What are the major drivers of prevalent disability burden in young Australians?

Rebecca R S Mathews, Wayne D Hall, Theo Vos, George C Patton and Louisa Degenhardt

ABSTRACT

Objective: To examine age and sex differences in the leading causes of prevalent disability in young Australians.

Design, setting and participants: We analysed data from the 2003 Australian Burden of Disease and Injury Study, which estimated the prevalent disability burden attributable to 170 diseases and injuries, for younger adolescents (10–14 years), older adolescents (15–19 years) and young adults (20–24 years).

Main outcome measures: The broad categories of disease and injury that are the main contributors to prevalent disability and the 10 leading disease and injury causes of prevalent disability, according to sex and age group.

Results: Total prevalent disability rates are lowest in younger adolescents and highest in young adults. Mental disorders are the largest "contributor" to disability in young Australians, and anxiety and depressive disorders are the leading single cause. In young males, autism and attention deficit hyperactivity disorder cause similar levels of disability as do anxiety and depression. In young females, eating disorders are the second leading cause of mental disorder disability. Alcohol use disorders and schizophrenia make important contributions to disability in young adult males. Asthma is the most prominent cause of physical disability in all three age groups.

Conclusions: There are substantial changes in both the pattern and level of disability burden across the three age groups that we studied. The increase in total prevalent disability that occurs from early adolescence to young adulthood should focus attention on the delivery of accessible and youth friendly health care as well as the effectiveness of transitions from child health services to adult health services.

MJA 2011; 194: 232–235

The transition from puberty to young adulthood brings rapid changes in health. Anxiety, depression and eating disorders become common during teenage years. In young adulthood, substance misuse peaks and psychotic disorders become prominent,[1] as do injury and sexual health problems. Also, childhood-onset disorders such as asthma, attention deficit hyperactivity disorder (ADHD) and autism, as well as complications from perinatal and congenital disorders, persist through these years. This complex, changing profile of adolescent health is challenging in terms of developing comprehensive policy responses.

Patterns of prevalent disability (ie, disability caused by current cases of disease or injury) are important starting points for planning health services. They indicate the most important diseases and injuries that are likely to need health services, and show how diseases and injuries may change when young people transition from using child health services to adult health services.

We undertook secondary analysis of data from the Australian Burden of Disease and Injury Study[2,3] to compare the causes of prevalent disability for 10–24-year-old Australians in 2003 by sex and age group.

METHODS

The Australian Burden of Disease and Injury Study estimated the prevalent years lived with disability (PYLD) caused by 170 diseases and injuries for Australians in 2003.[2,3] PYLD are the healthy years of life lost in the year of the study by people who have the disease or injury. They are distinct from incident years lived with disability, which are the future years of healthy life lost from new cases of disease or injury.

PYLD are equal to the prevalence of disease or injury multiplied by a "disability weight".[4,5] The prevalence estimates that we used to calculate PYLD were derived from national or state level Australian epidemiological data, where available (further detail on data sources and modelling has been described previously[2]).

For younger adolescents (10–14-year-olds), older adolescents (15–19-year-olds), and young adults (20–24-year-olds), we present the rates of PYLD per 1000 population attributable to 22 broad causes, and the 10 leading individual causes of PYLD.

RESULTS

Broad causes of total prevalent disability

Total prevalent disability rates are lowest for younger adolescents (25.4 PYLD per 1000 population) and highest for young adults (43.9 PYLD per 1000 population) (Box 1), and increase more from young adolescence to young adulthood in females (52% increase) than in males (33% increase).

Mental disorders are the largest "contributor" to disability in 10–24-year-olds (12.5 PYLD per 1000 population), followed by chronic respiratory diseases (4.8 PYLD per 1000 population) and neurological disorders (2.7 PYLD per 1000 population). Neonatal causes and congenital anomalies account for a further 3.9 PYLD per 1000 population. Injuries (1.8 PYLD per 1000 population) and substance misuse (1.6 PYLD per 1000 population) are also major contributors.

Rates of PYLD due to mental disorders increase from young adolescence to young adulthood (7.9 to 17.3 PYLD per 1000 population), as do rates for substance use disorders (0 to 3.7 PYLD per 1000 population), injuries (1.2 to 2.4 PYLD per 1000 population) and neurological disorders (2.1 to 3.4 PYLD per 1000 population). Rates of PYLD caused by chronic respiratory diseases decrease from young adolescence to young adulthood (5.7 to 4.0 PYLD per 1000 population), and congenital and neonatal causes have similar rates across the three age groups (ranging from 3.8 to 3.9 PYLD per 1000 population).

