scalable for the early childhood sector to integrate. Examples include Tooty Fruity Veggie in Preschools,^{21,22} found to have long-term beneficial outcomes^{23,24} and translated successfully across NSW as Munch and Move²⁵ and also Jump Start,²⁶ currently being translated in childcare settings in Tasmania.

In school settings, a proposed solution to PA promotion and the provision of quality physical education is to have physical education specialists in primary schools. A secondary option is to provide sufficient training and up-skilling for generalist teachers to undertake this role. However, this is cautioned by available evidence that shows there is strong and consistent consensus that generalist classroom

teachers lack confidence to teach physical education, feel inadequately trained and prepared and tend to place physical education as a lower priority in an already 'crowded' curriculum.^{9,10} There is also an immediate opportunity with the development of the Australian National HPE curriculum for primary and high schools to place opportunities to develop FMS centre stage in HPE programs. The public consultation phase for the Draft HPE curriculum has recently closed and it is currently being revised for publication in late 2013. Fortunately, it appears that FMS will be one of the key categories in the curriculum's movement and PA strand. However, it is unclear whether teachers will have to assess and report student achievement against FMS proficiency. Current practice would suggest this is unlikely¹⁰ but, given the evidence, this is what we should be striving for.

Solutions to address Australian children's lack of mastery in basic FMS^{14,27-29} needed to lead active healthy lives require cooperation and commitment between public health, education and early childhood sectors. There are three priority areas: first, we need to ensure that FMS development is highlighted in all relevant policy documents; second, we need to ensure that children are given opportunities to be taught FMS during the preschool years; and third, we need to ensure primary schools provide a quality HPE program accompanied by appropriate teacher resources and professional development. We also need all Australian states and territories to monitor children's FMS proficiency through state-wide surveys (such as the NSW SPANS¹⁴), because this will provide one dimension of children's capacity to participate in a range of physical activities and give us valuable information as to how we are tracking with changing this situation. In the face of disparaging public reports and at a time when we are currently considering a national curriculum, now is the opportune time to take action in a timely and coordinated fashion to up-skill our children for a lifetime of PA.

References

- Hardy LL, Reinten-Reynolds T, Espinel P, Zask A, Okely AD. Prevalence and correlates of low fundamental movement skill competency in children. *Pediatrics* 2012; **130**(2): e390-8. doi:10.1542/peds.2012-0345
- Lubans DR, Morgan PJ, Cliff DP, Barnett LM, Okely AD. Review of the benefits associated with fundamental movement skill competency in youth. *Sports Med* 2010; **40**(12): 1019-35. doi:10.2165/11536850-000000000-00000
- Barnett LM, van Beurden E, Morgan PJ, Brooks LO, Beard JR. Childhood motor skill proficiency as a predictor of adolescent physical activity. *J Adolesc Health* 2009; **44**: 252-9. doi:10.1016/j.jadohealth.2008.07.004
- Barnett LM, van Beurden E, Morgan PJ, Brooks LO, Beard JR. Does childhood motor skill proficiency predict adolescent fitness? *Med Sci Sports Exerc* 2008; **40**: 2137-44. doi:10.1249/MSS.0b013e31818160d3
- Ulrich DA. Test of gross motor development, 2nd edn. Austin, TX: PRO-ED; 2000.
- Bunker LK. The role of play and motor skill development in building children's self-confidence and self-esteem. *Elem Sch J* 1991; **91**(5): 467-71. doi:10.1086/461669
- Barnett L, Hinkley T, Okely AD, Salmon J. Child, family and environmental correlates of children's motor skill proficiency. *J Sci Med Sport* [Epub ahead of print]. doi:10.1016/j.jsams.2012.08.011
- Cools W, Martelaer KD, Samaey C, Andries C. Fundamental movement skill performance of preschool children in relation to family context. *J Sports Sci* 2011; **29**: 649-60. doi:10.1080/02640414.2010.551540
- Morgan PJ, Hansen V. Recommendations to improve primary school PE: the classroom teacher's perspective. *J Educ Res* 2007; **101**: 99-111. doi:10.3200/JOER.101.2.99-112

