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## Title

Implementation of continuous free play schedules in Australian childcare services: a cross-sectional study

## Abstract

**Issue addressed:** Modifying the scheduling of physical activity opportunities to provide children with more frequent opportunities for outdoor free play has been demonstrated to increase child physical activity in care. The primary aim of this study was to describe the current implementation of continuous free play schedules consistent with sector guidelines in a national sample of Australian childcare services. Secondary aims were to investigate associations between the implementation of continuous free play schedules and service characteristics, and assess perceived barriers and enablers to implementation.

**Methods:** A cross-sectional study was undertaken with a random sample of 326 centre-based childcare services located across Australia. Childcare service characteristics, continuous free play scheduling and perceived barriers and enablers to implementation were assessed via a survey administered to service managers online or via telephone.

**Results:** A total of 203 service managers (62%) reported implementing a continuous free play schedule, for 3 periods of 126 minutes per period, each day on average. Service type (long day care services), size (services with higher numbers of child enrolments ( $\geq 80$  children)) and socio-economic area (services located in lower socio-economic areas) were associated with the implementation of a continuous free play schedule. The most prevalent barriers to implementation included insufficient staff to ensure adequate supervision of children (69%) and service layout being unsuitable (65%), while the most prevalent enablers included advice on how to overcome staffing or supervision issues (89%) and to re-orientate the service layout (54%).

**Conclusions:** There is scope to support the implementation of continuous free play schedules consistent with childcare sector guidelines.

**So what?** Future intervention research that targets the reported barriers and enablers to implementation is needed.

## Summary

Providing children with more frequent opportunities for outdoor free play at childcare via continuous play schedules has the potential to increase child physical activity and aligns with childcare regulatory guidelines. Despite this, approximately 40% of services do not implement such play schedules at

childcare, with further research targeting reported barriers needed to establish effective approaches to do so.

## **Keywords**

Childcare; physical activity; implementation; child; active play; early childhood

## **Introduction**

Adequate physical activity in early childhood has been associated with various physical and psychosocial benefits.<sup>1-5</sup> Physical activity habits developed early in life also aid in reducing the risks associated with the onset of overweight and obesity and other chronic illnesses later in life.<sup>1, 6, 7</sup> Consequently, national and international public health guidelines<sup>6, 8-10</sup> recommend that young children engage in sufficient amounts of physical activity to reduce the risk of chronic disease. Despite this, many young children do not adhere to national physical activity guidelines.<sup>1, 11</sup>

Centre-based childcare is a recommended setting to promote child physical activity. Childcare services provide access to the majority of the population aged less than five years, often for prolonged periods each day<sup>5, 12, 13</sup>. There is also significant opportunity to improve child physical activity in care, with only 10% of preschool-aged children in Australia meeting recommended levels of at least 15 minutes of physical activity per hour while in attendance at childcare.<sup>14</sup> Further, childcare service staff see it as their role and professional responsibility and are motivated to support children to be physically active while in care,<sup>15, 16</sup> and creating environments supportive of child physical activity is consistent with service accreditation standards and guidelines.<sup>17</sup>

Findings from systematic reviews and randomised trials indicate that providing opportunities for active play during childcare can result in improvements in child physical activity levels.<sup>13, 18-20</sup> For example, modifying the scheduling of physical activity opportunities to provide children with more frequent opportunities for outdoor free play has been demonstrated to increase the level of overall child physical activity in care<sup>1, 21-25</sup>. In addition, a systematic review of the physical activity levels of children during indoor and outdoor play periods at childcare found that children spent almost half (48% (33-55%)) of their outdoor play time engaging in physical activity, compared to less than 10% of indoor play time being active.<sup>26</sup> As such, Australian childcare regulatory guidelines (the National Quality Framework<sup>27, 28</sup>) recommend that services provide children with opportunities to access outdoor play areas (whenever a structured activity is not in place), allowing flexible access between

the indoor and outdoor environments to increase total outdoor free play time. This is also referred to as a continuous free play schedule or a free-flow routine.

