

# Toys are a potential source of cross-infection in general practitioners' waiting rooms

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## SUMMARY

*The waiting rooms of general practitioners' surgeries usually have toys provided for children. The level of contamination of these toys and the effectiveness of toy decontamination was investigated in this study. Hard toys from general practitioners' waiting rooms had relatively low levels of contamination, with only 13.5% of toys showing any coliform counts. There were no hard toys with heavy contamination by coliforms or other bacteria. Soft toys were far more likely to be contaminated, with 20% of toys showing moderate to heavy coliform contamination and 90% showing moderate to heavy bacterial contamination. Many waiting-room toys are not cleaned routinely. Soft toys are hard to disinfect and tend to rapidly become recontaminated after cleaning. Conversely, hard toys can be cleaned and disinfected easily. Soft toys in general practitioners' waiting rooms pose an infectious risk and it is therefore recommended that soft toys are unsuitable for doctors' waiting rooms.*

**Keywords:** *general practice surgery; waiting rooms; bacterial contamination; soft toys.*

## Introduction

SICK children visiting their doctor usually spend some time in the waiting room. Most of these waiting rooms provide toys for children to play with. Sick children, many with infectious diseases such as those causing diarrhoea, are likely to be handling toys and putting them in their mouths. The next child to play with these toys may thus be exposed to pathogens that could make them ill. Studies have previously looked at bacteria on toys in paediatric wards and day-care centres.<sup>1,2</sup> Contamination of hands, toys, and other classroom objects with faecal coliforms has been demonstrated in previous studies done in a day-care setting and it has been shown that this contamination increases during outbreaks of diarrhoea.<sup>3,4</sup> No studies of toys in general practitioners' (GPs') surgeries had been reported when this study was conducted, but one similar study has been published more recently.<sup>5</sup> The bacteriology of toys and the potential for cross-infection in GPs' waiting rooms, a day-care centre, and a public library was examined. Decontamination procedures and their effectiveness were also explored.

## Method

Six group practices in Christchurch, New Zealand were approached and all agreed to participate in the study. None of these practices did any extra cleaning of their toys before toys were sampled. A selection of soft and hard toys were taken from each practice, with those toys that looked as if they were played with regularly being taken preferentially. Toys were placed in sterile plastic bags to be transported back to the laboratory. A total of 10 soft and 22 hard toys were sampled from the six general practices, as well as six soft and eight hard toys from the day-care centre and public library.

In the laboratory, 0.1% peptone broth (enough to cover the toy) was poured into the bag and the toy was then massaged from the outside of the bag to ensure that organisms were eluted by the broth. As much broth as possible was retrieved from the toys after massaging which, for the soft toys, necessitated squeezing them while in the bag. The broth was then shaken vigorously in the bag to ensure a uniform distribution of bacteria, then serially diluted to obtain a  $10^{-3}$  dilution and cultured for both coliforms and bacteria using standard techniques.<sup>6</sup> Coliform and total bacterial counts per millilitre were recorded for each plate. An average was taken of counts obtained from the duplicate plates and then the amount of peptone broth used for each toy was multiplied by the colony forming units (CFUs) per millilitre to obtain a total count for that toy. Total coliform and total bacterial counts were categorised as 'none detected', 'low' (between no CFUs and  $\leq 10^3$  CFUs/toy), 'moderate' ( $>10^3$

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Submitted: 17 August 2000; Editor's response: 3 January 2001; final acceptance: 27 March 2001.

©British Journal of General Practice, 2002, 52, 138-140.

**HOW THIS FITS IN***What do we know?*

Some toys in general practitioners' surgeries have been shown to be contaminated with potential pathogens.

*What does this paper add?*

Most soft toys in waiting rooms are contaminated with potential pathogens. Soft toys are almost impossible to decontaminate and rapidly get recontaminated. Hard toys are much less likely to be contaminated and are easy to decontaminate.



CFUs/toy and  $<10^5$  CFUs/toy) or 'high' ( $10^5$  CFUs/toy or greater). The Fisher exact probability test (two-tailed) was used to test for significance using Epi-Info software. The type and frequency of decontamination procedures that the general practices used was recorded as well as when the toys were last cleaned (if known).

