

SWIMMING POOLS IN NSW: DO WE KNOW HOW DANGEROUS THEY ARE?

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This article reports on a postal survey of the 179 local government authorities (LGAs) in NSW to investigate the number of swimming pools under their ordinances and whether there is an association between the number of pools and serious immersions (drownings and hospitalised near-drownings) in those areas.

BACKGROUND

Private swimming pools represent the single most dangerous water environment for children up to the age of four in NSW. For example, there were 400 serious immersions in swimming pools in NSW for this age group in the years 1986 and 1989–92 inclusive.¹

On 1 August 1992, the Swimming Pools Act 1992 replaced legislation which had been passed in NSW in 1990. The major revision of the new Act was the removal of the requirement of all private pools to have isolation fencing. The new legislation requires only pools built after 1 August 1990 to be surrounded by isolation fencing. Pools built prior to that date need only to be surrounded by a child-resistant barrier that separates the pool from any adjoining premises. Before 1990, under Ordinance 288C of the Local Government Act 1919, a council could serve notice on pool owners to enclose or fence a pool if it was considered by the council to be dangerous to human life. Under this ordinance, individual local councils set their own enclosure requirements, with varied opinions of what pool environments would be considered dangerous.

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TABLE 1**DESCRIPTIVE STATISTICS OF THE SURVEY**

Survey Question	% with DK *	<i>n</i>	Mean	SD	Median	Range
How many pools are there in the LGA?	22.5	110	1535.5	3619.2	209	2–25000
What proportion of these pools would comply with the 1992 Swimming Pools Act?	44.4	79	75.5	23.9	80	1–100
How many new applications for pools have there been in the past 12 months?	2.1	138	49.7	119.2	9	0–1043
How many inspections of swimming pools took place in the past 12 months?	18.3	116	116.1	385.1	10	0–3000
Per cent of pools inspected	—	94	14.8	24.2	5.2	0–100
How many residential properties are there in the LGA?	7.8	130	12356.8	17093.2	4157.5	100–75000

* DK = 'don't know'

The provisions of the Swimming Pools Act 1992 places two mandatory requirements on a local council:

- to ensure that it is notified of the existence of all swimming pools that are within its Area;
- to promote awareness of the requirements of the Act to swimming pool owners in its Area.

Unfortunately, these provisions can be interpreted in different ways, resulting in great variation in their implementation. For example, many local councils believe that it is the pool owner's responsibility to ensure that a pool complies with the legislation. Many local councils believe that the requirement of council inspection is only in the instance of pool installation under building application requirements. There is confusion about whether further inspections should be made after installation. Although there is no clear requirement to inspect any swimming pools on a regular basis, there are provisions within the legislation to prosecute noncompliance. In practice, it is up to local councils to decide whether regular inspection of swimming pools is required to ensure that pool owners are both aware of the legislation and comply with it.

Under the Swimming Pools Act 1992, local councils are responsible for regulating and enforcing the Act. However, there has been no state-wide evaluation of the implementation and effectiveness of the new legislation as there is no coordinated approach to ensure that local councils are fulfilling their mandatory responsibilities.

In identifying black spots in NSW for serious immersions in the toddler age group, it was hypothesised that the

number of serious immersions in an area is related to the number of children,¹ the number of pools and, importantly, the number of pools that are considered 'safe' comply with the Swimming Pools Act 1992. Affluence (socioeconomic status) is also thought to have a positive association with the rate of serious immersions in local government authorities (LGAs),² as more affluent areas could be expected to have a greater number of pools. If these relationships exist, level of affluence would be a confounder in the relationship between number of pools and serious immersions. In the current study, we investigated these factors for possible association with higher than expected rates of serious immersions.

Until the present study, there has been no attempt to determine the number of pools for each LGA in NSW. The aim of the present study was to identify how many pools there are in each LGA and how many of these comply with the existing legislation. A secondary aim was to determine whether there is an association between the number of pools and serious immersion incidents, after adjusting for level of affluence.

METHODS

Following the publication of 'Motivating local action on pool drownings: A black spot approach for NSW',¹ a survey was carried out of all 179 local government councils in NSW during February 1996.

The postal survey was addressed to the general manager of each local council, but stated in the covering letter that the appropriate officer should complete the form. The survey asked:

TABLE 2**REGRESSION OF STANDARDISED SERIOUS IMMERSION RATIOS (SSIR) ON THE NUMBER OF POOLS IN LGAs IN NSW**

	<i>n</i>	Univariate: No. of pools		No. of pools adjusted for by Jarman 8 index	
		<i>p</i>	<i>R</i> ²	<i>P</i>	<i>R</i> ²
NSW	105	0.104	0.026	0.038	0.047
Sydney	19	0.076	0.174	0.305	0.199
LGAs with SSIR>0					
NSW	61	0.674	0.003	0.498	0.009
Sydney	15	0.269	0.093	0.708	0.150

How many pools are there in the LGA?

What proportion of these pools would comply with the 1992 Swimming Pools Act?

How many new applications for pools have there been in the past 12 months?

How many inspections of swimming pools took place in the past 12 months?

How many residential properties are there in the LGA?