Despite the potential to improve child health, there have been no previous studies describing how Australian childcare services schedule continuous free play opportunities. There is also limited literature available identifying perceived barriers to the implementation of such guidelines, and if implementation differs according to various service characteristics.<sup>1, 5</sup> Such information is critical in order to guide efforts to support implementation. Previous studies have found that children's inappropriate clothing,<sup>29</sup> family and cultural factors,<sup>21, 30</sup> availability of outdoor space and play equipment,<sup>31, 32</sup> structure of daily programming<sup>5, 23</sup> and additional time taken for adhering to sun-safe policies<sup>5</sup> may negatively impact on the implementation of physical activity promoting initiatives more broadly in childcare. A better understanding of the various factors that impact on the implementation of continuous free play schedules in childcare is required in order to develop effective strategies to support childcare service staff with implementing guidelines.

The primary aim of this study was to describe the current implementation of continuous free play schedules in a national sample of Australian childcare services. Secondary aims were to: i) investigate associations between the implementation of continuous free play schedules and service characteristics, including type of service (preschool or long day care service); service size (in relation to numbers of child enrolments); geographic location; and socioeconomic status of the surrounding community; and ii) assess perceived barriers and enablers to the implementation of continuous free play schedules.

## **Methods**

### **Design and setting**

A cross-sectional study was undertaken in a random sample of Australian centre-based childcare services. Ethical approval to conduct the study was obtained from the Hunter New England (16/02/17/4.05) and the University of Newcastle (H-2016-0111) Human Research Ethics Committees.

### **Sample and recruitment procedures**

A list of Australian centre-based childcare services supplied by the national government regulating agency formed the overall possible study sampling frame (n=10,631). Services located in the Hunter New England region of NSW, services across NSW that were participating in nutrition and physical activity research trials being run by the research team, and services identified as out of school hours

or vacation care were excluded prior to random sampling, leaving 10,631 potentially eligible services. A sample of 1500 services (approximately 15%, stratified by state and socioeconomic status) were then randomly selected by an independent statistician using a computer generated random sequence, and invited to participate in the study between December 2017 and August 2018. Long day care services and preschools were eligible to participate. The following services were excluded from the study: i) services located within the Hunter New England region of NSW, and services across NSW participating in concurrent nutrition and physical activity research trials being undertaken in the region by the research team; ii) services catering exclusively for children requiring specialist care, out of school hours and vacation care, and family day care services given the different operational characteristics and individual requirements for such services; and iii) Department of Education and Communities Services, as ethics approval was not obtained from the relevant government department. Further, only services indicating that they do not prepare and provide meals and snacks to children onsite were eligible to receive survey items assessing the scheduling of continuous free play. Service managers indicating that they prepared and provided meals and snacks to children onsite, with an active role in menu planning, completed alternate survey items relating to the provision of food to children at childcare. Remaining services received the survey items described below. This was intended to reduce the burden placed on participating childcare services.

The sample size of 1500 childcare services was determined to allow for inclusion of at least 450 childcare services in the sample (accounting for 60% consent rate and 50% meeting the eligibility criteria). This number was estimated to allow prevalence estimates with 95% CI's within  $\pm 5\%$ , assuming an expected population prevalence of 50%.

Service managers (or an individual in a leadership position within the service, e.g. service director, lead educator) were invited to take part in an online survey via an invitation email, with a reminder email sent four weeks following the initial email invitation. Non-responders received up to two telephone call attempts between February and August 2018 to invite participation, obtain verbal consent and administer the survey via telephone interview. Services that were uncontactable by telephone received a second reminder email to invite completion of the survey online.

### **Data collection and measures**

A survey tool was developed by the research team, consisting of items assessing childcare service characteristics, scheduling of indoor free play, continuous free play and perceived barriers and enablers to implementing a continuous free play schedule. Service managers were provided with the

option to complete the survey online or via telephone interview. Trained interviewers administered the telephone interview. The survey items were piloted with experienced telephone interviewers and members of the research team prior to the commencement of the survey, with minor amendments made based on feedback received.