10. Morgan PJ, Hansen V. Classroom teachers' perceptions of the impact of barriers to teaching PE on the quality of PE programs delivered in primary schools. *Res Q Exerc Sport* 2008; **79**: 506–16. doi:10.1080/02701367.2008.10599517
11. Cliff DP, Okely AD, Morgan PJ, Steele JR, Jones RA, Colyvas KIM, Baur R. Movement skills and physical activity in obese children: randomized controlled trial. *Med Sci Sports Exerc* 2011; **43**(1): 90–100. doi:10.1249/MSS.0b013e3181e741e8
12. Morley B, Scully M, Niven P, Baur LA, Crawford D, Flood V, Okely AD, Pratt IS, Salmon J, Wakefield J. Prevalence and socio-demographic distribution of eating, physical activity and sedentary behaviours among Australian adolescents. *Health Promot J Austr* 2012; **23**: 213–18.
13. Kohl HW 3rd, Craig CL, Lambert EV, Inoue S, Alkandari JR, Leetongin G, Kahlmeier S. Lancet Physical Activity Working Group The pandemic of physical inactivity: global action for public health. *Lancet* 2012; **380**(9838): 294–305. doi:10.1016/S0140-6736(12)60898-8
14. NSW Ministry of Health. NSW schools physical activity and nutrition survey (SPANS) 2010. Full report. Sydney: Centre for Health Advancement; 2011.
15. Crawford D. Australian Government Independent Sport Panel: the future of sport in Australia. 2009. Available from: [http://www.health.gov.au/internet/main/publishing.nsf/Content/1DDA76A44E5F4DD4CA257671000E4C45/\\$File/Crawford_Report.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/1DDA76A44E5F4DD4CA257671000E4C45/$File/Crawford_Report.pdf) [Verified 13 June 2013].
16. Australian Government Preventive Health Taskforce. Australia the healthiest country by 2020. National Healthy Preventative Health Strategy: the road map for action, Canberra 2009. Contract No. P3-5444. Canberra: Commonwealth of Australia; 2009.
17. Senate Standing Committee on Environment Recreation and the Arts. Physical and sport education. Canberra: The Parliament of the Commonwealth of Australia; 1992.
18. Department of Health and Ageing. National physical activity recommendations for children 0–5 years, move and play every day. Canberra: Commonwealth of Australia; 2010.
19. Australian Government Department of Health and Ageing. Get up and Grow Healthy Eating and Physical Activity for Early Childhood. Canberra: Commonwealth of Australia; 2009.
20. Council of Australian Governments, Early Childhood Development Steering Committee. National quality standard for early childhood education and care and school age care. 2009. Available from: <http://www.eduweb.vic.gov.au/edulibrary/public/earlychildhood/nqf/nationalqualitystandard.pdf> [Verified 13 June 2013].
21. Adams J, Zask A, Dietrich U. Tooty Fruity Veggie in preschools: an obesity prevention intervention in preschools targeting children's movement skills and eating behaviours. *Health Promot J Austr* 2009; **20**(2): 112–19.
22. Zask A, Adams JK, Brooks LO, Hughes DF. Tooty Fruity Veggie: an obesity prevention intervention evaluation in Australian preschools. *Health Promot J Austr* 2012; **23**(1): 10–15.
23. Adams J, Molyneux M, Squires L. Sustaining an obesity prevention intervention in preschools. *Health Promot J Austr* 2011; **22**(1): 6–10.
24. Zask A, Barnett LM, Rose L, Brooks LO, Molyneux M, Hughes D, Adams J, Salmon J. Three year follow-up of an early childhood intervention: is movement skill sustained? *Int J Behav Nutr Phys Act* 2012; **9**(1): 127. doi:10.1186/1479-5868-9-127
25. Hardy LL, King L, Kelly B, Farrell L, Howlett S. Munch and Move: evaluation of a preschool healthy eating and movement skill program. *Int J Behav Nutr Phys Act* 2010; **7**: 80–90. doi:10.1186/1479-5868-7-80
26. Jones RA, Riethmuller A, Hesketh K, Trezise J, Batterham M, Okely AD. Promoting fundamental movement skill development and physical activity in early childhood settings: A cluster randomized controlled trial. *Pediatr Exerc Sci* 2011; **23**: 600–15.
27. van Beurden E, Zask A, Barnett LM, Dietrich UC. Fundamental movement skills: how do primary school children perform? The 'Move It Groove It' program in rural Australia. *J Sci Med Sport* 2002; **5**: 244–52. doi:10.1016/S1440-2440(02)80010-X
28. Cooley D, Oakman R, McNaughton L, Ryska T. Fundamental movement patterns in Tasmanian primary school children. *Percept Mot Skills* 1997; **84**(1): 307–16. doi:10.2466/pms.1997.84.1.307
29. Hume C, Okely AD, Bagley S, Telford A, Booth M, Crawford D, Salmon J. Does weight status influence associations between children's fundamental movement skills and physical activity? *Res Q Exerc Sport* 2008; **79**: 158–65.