Leading causes of PYLD

Anxiety and depression cause more PYLD in 10–24-year-olds than any other disorder and account for the majority of mental disorder disability in females (Box 2). The contribution of anxiety and depression increases from 7.1% in males and 16.4% in females during young adolescence, to 17.3% in males and 27.4% in females during young adulthood.

ADHD and autism spectrum disorders together cause a similar level of disability in 10–24-year-old males as depression and anxiety. They make a particularly large contribution in younger adolescent males (25.0% of total PYLD and 77.3% of mental disorder PYLD), with less impact on males during older adolescence (14.6% of PYLD) and young adulthood (7.1% of PYLD). ADHD and autism spectrum disorders cause 10.8% of PYLD in younger adolescent females, but have less impact at other ages.

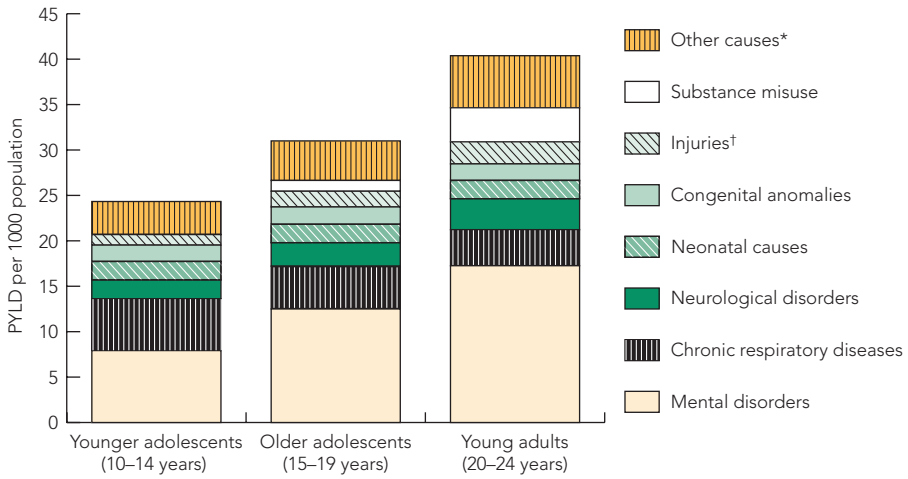
Anorexia nervosa and bulimia nervosa are the second leading cause of mental disability in young females; they contribute to 6.1% of PYLD in 10–24-year-old females, with larger contributions in older adolescents (7.4%) and young adults (7.1%) than in younger adolescents (2.0%).

Schizophrenia causes 2.6% of PYLD in 10–24-year-old males, increasing from less than 0.1% in young adolescents to 4.9% in young adults. Alcohol misuse disorders (according to diagnostic criteria for alcohol dependence and harmful use in the 10th revision of the International Classification of Diseases) explain more PYLD in 10–24-year-olds than any other substance misuse disorder. Overall, alcohol misuse disorders cause 1.6% of PYLD in older adolescents and 3.6% in young adults, with much larger contributions in males (3.0%–6.5%) than females (less than 1.0%).

Asthma is the second leading cause of disability among 10–24-year-olds (13.9% of PYLD in males and 13.4% in females) and the leading cause in younger adolescents (22.5% in males and 21.3% in females). Its contribution to disability declines to 8.7% in young adulthood, but it remains the most prominent contributor to physical disability in all three age groups. Low birth weight and birth trauma and asphyxia are the next leading causes of physical disability, together accounting for 4.8% of PYLD.

Migraine is one of the leading causes of physical disability in 10–24-year-old females (contributing to 3.5% of PYLD) but not males; it causes about 1.5 times more disability in older adolescent and young adult females compared with younger adolescent females. Another important cause of physical disability is epilepsy, which is responsible for 2.3% of PYLD in 10–24-year-olds.

1 Contribution of broad causes to total prevalent disability in young Australians in 2003, by age group



PYLD = prevalent years lived with disability. * Other causes are those that explain less than 5% of total PYLD in 10–24-year-olds — infectious and parasitic diseases, acute respiratory infections, maternal conditions, genitourinary diseases, skin diseases, nutritional deficiencies, cancers, other neoplasms, endocrine and metabolic disorders, cardiovascular disease, diabetes mellitus, diseases of the digestive system, musculoskeletal diseases, oral conditions and ill-defined conditions. † Injuries include intentional and non-intentional injuries. ◆

DISCUSSION

Our analysis of 2003 data from the Australian Burden of Disease and Injury Study showed that rates of prevalent disability increase by almost 50% from younger adolescence to young adulthood. Mental disorders are the largest contributor to disability, with anxiety and depression being the leading single cause. Eating disorders make a significant contribution to mental disability in young women, which is noteworthy given they have received less attention in policy than other mental disorders such as schizophrenia, which cause less disability at the population health level at these ages.