### ***Service characteristics***

The survey assessed service characteristics including: service days and hours of operation; type of service (preschool or long day care service); suburb (to determine geographic location); number of children enrolled (to determine size); number of children of Aboriginal and/or Torres Strait Islander background enrolled; and number of full time equivalent primary contact teaching staff. The items used to assess service characteristics have been used in other Australian surveys of childcare services conducted by the research team.<sup>4, 5</sup> Service postcode (to determine socio-economic status) was retrieved from the list of Australian centre-based childcare services supplied by the national government regulating agency.

### ***Scheduling of continuous free play***

To assess the implementation of a continuous free play schedule, service managers were asked 'During the periods when children are given the opportunity to engage in child-initiated free active free play, are they given the choice to freely move between both the indoor and outdoor environments?' Where service managers indicated children were provided with a continuous free play schedule, they were asked to specify the frequency (average number of periods (occasions) per day) and average duration per period/occasion (in minutes).

### ***Perceived barriers and enablers to implementing a continuous free play schedule***

Service managers indicating they did not provide continuous free play were also asked to report any barriers or enablers to implementing a continuous free play schedule. Managers were provided with a list of potential barriers and enablers, developed based on evidence collected by the research team in the conduct of previous physical activity trials in the setting,<sup>5, 33</sup> evidence from studies assessing barriers to the implementation of physical activity initiatives in childcare and young children more broadly, as well as parallel research in schools.<sup>6, 29, 34, 35, 36</sup> As barriers specific to the implementation of this practice has not been previously explored, the research team consulted with five childcare services to identify a list of most relevant barriers to implementation based on findings in the literature. Barriers included: lack of alignment with service policy; educators not supportive of implementation; increased frequency of applying sunscreen; insufficient staff to ensure adequate

supervision; service layout is unsuitable; too busy to implement; extreme weather conditions. Enablers included advice on: adjusting the service daily program, how to reorientate service layout, and how to overcome staffing or supervision issues. Service managers were asked to select all barriers and/or enablers that applied and were also encouraged to specify any additional barriers or enablers in an open-ended question.

### **Statistical analyses**

All statistical analyses were performed using SAS (version 9.3) statistical software. Statistical significance was set at  $p < 0.05$ . Descriptive statistics were used to describe service characteristics. Service socioeconomic characteristics were determined using service postcodes, which were classified as being in the top or bottom 50% of Australia according to the Socio-economic Indexes for Areas (SEIFA).<sup>37</sup> Geographic characteristics of the service locality were classified as either urban or rural according to the Australian Statistical Geography Standard.<sup>38</sup> Descriptive statistics were also used to describe the frequency and duration of service scheduling of continuous free play. Childcare services were grouped according to the following: i) service type (preschool or long day care service); ii) service size (services were categorised as 'small' if they reported  $< 80$  child enrolments, or 'large' if they reported  $\geq 80$ ); iii) geographic location (services were categorised as 'urban' if located in major cities, or 'rural' if located in inner/outer regional, remote, and very remote areas based on postcode using the Accessibility/Remoteness Index of Australia; and iv) socioeconomic status of the surrounding community (services located in the top 50% of postcodes based on socioeconomic status were categorised as being located in 'higher', and those in the bottom 50% categorised as 'lower' using the 2016 Socio-economic Indexes for Areas.<sup>37</sup> All four service characteristics were entered into a multivariate logistic regression model, to identify which characteristics were significantly associated with implementation after adjusting for each other.

## **Results**

### **Sample and service characteristics**

1500 randomly selected centre-based childcare services were invited to participate in the study. Of these, 72 could not be contacted, and 53 were classified as non-responders and 250 were deemed ineligible (leaving 1125 contactable and eligible participants). Of those, 996 services provided consent to participate, an overall consent rate of 79%. A total of 746 service managers completed the survey, either via telephone or online. Within this sample, 326 service managers (44%) completed survey items assessing the scheduling of continuous free play, while the remaining service managers

completed alternate survey items relating to the provision of food to children at childcare to reduce participant burden due to survey length.

