Asthma Morbidity in Young People Living in Rural NSW: Time for Action

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INTRODUCTION
Asthma is a major health problem among adolescents. Prior studies have identified substantial morbidity from asthma and generally a poor understanding of asthma among adolescence. Behaviour and lifestyle appear to be the main barriers to effective self management in this age group. Inadequate management contributes to much of the morbidity and even mortality in this age group. For many adolescents this is a particularly risky period, as adherence to therapy may decrease and medical supervision may become less consistent.

Traditional health care often does not meet the needs of young people. In rural Australia this is often compounded by distance and difficulties in accessing appropriate health services. The aim of our study was to assess the self management of asthma, the impact of asthma on lifestyle and related morbidity in young people living in rural Australia, prior to the implementation of the peer-led asthma intervention for high schools.

STUDY POPULATION
Students were from six high schools in Tamworth. These schools were recruited as part of a randomized controlled asthma intervention study. We tested all students from Year 7 (mean age = 12.5 years), and Year 10 students (mean age = 15.5 yr) at each school, as these were the students targeted to receive the peer-led asthma education program.

Of a total population of 1515 students, we collected data from 1379 students. The response rate was 91 per cent. Overall the proportion of males to females was similar, with 48 per cent of the students being female.

METHODS
We administered video questionnaires to all students in Years 7 and 10 to measure prevalence and severity of asthma symptoms and asthma self management in adolescents. Those students who said yes to wheezing in the last 12 months were then invited for further testing. 86 per cent of the students consented to participate in the rest of the study (n=272). These students completed a symptom’s questionnaire, which measured numerous variables,
including school and sport absenteeism, asthma attacks, and medication use. Additionally they performed spirometry tests and completed the Pediatric Quality of Life questionnaire [1].

RESULTS

Asthma symptoms: past 12 months

Figure 1 shows the self reported prevalence of asthma symptoms in last 12 months. The most commonly reported symptom in the last 12 months was wheezing, followed by exercise-induced asthma and cough at night. For both wheezing and exercise-induced asthma, there was a significantly higher prevalence in Year 10 students compared to Year 7 students. The first three symptoms wheezing, exercise and cough at night indicate a probable diagnosis of asthma, whilst wheezing at rest and wheeze at night reflect severity of asthma. The overall prevalence of wheeze in the last 12 months was 26 per cent in the student population.

Asthma Symptoms: past 12 months

Looking more closely at recent wheeze, figure 2 shows the data broken down by sex and by age. There is a significant increase in prevalence of recent wheeze in older students (p<.02) and this is more evident in females than in males.

The remainder of the data will be referring to information collected on those 272 students who reported recent wheeze.
We asked students what medications they were currently taking. Most students (65%) used intermittent bronchodilator treatment and 27 per cent used regular inhaled corticosteroids.

**Figure 2**

*Quality of Life Score in students with recent wheeze*

To assess the impact of lifestyle, students completed a validated quality of life questionnaire. Figure 3 shows the distribution of total Quality of Life (QOL) scores. The total score is 7, where 1 is severe and 7 is mild impairment of QOL due to asthma. Over two thirds of the students reported mild impairment scoring between 5.1 and 7.0. Of concern is that up to 25 per cent of the students with recent wheeze had scores between 3.1 and 5.0 depicting moderate impairment, and 5 per cent reported severe impairment of QOL due to asthma. Females showed significantly lower QOL scores in each of the domains denoting more severe impairment of QOL than males, p< .05. This was also evident in the overall score for female students.
To realise the burden of asthma at school we asked students if they had experienced an asthma attack at school. Overall 10 per cent of students reported having an attack last year and 15 per cent were not sure whether they had an attack at school. As figure 4 illustrates, the highest incidence was in Year 7 female students with as many as 15 per cent reported having an asthma attack at school.

**TIME FOR ACTION: THE TRIPLE A PROGRAM**

The Tamworth Adolescent Asthma Project aims to improve the recognition and management of asthma in the high school students of Tamworth. This project is the basis of a study regarding the effectiveness of the Triple A (Adolescent Asthma Action) Program, a program that uses peer education as a tool to impart vital asthma health information to high school students.

**Partnerships**

TamAAP is a collaborative study under the direction of the Primary Health Care Education and Research Unit of the Auburn Hospital and Community Health Services and the Respiratory Medicine Unit at the John Hunter Hospital in Newcastle working with the Tamworth Branch of the Asthma Foundation (NSW), Department of School Education, Independent Schools Association, New England Area Health Service and North West Slopes (NSW) Division of General Practice. This project is funded by the Commonwealth Department of Health and Aged Care and Asthma NSW.
Chemical Reactions and Equilibria

A chemical reaction is a process by which a substance is transformed into another substance by the addition of energy in the form of heat, light, or electrical energy. The substances involved in a chemical reaction are called reactants, and the substances produced are called products.

The balanced chemical equation shows the stoichiometry of a chemical reaction, and the coefficients indicate the relative amounts of reactants and products. The law of conservation of mass states that the mass of the reactants is equal to the mass of the products.

The products of a chemical reaction are obtained by combining the reactants according to the stoichiometry of the reaction. The products are the substances that are formed as a result of the reaction.

For example, the reaction between sodium and chlorine to form sodium chloride (NaCl) is a chemical reaction. The balanced chemical equation is:

2Na + Cl₂ → 2NaCl

In this reaction, two moles of sodium (Na) react with one mole of chlorine (Cl₂) to produce two moles of sodium chloride (NaCl).

The law of conservation of mass states that the mass of the reactants is equal to the mass of the products. In this case, the law of conservation of mass is satisfied because the mass of the reactants (2 atoms of Na and 1 molecule of Cl₂) is equal to the mass of the products (2 molecules of NaCl).

In conclusion, chemical reactions involve the transformation of substances through the addition of energy, and the products of a chemical reaction are obtained by combining the reactants according to the stoichiometry of the reaction. The law of conservation of mass states that the mass of the reactants is equal to the mass of the products.
Triple A (Adolescent Asthma Action) Program is about empowering young people to take the asthma information to their peers, family and friends. Through peer-led asthma education and a supportive school environment it allows young people with asthma to take control, rather than asthma controlling their lives.

We would like to acknowledge the enthusiasm and cooperation of the young people from Tamworth in this study and the assistance and the hospitality of the school staff and local community. The Tamworth Adolescent Asthma Project was supported by the Commonwealth Department of Health and Aged Care and Asthma New South Wales. References available on request.