ADHD and autism cause more disability in younger adolescents than in older adolescents and young adults, while all the other mental disorders cause more disability in older adolescents and young adults. The decline in disability caused by ADHD is a result of the modelling of prevalence estimates, which assumed rapid remission of ADHD symptoms in young adults. The relative contribution of autism to disability declines with age because of higher rates of other causes of disability.

Ongoing physical health problems from childhood (such as asthma) and the disabling consequences of low birth weight and birth trauma continue to play substantial roles in the health of adolescents, particularly younger adolescents. Many of these adolescent physical health problems are associated with substantial concurrent mental health and behavioural problems, which require an integrated approach to care.[6] Furthermore, as with autism spectrum disorders, many physical health problems will persist into adulthood, and the quality of the transition to adult health care will influence the level of future associated disability.[7,8]

Our findings have some limitations. First, because of the small numbers of cases of disease in the age groups studied, differences in PYLD by age may reflect inaccuracies in modelling rather than real variations. Second, the age of some of the prevalence estimates must also be considered. For example, the mental disorder data[9] used in the Australian Burden of Disease and Injury Study predates the year of the study (2003) by 6 years. Third, the disability weights applied to each disorder were, with a few exceptions (eg, adult-onset hearing loss, childhood conditions), uniform across age groups, which may not reflect potential differences in experience of disability at different ages.

Nevertheless, our findings highlight the changing pattern of disability caused by physical and mental disorders along the developmental trajectory from early adolescence to young adulthood. Successful policy and service responses to the drivers of disability among youth must be informed by the nature of the causes of disability (physical v mental) and age of onset. Childhood-onset physical disorders (eg, asthma) and mental disorders (eg, ADHD and autism) require models of care that facilitate ongoing