In regards to the service characteristics of participating childcare services, 283 services (87%) operated for five days per week, for an average of 8.7 hours per day. One hundred and ninety nine services were preschools (61%) and 127 (39%) long day care services, with 42% of services located in lower socio-economic areas, and 37% located in rural locations. Service managers reported employing an average of seven full time equivalent primary contact teaching staff (range 1 - 42), and had an average enrolment of 72.5 children (Table 1). The characteristics of participating childcare services were representative of Australian childcare services in terms of geographic location and socioeconomic area, however our sample included a larger proportion of preschools and lower average number of child enrolments<sup>39, 40</sup>

### **Scheduling of continuous free play**

Overall, 203 services (62.3%; 95% CI 56.98-67.56) reported currently implementing a continuous free play schedule, on average for 3.0 (SD 7.2) periods per day, for 126.3 (SD 143.8) minutes per period.

### **Service characteristics associated with the implementation of continuous free play schedules**

Differences in implementation by service characteristics including service type, size, socio-economic area and geographical location are shown in Table 2. In the multivariate analysis, long day care services compared to preschools (OR 1.7; 95% CI 1.03-2.74; p=0.04); larger services with higher numbers of child enrolments compared to smaller services (OR 1.8; 95% CI 1.11-2.89; p=0.02); and services located in lower socio-economic areas compared to those in higher socio-economic areas (OR 1.9; 95% CI 1.07-3.26; p=0.03), were more likely to report implementing a continuous free play schedule.

### **Perceived barriers and enablers to implementing a continuous free play schedule**

Of the 119 services not currently implementing a continuous free play schedule, 98 (80%) service managers reported experiencing one or more barriers to implementation. The remaining 21 did not report experiencing any barriers to implementation. The most prevalent barrier was insufficient staff to ensure adequate supervision of children (69%), followed by the service layout being unsuitable (65%), extreme weather conditions (25%), and educators not demonstrating support for implementation (15%) (Table 3). In addition, service managers noted children with additional support needs (n=3), age of the children at the service (n=3), parent expectations regarding school readiness (n=1), level of educator qualification/training on how to successfully implement (n=1) and staff



capacity to interact with children (n=1), to also be barriers to implementation. In regards to perceived enablers, of the 123 services not currently implementing a continuous free play schedule, 28 (23%) service managers reported one or more enablers to implementation. The most prevalent enablers included advice on how to overcome staffing or supervision issues (89%), to re-orientate the service layout (54%) and to adjust the service daily program (50%) (Table 3). In addition, service managers noted training for new staff (n=1), additional information and case study examples of successful implementation (n=2), ideas of how to cater for inclement weather (n=1) and financial support (n=1) as additional enablers to implementation.

## **Discussion**

This study provides valuable information regarding the current implementation of continuous free play schedules consistent with best practice guidelines in Australian childcare services and the perceived barriers and enablers to implementation. The findings indicate that despite evidence indicating the potential of this approach to improve child physical activity and a supportive regulatory context, there remains substantial scope for improvement in the implementation of continuous free play schedules in Australian childcare services. The study also identified several important perceived barriers and enablers to implementation, most notably concerns regarding staffing to ensure adequate supervision of children, suitability of the service layout and extreme weather conditions.

To date, a small number of randomised trials have been conducted specifically targeting childcare scheduling of physical activity opportunities, for example through the provision of more frequent or longer periods of outdoor free play.<sup>5, 41</sup> The study conducted by Razak and colleagues<sup>5</sup> reported a similar level of implementation as found in the current study, with 58% (n=127) of childcare services found to be currently implementing a continuous free play schedule during an assessment of eligibility. Internationally, there is limited data available regarding the implementation of continuous free play schedules. However, observational studies conducted in childcare services in the US have found that children spend an average of just 33 minutes engaged in outdoor free play, representing just 8% of the childcare day, suggesting considerable opportunity to increase opportunities for outdoor play.<sup>42</sup>

