

# The impact of asthma in the school environment and the use of telemedicine

Ana Maria Alexandra STANESCU<sup>1</sup>, Gabriela Carmen OBILISTEANU<sup>2</sup>, Laura Carina TRIBUS<sup>1,3</sup>,  
Ioana Veronica GRAJDEANU<sup>1</sup>

<sup>1</sup>"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

<sup>2</sup>"Nicolae Malaxa" Clinical Hospital, Bucharest, Romania

<sup>3</sup>Ilfov County Hospital, Ilfov County, Romania

## ABSTRACT

*Asthma is a common chronic disease in children, especially children from certain ethnic minority groups and those living in poverty. Asthma is also a burden on the health care system, requiring numerous doctor visits, hospitalizations, and urgent interventions, all of which are added to the costs of the treatments. In addition to the burden of symptoms and the high impact due to continuous exacerbations, children with asthma also experience schooling problems. The current therapeutic trend for children with persistent asthma symptoms is to recommend daily preventive anti-inflammatory drugs. In this review, we want to illustrate the impact of asthma in the school environment and the possibility of using interventions for a better quality of life in children with asthma.*

**Keywords:** asthma, school, impact, telemedicine

## INTRODUCTION

Asthma is a common chronic disease in children, especially children from certain ethnic minority groups and those living in poverty [1]. One in eleven US children has asthma, and 16% of Puerto Rican and non-Hispanic black children [2,3]. Asthma is also a burden on the health care system, requiring numerous doctor visits, hospitalizations, and urgent interventions, all of which are added to the costs of the treatments [4]. The costs of asthma care in the US were estimated at \$50.3 billion per year from 2008 to 2013 [5].

In addition to the burden of symptoms and the high impact due to continuous exacerbations, children with

asthma also experience schooling problems. Asthma significantly contributes to school absenteeism, with approximately eleven million days absent yearly [6]. Previous studies have concluded that school-based health interventions for asthma can improve outcomes [7,8].

The current therapeutic trend for children with persistent asthma symptoms is to recommend daily preventive anti-inflammatory drugs [9]. However, implementing this trend is problematic because many children with asthma do not receive preventive therapy. Halterman et al, in their multi-state study, showed that 1/3 of children with persistent asthma symptoms reported not using the preventive

*Corresponding author:*  
Ana Maria Alexandra Stanescu  
E-mail: alexandrazotta@yahoo.com

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medication, and those receiving preventive medication did not perform optimal periodic controls [10]. Also, Halterman et al. have shown adherence rates to the daily preventive medication of approximately 50%, and adequate control of these patients is rare [11,12]. Some of the morbidity from bronchial asthma could be therapeutically prevented, especially in the case of poor children living in the inner city who are most at risk for inadequate treatment and underuse of preventive drugs [13].

In this review, we want to illustrate the impact of asthma in the school environment and the possibility of using interventions for a better quality of life in children with asthma.

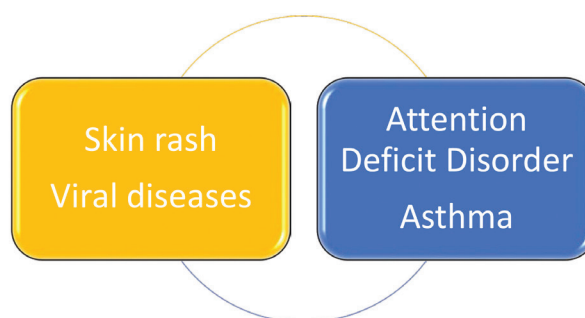
### THE NEED FOR INTERVENTIONS AT THE SCHOOL LEVEL

School-based asthma management programs have the potential to reach large numbers of children in a community setting. Daily administration of preventive asthma medication at school is a conceptually simple and inexpensive system intervention to improve adherence [14].

The chronic care model as a school-based intervention is currently being implemented in some education systems as a health care model for improving quality of life and changing the chronic care system [15]. This model of care includes delivery system change (school-based asthma prevention medications), decision support (assessments using telemedicine involving the child's family physician and family), and community resources (school-based care, pharmacy support). This model allows for improved communication, access to care, drug accessibility, and satisfaction with the care, leading to improved clinical and functional outcomes and reduced costs.

### THE UTILITY OF TELEMEDICINE

The advantage of telemedicine in school medicine is represented by the possibility of an evaluation and consultation with a specialist doctor without needing the child to go to the specialized medical office [16]. Evaluation and consultation through telemedicine in schools meet problems such as the long distance in some regions from the specialist doctor, combats absenteeism due to the need for medical visits, and the parent will no longer leave the workplace to take



**FIGURE 1. The role of school telemedicine**

his child to the doctor. Telemedicine can play an important role in both acute and chronic conditions (Figure 1).

Telemedicine is increasingly used, and mobile school telemedicine units have been in New York for more than 12 years [17]. Telemedicine is a practical, cost-effective, and safe method to promote access to healthcare, even in disadvantaged areas.

A complex multidimensional approach is needed to improve medical care and prevention. On the one hand, prevention can be done at the level of the school office with the administration of medication; on the other hand, telemedicine can overcome preventive barriers and asthma care [18].

Children may be scheduled for a telemedicine visit in the school health office at the beginning of the school year to provide an initial assessment and determine the medication to use. Administering a daily dose is generally effective, allowing medication to be administered during school hours. This can be done at home if the treatment requires a second administration. While many schools do not have full-time nurses, many schools are prepared to administer medication because many children require daily medication (e.g., ADHD medication).

Telemedicine can be used to treat many acute episodes of illness that occur in children (e.g., rashes, sore throats, colds, earaches, core), as well as to monitor and address chronic conditions such as would be attention deficit disorder and asthma. Telemedicine is used in cities worldwide, with mobile telemedicine units having an increased utility. Telemedicine is an efficient, cost-effective, and safe way to reach patients and facilitate access to care.

Available telemedicine interventions for asthma reduce hospital admissions but have no impact on quality of life (QOL) in adults and children. Although telemedicine was initially used as a means of providing health care in remote and rural areas, the broader implementation of high-speed Internet connections in schools and decreasing costs of telemedicine equipment have led to implementation in both urban and rural school districts, as well as commercial telemedicine suites are marketed for use in schools.

## CONCLUSIONS

Although the literature has provided evidence of the benefits of school-based asthma interventions and general asthma telemedicine interventions independently, more research is needed exploring school-based telemedicine programs to address pediatric asthma.

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