2 Leading causes of prevalent years lived with disability (PYLD) for young Australians in 2003, by sex and age group

Males				Females			
Rank	Cause	Prevalence (cases)*	Proportion of total PYLD	Rank	Cause	Prevalence (cases)*	Proportion of total PYLD
Young people: 10–24-year-olds (males, total PYLD = 74 442; females, total PYLD = 66 874)							
1	Anxiety and depression	129 840	14.2%	1	Anxiety and depression	161 064	24.6%
2	Asthma	197 089	13.9%	2	Asthma	172 078	13.4%
3	Autism spectrum disorders	15 760	8.8%	3	Bulimia nervosa	8 482	3.6%
4	ADHD	55 454	6.1%	4	Migraine	99 955	3.5%
5	Alcohol misuse	124 081	3.6%	5	Low birth weight	NA	2.9%
6	Schizophrenia	4 482	2.6%	6	ADHD	21 726	2.7%
7	Low birth weight	NA	2.6%	7	Anorexia nervosa	5 950	2.5%
8	Falls	NA	2.5%	8	Epilepsy	5 056	2.1%
9	Epilepsy	5 287	2.5%	9	Personality disorders	14 245	1.9%
10	Birth trauma and asphyxia	NA	2.3%	10	Birth trauma and asphyxia	NA	1.8%
	Other mental disorders		6.9%		Other mental disorders		5.7%
	Other physical disorders		34.2%		Other physical disorders		35.4%
Younger adolescents: 10–14-year-olds (males, total PYLD = 20 504; females, total PYLD = 14 541)							
1	Asthma	88 076	22.5%	1	Asthma	59 095	21.3%
2	ADHD	36 369	14.5%	2	Anxiety and depression	23 195	16.4%
3	Autism spectrum disorders	5 100	10.5%	3	ADHD	14 487	8.1%
4	Anxiety and depression	17 796	7.1%	4	Low birth weight	NA	4.4%
5	Low birth weight	NA	3.2%	5	Epilepsy	1 319	3.0%
6	Epilepsy	1 390	2.8%	6	Birth trauma and asphyxia	NA	2.8%
7	Birth trauma and asphyxia	NA	2.8%	7	Autism spectrum disorders	950	2.7%
8	Falls	NA	2.2%	8	Eczema	19 024	2.5%
9	Migraine	16 990	1.9%	9	Migraine	14 813	2.4%
10	Otitis media	NA	1.7%	10	Otitis media	NA	2.2%
	Other mental disorders		0.2%		Other mental disorders		2.2%
	Other physical disorders		30.5%		Other physical disorders		32.0%
Older adolescents: 15–19-year-olds (males, total PYLD = 23 663; females, total PYLD = 22 162)							
1	Anxiety and depression	47 328	16.3%	1	Anxiety and depression	56 735	26.2%
2	Asthma	63 203	14.0%	2	Asthma	58 346	13.8%
3	Autism spectrum disorders	5 352	9.3%	3	Bulimia nervosa	3 447	4.4%
4	ADHD	15 270	5.3%	4	Migraine	33 522	3.5%
5	Alcohol misuse	32 864	3.0%	5	Anorexia nervosa	2 351	3.0%
6	Acne	12 090	2.8%	6	Low birth weight	NA	2.9%
7	Low birth weight	NA	2.7%	7	Epilepsy	1 682	2.1%
8	Falls	NA	2.6%	8	ADHD	5 704	2.1%
9	Epilepsy	1 764	2.6%	9	Acne	8 102	2.0%
10	Birth trauma and asphyxia	NA	2.4%	10	Birth trauma and asphyxia	NA	1.8%
	Other mental disorders		7.0%		Other mental disorders		5.7%
	Other physical disorders		32.0%		Other physical disorders		32.6%
Young adults: 20–24-year-olds (males, total PYLD = 30 275; females, total PYLD = 30 172)							
1	Anxiety and depression	64 716	17.3%	1	Anxiety and depression	81 134	27.4%
2	Asthma	45 809	7.9%	2	Asthma	54 637	9.4%
3	Autism spectrum disorders	5 308	7.1%	3	Bulimia nervosa	4 406	4.1%
4	Alcohol misuse	91 217	6.5%	4	Migraine	51 620	4.0%
5	Schizophrenia	3 418	4.9%	5	Personality disorders	10 841	3.2%
6	Personality disorders	15 683	3.7%	6	Anorexia nervosa	3 183	3.0%
7	Heroin misuse	3 852	3.4%	7	Low birth weight	NA	2.1%
8	Cannabis misuse	36 527	3.2%	8	Infertility	3 865	1.9%
9	Falls	NA	2.6%	9	Acne	10 447	1.8%
10	Migraine	27 933	2.1%	10	Schizophrenia	1 254	1.8%
	Other mental disorders		3.4%		Other mental disorders		6.6%
	Other physical disorders		37.7%		Other physical disorders		34.7%

ADHD = attention deficit hyperactivity disorder. NA = not available. * Prevalence data are not available for the number of cases of falls, low birth weight, birth trauma and asphyxia, and otitis media; for these conditions, PYLD estimates are based on the various disabling consequences, which each have an estimate of prevalence. ◆

self-management and successful transitions to adult health services. These models exist for asthma,[10] but few exist for autism and ADHD.[11]

Common mental disorders with adolescent and young adult onset, such as anxiety and depression, are most likely to be detected in primary care. However, there are significant challenges in identifying and managing these conditions, so it is not clear which models of care best address them.[12,13] Schizophrenia and eating disorders have a similar age of onset, but usually require specialist care. For anorexia nervosa, family-based treatment can be effective in the context of comprehensive specialist treatment.[14] For schizophrenia, early intervention programs have the potential to reduce the associated disability,[15,16] but more evaluation of medium-term outcomes and generalisability is needed.[17,18]

The major contributors to disability in young Australians are a mixture of mental disorders (especially anxiety and depression, ADHD, autism, eating disorders and schizophrenia) and some physical disorders (including asthma, migraine, and the consequences of low birth weight and birth trauma). Changes in the patterns of prevalent disability from early adolescence to young adulthood are necessary for prioritising health service investment — although these alone are not sufficient.[19-21] Policymakers also need to know how much burden can be averted by effective interventions (if these exist), and which interventions are the most cost-effective. Even so, the changing profile of disability burden between early adolescence and young adulthood should focus attention on the delivery of accessible and youth-friendly health care, as well as the effectiveness of transitions in care from child health services to adult health services.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Rebecca R S Mathews, MPH, Senior Research Assistant[1]
Wayne D Hall, PhD, NHMRC Australia Fellow[1]
Theo Vos, PhD, Professor[2]
George C Patton, MD, FRANZCP, Professor[3]
Louisa Degenhardt, PhD, Professor and Principal[4]