The perceived barriers to implementation of continuous free play schedules identified in this study are similar to those reported in previous studies that have explored barriers to physical activity opportunities broadly in childcare. For example, Driediger and colleagues assessed barriers to the implementation of the multi-component SPACE intervention, which included modifications to the

childcare daily outdoor play schedule from two 60 minute outdoor periods to four 30 minute periods.<sup>43</sup> While the biggest challenge was found to be the increase in transitions between the indoor and outdoor environments, additional barriers, similar to the current study, that were identified included maintaining mandatory staff/child supervision ratios and inclement weather conditions.<sup>43</sup> Razak and colleagues also suggested similar anecdotal barriers to the implementation of multiple outdoor free play periods, in their paper reporting on the outcomes of a scheduling intervention, including additional time needed for the application of sunscreen and hats, together with disruptions to routines for children with behavioural challenges.<sup>5</sup> The incorporation of such free play schedules may also be considered disruptive to the development of school readiness and academic skills for older children in particular, findings that have been reported in previous studies to improve child physical activity in childcare<sup>36, 44</sup>. Recent evaluations of the impact of such free play schedules however did not identify differences in physical activity levels by age<sup>5, 33</sup>, which may suggest that the implementation of such policies could provide a way of supporting physical activity across the different age groups attending care. Consideration of such barriers is required if routine implementation of continuous free play schedules is to be achieved.

Several enablers to the implementation of continuous free play schedules were also identified, including the provision of advice on overcoming staffing or supervision issues, how to reorientate service layouts and adjust daily programs to incorporate such play schedules. Such factors are similar to those identified in other studies which report additional support on reorienting play spaces and that the physical design of play spaces significantly influenced Educators' beliefs on outdoor play.<sup>45, 46</sup> Overall, these findings suggest that additional support and resourcing may be required to facilitate the implementation of continuous free play schedules in centre-based childcare.

The current study also identified variability in implementation of continuous free play schedules according to a number of service characteristics, suggesting that preschools, smaller services and those located in higher socio-economic areas may require additional support to implement a continuous free play schedule. It is possible that these differences could be due to such services having a smaller number of educators, smaller outdoor play areas and/or less available resources to facilitate implementation.<sup>47</sup> Other studies have reported that the implementation of physical activity practices and programs can vary according to service remoteness.<sup>48</sup> Encouragingly there were no differences found in the current study in regards to the implementation of continuous free play schedules for services located in rural areas versus those located in urban areas. Collectively these findings provide guidance for future efforts to support implementation through the identification of services most in

need of support to ensure that children have sufficient and equitable opportunities to be physically active while in care.

Key strengths of the study include the large sample of childcare services located across Australia. Nonetheless, several study limitations exist. The survey was only completed by a subsample of services who did not provide food to children, and there was a larger proportion of preschools in our sample compared to national estimates. As such study findings may have limited generalizability to services who provide all food to children and long day care services. The study used self-reported measures to assess implementation of physical activity policies which may be subject to recall and social desirability bias. Other studies have reported that self-reported measures may result in a higher prevalence of implementation relative to direct observations.<sup>49</sup> The study assessed only a limited number of barriers and enablers to the implementation of continuous free play schedules, with participants required to first select from a pre-identified list of barriers and enablers. This may have influenced their responses, however participants were encouraged to list additional barriers and enablers not previously identified. Further, the study did not undertake any qualitative assessments of such factors. Future studies would benefit from expanding on these findings through undertaking a more systematic assessment of barriers and enablers, incorporating observations, together with employing both quantitative and qualitative methods and involving a range of childcare staff, including educators. Such studies could also investigate possible associations between such factors and implementation. The study also did not assess additional environmental factors that may have influenced implementation, for example the size of indoor and outdoor areas, availability and variety of physical activity equipment, and the availability of shade in outdoor areas. Such factors have previously been suggested to influence the implementation of childcare physical activity practices more broadly.<sup>34, 46,</sup>

<sup>50</sup> Future studies should consider undertaking an assessment of such factors to assist in providing a more comprehensive understanding of the broader factors that may impact implementation. Finally, the study was conducted within Australia which may limit the generalisability of the study findings more broadly. Future studies conducted in different jurisdictions, with different climates and operational contexts, would assist in verifying the study findings.

## **Conclusion**

In conclusion, there is considerable scope for improvement in the implementation of continuous free play schedules within Australian childcare services consistent with accreditation guidelines. Future research is needed to identify effective strategies to support implementation in order to overcome reported barriers and facilitate improvements in the physical activity behaviours of children in care.