**Results**

Total bacterial and coliform contamination rates for hard and soft toys are given in Table 1. Ninety per cent of soft toys showed evidence of coliform contamination; however, only 13.5% of hard toys showed evidence of such contamination ( $P < 0.001$ ). For bacterial contamination there was little difference in the percentage with any contamination (100% versus 91%); however, soft toys were far more likely to have moderate to high contamination rates (90% versus 27%,  $P = 0.002$ ). Two of the six practices studied cleaned their toys on a weekly or fortnightly basis. One of these surgeries had only hard toys and these were decontaminated by soaking in dilute sodium hypochlorite for at least one hour. The other surgery decontaminated hard toys on a weekly basis by wiping them down with a commercial spray disinfectant and cleaned the soft toys by machine washing them when they 'looked dirty.' The other four cleaned their toys infrequently or not at all. Toys sampled from the two surgeries that regularly decontaminated their toys had not been cleaned for at least one week. The hard toys from the two surgeries that regularly cleaned their toys grew no coliforms and had only low total bacterial counts. Importantly, soft toys that were cleaned regularly were no different in terms of total bacterial count or coliform count from soft toys from waiting rooms without regular toy decontamination. Toys from the day-care centre and public library had contamination rates of both coliforms and total bacteria similar to surgeries that did not regularly

clean their toys.

It was found that hard toys could be effectively decontaminated by cleaning and then soaking them in a hypochlorite (2.5 g/l) solution for one hour. We did not investigate shorter soak times. Machine washing and drying soft toys was found to be inadequate, with high bacterial counts present after cleaning. However, disinfecting by soaking soft toys in a hypochlorite solution for 30 minutes, followed by machine washing and drying, was found to reduce bacterial counts and eliminate coliforms. Autoclaving soft toys also reduced coliforms to undetectable levels but did not reduce total bacterial counts nearly as well, indicating that steam penetration was inadequate. After disinfection as above and returning to GPs' waiting rooms, two of the soft and two of the hard toys from each of two GPs' waiting rooms were cultured after two and seven days. Total bacterial counts at two days were generally low for the hard toys, but for the soft toys the levels were back to low or moderate. By one week, total bacterial counts for both hard and soft toys were much the same as they had been before cleaning. Coliforms were isolated from two of the four soft toys after one week but from none of the hard toys.

**Conclusion**

This study confirms the results of a recent bacteriological study of toys from one GP's surgery.<sup>5</sup> Hard toys are less contaminated, easier to clean, and do not recontaminate as rapidly as soft toys. Soft toys had higher total bacterial and coliform counts in general, even when toy size was taken into account. The fact that soft toys are harder to clean means that they are less likely to be cleaned by staff in a busy practice even though they are much more likely to harbour coliforms.

This small study raises a myriad of further questions for research. Does the potential for infection shown in this study indicate an actual risk of disease transmission? Should soft toys be removed from all public places? Are waiting room books and magazines similarly contaminated? Whatever the answers to these questions it would appear that soft toys have high levels of contamination. Isn't it time to give teddy the boot?

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Table 1. Total bacterial and coliform contamination rates for soft and hard toys from surgery waiting rooms.

Contamination rates	None (no CFUs <sup>a</sup> detected) n (%)	Low ( $10^3$ or less CFUs/toy) n (%)	Moderate ( $>10^3$ CFUs/toy and $<10^5$ CFUs/toy) n (%)	High ( $10^5$ CFUs/toy) n (%)
Soft toys (10): total bacteria	0 (0)	1 (10)	4 (40)	5 (50)
Soft toys (10): coliforms	1 (10)	7 (70)	2 (20)	0 (0)
Hard toys (22): total bacteria	2 (9)	14 (64)	6 (27)	0 (0)
Hard toys (22): coliforms	19 (86)	2 (9)	1 (4.5)	0 (0)

<sup>a</sup>CFU = colony forming unit.

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#### **Acknowledgements**

Eileen Merriman was funded in her summer studentship by the Community Trust and the Child Health Research Foundation. Thanks to Professor Les Toop, Department of General Practice and Dr Elisabeth Wells, biostatistician, Christchurch School of Medicine for helpful comments and to Medlab South for providing laboratory facilities for this work.