1 Centre for Clinical Research, University of Queensland, Brisbane, QLD.
2 Centre for Burden of Disease and Cost-Effectiveness, School of Population Health, University of Queensland, Brisbane, QLD.
3 Centre for Adolescent Health, Royal Children's Hospital, Murdoch Childrens Research Institute, University of Melbourne, Melbourne, VIC.
4 Burnet Institute, Melbourne, VIC.
Correspondence: r.mathews@uq.edu.au

REFERENCES

1 Patton GC, Viner R. Pubertal transitions in health. *Lancet* 2007; 369: 1130-1139.
2 Begg S, Vos T, Barker B, et al. The burden of disease and injury in Australia 2003. Canberra: Australian Institute of Health and Welfare, 2007. (AIHW Cat. No. PHE 82.) http://www.aihw.gov.au/publications/index.cfm/title/10317 (accessed Oct 2009).
3 Australian Institute of Health and Welfare. Young Australians: their health and wellbeing 2007. Canberra: AIHW, 2007. (AIHW Cat. No. PHE 87.) http://www.aihw.gov.au/publications/index.cfm/title/10451 (accessed Oct 2009).
4 Murray C, Lopez A. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Cambridge, Mass: Harvard School of Public Health on behalf of the World Health Organization and the World Bank, 1996.
5 Stouthard MEA, Essink-Bot ML, Bonsel GJ, et al. Disability weights for diseases in the Netherlands. Rotterdam: Department of Public Health, Erasmus University, 1997. http://dare.uva.nl/record/30262 (accessed Jul 2010).
6 Suris JC, Michaud PA, Akre C, Sawyer SM. Health risk behaviors in adolescents with chronic conditions. *Pediatrics* 2008; 122: e1113-e1118.
7 Suris JC, Akre C, Rutishauser C. How adult specialists deal with the principles of a successful transition. *J Adolesc Health* 2009; 45: 551-555.
8 Sawyer SM, Drew S, Yeo MS, Britto MT. Adolescents with a chronic condition: challenges living, challenges treating. *Lancet* 2007; 369: 1481-1489.
9 Australian Bureau of Statistics. Mental health and wellbeing: profile of adults, Australia, 1997. Canberra: ABS, 1998. (ABS Cat. No. 4326.0.)
10 Shah S, Roydhouse JK, Sawyer SM. Asthma education in primary healthcare settings. *Curr Opin Pediatr* 2008; 20: 705-710.
11 Kogan MD, Strickland BB, Blumberg SJ, et al. A national profile of the health care experiences and family impact of autism spectrum disorder among children in the United States, 2005–2006. *Pediatrics* 2008; 122: e1149-e1158.
12 Sanci L, Lewis D, Patton G. Detecting emotional disorder in young people in primary care. *Curr Opin Psychiatry* 2010; 23: 318-323.
13 Tylee A, Haller DM, Graham T, et al. Youth-friendly primary-care services: how are we doing and what more needs to be done? *Lancet* 2007; 369: 1565-1573.
14 le Grange D, Crosby RD, Rathouz PJ, Leventhal BL. A randomized controlled comparison of family-based treatment and supportive psychotherapy for adolescent bulimia nervosa. *Arch Gen Psychiatry* 2007; 64: 1049-1056.
15 McGorry PD, Nelson B, Amminger GP, et al. Intervention in individuals at ultra-high risk for psychosis: a review and future directions. *J Clin Psychiatry* 2009; 70: 1206-1212.
16 Mihalopoulos C, Harris M, Henry L, et al. Is early intervention in psychosis cost-effective over the long term? *Schizophr Bull* 2009; 35: 909-918.
17 Correll CU, Hauser M, Auther AM, Cornblatt BA. Research in people with psychosis risk syndrome: a review of the current evidence and future directions. *J Child Psychol Psychiatry* 2010; 51: 390-431.
18 Ricciardi A, McAllister V, Dazzan P. Is early intervention in psychosis effective? *Epidemiol Psichiatr Soc* 2008; 17: 227-235.
19 Chisholm D. Choosing cost-effective interventions in psychiatry: results from the CHOICE programme of the World Health Organization. *World Psychiatry* 2005; 4: 37-44.
20 Carter R. The ACE (Assessing Cost Effectiveness) approach to priority setting. 6th World Congress: Explorations in Health Economics; 2007 Jul 8-11; Copenhagen, Denmark. Denmark: International Health Economics Association, 2007.
21 Carter R, Vos T, Moodie M, et al. Priority setting in health: origins, description and application of the Australian Assessing Cost Effectiveness initiative. *Expert Rev Pharmacoecon Outcomes Res* 2008; 8: 593-617.

(Received 22 Jul 2010, accepted 19 Dec 2010) ❑