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## Tables

**Table 1: Service characteristics**

| Characteristic                                                                                |                                                | n=326      |
|-----------------------------------------------------------------------------------------------|------------------------------------------------|------------|
| Service operates 5 days per week                                                              | Yes (n, %)                                     | 283, 86.8% |
| Type of service                                                                               | Preschool (n, %)                               | 199, 61.0% |
|                                                                                               | Long day care service (n, %)                   | 127, 39.0% |
| Hours of operation each day (mean, SD)                                                        |                                                | 8.7, 1.9   |
| Number of children enrolled (mean, SD)                                                        |                                                | 72.5, 45.4 |
| Number of full time equivalent primary contact teaching staff (mean, SD)                      |                                                | 7.0, 6.2   |
| Children of Aboriginal and/or Torres Strait Islander background enrolled                      | Yes (n, %)                                     | 174, 53.4  |
| Number of children of Aboriginal and/or Torres Strait Islander background enrolled (mean, SD) |                                                | 4.1, 5.7   |
| Service socio-economic area (n, %)                                                            | Top 50% of Australia                           | 189, 58.0  |
|                                                                                               | Bottom 50% of Australia                        | 137, 42.0  |
| Service geographical location (n, %)                                                          | Urban (major cities)                           | 206, 63.2  |
|                                                                                               | Rural (inner regional, outer regional, remote) | 120, 36.8  |

**Table 2: Differences in implementation of continuous play schedules by service type, size, socio-economic area and geographical location**

|                                              | Variable                                  |                                         | Odds ratio (95% CI) | p-value |
|----------------------------------------------|-------------------------------------------|-----------------------------------------|---------------------|---------|
| Implementation of a continuous play schedule | Type of service                           | Long day care service vs preschool      | 1.68 (1.03-2.74)    | 0.04    |
|                                              | Service size (number of child enrolments) | Large ( $\geq 80$ ) vs small ( $< 80$ ) | 1.77 (1.08-2.89)    | 0.02    |
|                                              | Service socio-economic area               | Lower vs higher                         | 1.87 (1.07-3.26)    | 0.03    |
|                                              | Service geographical location             | Urban vs rural                          | 1.69 (0.96-2.98)    | 0.07    |



**Table 3: Perceived barriers and enablers to implementing a continuous free play schedule**

|                                                                                  | n, %        |
|----------------------------------------------------------------------------------|-------------|
| <b>Barrier</b>                                                                   | <b>n=98</b> |
| Insufficient staff to ensure adequate supervision of children                    | 68, 69.4    |
| Service layout is unsuitable                                                     | 64, 65.3    |
| Extreme weather conditions                                                       | 24, 24.5    |
| Educators not supportive                                                         | 15, 15.3    |
| Lack of alignment with service policy                                            | 11, 11.2    |
| Increased frequency of applying sunscreen                                        | 4, 4.1      |
| Too busy                                                                         | 7, 7.1      |
| Other                                                                            | 9, 9.2      |
| <i>Children with additional support needs</i>                                    | 3, 3.1      |
| <i>Different requirements due to age of the children at the service</i>          | 3, 3.1      |
| <i>Parent expectations regarding school readiness</i>                            | 1, 1.0      |
| <i>Level of Educator qualification/training on how to successfully implement</i> | 1, 1.0      |
| <i>Staff capacity to interact with children</i>                                  | 1, 1.0      |
| <b>Enabler</b>                                                                   | <b>n=28</b> |
| Advice on overcoming staffing or supervision issues                              | 25, 89.3    |
| Advice on how to reorientate service layout                                      | 15, 53.6    |
| Advice on adjusting service daily program                                        | 14, 50.0    |
| Other                                                                            | 4, 14.3     |
| <i>Training for new staff</i>                                                    | 1, 3.6      |
| <i>Information and case study examples of successful implementation</i>          | 2, 7.1      |
| <i>Ideas of how to cater for inclement weather</i>                               | 1, 3.6      |
| <i>Financial support</i>                                                         | 1, 3.6      |