For each question, there was the option of a open field or a 'don't know' (DK) response. The LGA's were able to respond by mail or by fax. Three follow-up telephone calls were conducted between February and April 1996 for non-responders.

Descriptive analysis of the survey was carried out initially. Linear regression in SAS version 6.12 was used to test the association between the level of affluence as measured by the Jarman 8 Score Index and the number of pools in each LGA.³ Multiple linear regression was used to regress the number of pools in each LGA on the standardised serious immersion ratio (SSIR), adjusting for level of affluence. The SSIR uses all serious immersions in NSW for 1986 and 1989–92 for children under the age of four as the standard and calculates the ratio of observed immersions over expected immersions for each LGA.¹ The Jarman 8 index is derived from the 1991 census variables related to the population structure, family structure, worker skills, unemployment rates and ethnicity.³

Of the 179 LGAs, 142 (79.3 per cent) returned surveys by April 1996. The percentage of respondents who were

unable to answer the survey questions—designating the DK option—is given in Table 1.

The survey question most frequently receiving a DK response was the proportion of pools that complied with the legislative requirements (44.9 per cent). This was followed by the number of pools in the LGA (22.5 per cent).

The descriptive statistics (Table 1) show an enormous variation in responses. On average, there were 1535 pools in each LGA and it was stated that 75.5 per cent complied with the legislation.

Table 2 shows regression of standardised serious immersion ratios on the number of pools in LGAs in NSW. Univariate analysis revealed a significant positive association between the number of pools and higher level of affluence in an LGA as measured by the Jarman 8 ($p < 0.001$, $R^2 = 0.08$). Multivariate regression models showed that, after adjustment by the Jarman 8 index, the number of pools became a significant predictor of SSIR for NSW, but not for Sydney. However, the model accounted for only five per cent of the variation for NSW. No other variable was significant either univariately or adjusted for the Jarman 8 index. The number of new pools was the next best predictor of SSIR in Sydney ($p = 0.080$, $R^2 = 0.138$).

Given the results of the univariate analysis as a basis, a subsequent power analysis revealed a power of 0.34 for NSW and 0.17 for LGAs in the Sydney metropolitan area for the association between the number of pools and the SSIR.

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DISCUSSION

This survey suggests that many councils were unaware of their responsibilities under the Swimming Pools Act 1992. It is unlikely that 75 per cent of pools in NSW comply with the Act, given the low level of pool inspection shown in the current study (14.8 per cent of pools in a 12-month period). A study of compliance in the Newcastle area revealed that only 17 per cent of pools complied with the Swimming Pools Act 1992, even after a public awareness campaign.⁴ This result was much lower than that expected by the Newcastle City Council. The Newcastle study also showed that significant improvement (a 79 per cent increase) in pool compliance was achieved through an inspection and reinspection program. This indicates that an active regulation program can maintain a high level of compliance.

The large number of non-respondents and 'don't know' answers has reduced the power and accuracy of this analysis. The small amount of explained variation in the data (R^2) indicate that the number of pools and the level of affluence in an LGA are not the only important factors associated with serious immersions. The other factors need to be identified by further research.

Adjustment for the level of affluence strengthened the positive association between the number of pools and the SSIR. However, this was not the case for the 19 LGAs in Sydney. The lack of effect in Sydney may be due to the heterogeneity of LGAs in Sydney, with areas of great affluence and poverty coexisting in the same LGA, as well as the small number of LGAs included in this analysis. There may also be differences in the nature of pool use in rural and urban areas.

There are other possible explanations for these conflicting results. Children in less affluent families may have an unusually low exposure to pools (rather than children in affluent families having greater exposure), resulting in a lower rate of immersions. It is possible that the relationship is not linear and that a certain threshold of exposure has to be achieved before the relationship exists. The impact of isolation fencing versus perimeter fencing on the serious immersion rate is also difficult to assess. Affluent areas

often tend to be older suburbs, which would result in more pools being built before 1 August 1990. If perimeter fencing were less effective, there would be an increase in the immersion rate in those areas with higher rates of perimeter fencing.

The current analysis could be repeated with more reliable data on the number of pools in NSW; more accurate data on compliance levels; more reliable data on the number of pools with perimeter fencing or isolation fencing; and a longer period of surveillance that would capture more serious immersion incidents. If local government authorities kept accessible and timely records of the number of pools in their areas, and any inspection programs, this would permit identification of possible problem areas and assist the development of appropriate interventions.

REFERENCES

1. Sayer GP, Lonie C. Motivating local action on pool drownings: A black spot approach for NSW. *NSW Public Health Bulletin* 1995; 6: 139–144.
2. Alperstein G, Rissel C, Sainsbury P. Local Government Areas and rate of serious immersions of toddlers. *NSW Public Health Bulletin* 1996; 7: 89.
3. McCracken K, Forest J. Health inequalities and social circumstances in New South Wales. A comparison of alternative indexes linking deprivation and health. Northern Sydney Area Health Service. September 1995.
4. Sayer GP, Steele P, Bray C, Plumeridge K. Swimming Pools Act 1992: Regulation and compliance in Newcastle, New South Wales. *NSW Public Health Bulletin* 1996; 7: 83–86.

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