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ORIGINAL ARTICLE

## Evaluation of an intervention to improve the management of allergens in school food services in the city of Barcelona

M. Fontcuberta-Famadas<sup>a,b,c</sup>, G. Serral<sup>a,b,c</sup>, M.J. López<sup>a,b,c</sup>, P. Balfagón<sup>a</sup>, E. García-Cid<sup>a</sup>, L. Caballé-Gavaldà<sup>a,\*</sup>

<sup>a</sup> Agència de Salut Pública de Barcelona (ASPB, Public Health Agency of Barcelona), Pl Lesseps 1, 08023 Barcelona, Spain

<sup>b</sup> CIBER of Epidemiology and Public Health (CIBERESP), Melchor Fernández Almagro 3-5, 28029 Madrid, Spain

<sup>c</sup> Institut d'Investigació Biomèdica Sant Pau, Barcelona, Spain

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### KEYWORDS

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### Abstract

**Background:** An intervention to promote the development of an allergen control plan (ACP) and preventive measures for the management of allergens in school food services was implemented in all schools of Barcelona city over a three-year period (2013–2015) by the public health services. The present study aimed to assess changes regarding the management of food allergens in school food services in Barcelona after an intervention conducted by the public health services of the city.

**Methods:** School meal operators of a random sample of 117 schools were assessed before and after the intervention using a structured questionnaire. The questionnaire collected general information on the students and their demand for special menus, and included 17 closed questions regarding the implementation of specific preventive measures for the management of allergens. Based on these 17 questions, a food safety score was calculated for each school. The improvement in these scores was evaluated.

**Results:** The results showed positive increments in the percentage of implementation of 12 of the 17 preventive measures assessed. The percentage of school food services with an implemented ACP increased by 49%. Schools with external and internal food supplies increased their scores by 16.5% and 19.6%, respectively. The greatest improvements were observed in smaller food services and in schools located in districts with low gross household incomes.

**Conclusions:** The intervention was effective in improving school food services' management of allergens and in reducing the differences found among food services in the pre-intervention survey. We must also focus efforts on reducing socio-economic inequalities linked to the management of allergens.

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\* Corresponding author.

E-mail address: [lcaballe@aspb.cat](mailto:lcaballe@aspb.cat) (L. Caballé-Gavaldà).

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## Introduction

Food-induced allergic reactions are considered to be an emerging problem for which children are at higher risk than adults.<sup>1</sup>

In recent decades, lifestyles changes have increased the number of children who have lunch at school,<sup>2</sup> with schools becoming a higher risk environment for allergen exposure. Some studies have estimated that 20% of food allergy reactions occur in schools.<sup>3</sup> Schools in Spain with pupils with allergies or food intolerances, diagnosed by specialists, shall develop special menus adapted to these allergies or intolerances or when facilities do not allow to meet the guarantees required for the elaboration of special menus, be provided to students the means of cooling and warming for foods supplied by the family.<sup>4</sup> Also, depending on allergy type and severity, schools must establish measures for an allergen-free diet and guidelines for action against adverse reactions. Ensuring food safety for students is a responsibility of food service operators that produce or serve meals in school canteens. According to current European legislation, food operators must integrate allergen assessment into their self-control system following good practices guides or the principles of a Hazard Analysis Critical Control Point (HACCP). These regulations are applicable to commercial food services and to collective catering services.<sup>5,6</sup> However, public administrations may encourage and ensure that food safety standards are met. In Barcelona city, the Public Health Agency of Barcelona (ASPB) is the health authority that carries out the control and surveillance of food establishments, including school canteens, through its inspection services.

The latest amendment of the Spanish food labeling rule in 2008<sup>7</sup> established that allergenic ingredients had to be declared on food labels. Since then, the ASPB inspection services began to inform and distribute guidelines on good practices on managing food allergens to food services. However, the ASPB did not have data regarding the real implementation of specific preventive measures or control plans for allergens in schools.

In 2012, a descriptive study conducted in a sample of schools in Barcelona<sup>8</sup> showed that 89% of the schools were serving allergen-free menus in their canteens. In addition, the study confirmed heterogeneous implementation of food standards among canteen operators and low implementation (36%) of a specific allergen control plan (ACP) as part of their self-assessment system.

In view of those results, the potential impact of improving food safety practices in school food services operations to reduce allergen risk might be significant. Therefore, the ASPB designed a program called "Monitoring of Allergy and Food Intolerance in School Canteens" which included an intervention to promote the implementation of ACPs through regular visits of sanitary inspectors to schools.

The potential positive effects of food safety-related interventions in school food services have been described previously.<sup>9</sup> However, to our knowledge, no studies have been conducted focusing on allergens as a specific prerequisite.

The main objective of the present study was to assess changes regarding the management of food allergens in

school food services in Barcelona after an intervention conducted by the public health services of the city.

## Material and methods

### Intervention

The assessed intervention aimed to improve managing of food allergens through the implementation of a new prerequisite in schools. It comprised three steps and was implemented over a three-year period (2013–2015) to all schools in the city of Barcelona ( $n=764$ ) through the visits of ASPB's sanitary inspectors (Fig. 1).

#### First stage: agreement of the minimum content for an Allergen Control Plan (ACP)

Two models (one for each food supply system: external or internal) of ACP were designed by ASPB inspectors, based on current European regulations and good practice guides<sup>10–12</sup> (models are available as additional material on the online version). These models summarize the main items to be considered in schools to minimize the risk for food allergens.

#### Second stage: documenting school preventive procedures

During 2013 and 2014, sanitary inspectors conducted a first visit to schools to check whether they had an ACP or not. Those without a written plan had the possibility of adapting the ACP models developed by the ASPB. After a maximum of three months, all ACPs were reviewed to verify that the main procedures for allergen management were correctly described. Non-conformities were detected and requested to be included in the ACP.

#### Third stage: implementation of the ACP

During 2014–15, sanitary inspectors conducted a second visit to verify, in person, that all the items described in each school's ACP were actually being implemented in their daily work. When inadequacies were detected, inspectors required corrective actions.

Once the intervention finished, the follow-up of ACPs was integrated within the regular official control system of food operators already being conducted by inspectors for other prerequisites, with a variable frequency of inspections in each case according to a risk ranking.

### Study design, sampling and data collection

A non-experimental pre/post-evaluation study was conducted using a structured questionnaire.

Sampling was stratified by city districts, school types (pre-school, primary school and high schools, covering the ages of 0–18 years), the number of meals served daily and the management of the food service (internal when managed by the school management and external when outsourced to a private company). Food supplying of schools included "internal supplying" (meals were prepared and cooked with school equipment) or "external supplying" (meals were distributed by an external kitchen).

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