

Longitudinal analysis of inpatient care utilization among people with intellectual disabilities: 1999–2002

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Abstract

Background There has been no longitudinal study in Taiwan to identify the nature and the scale of medical care utilization of people with intellectual disabilities (IDs) up to the present. The aim of this study is to describe inpatient utilization among people under ID care in institutions in order to identify the pattern of medical care needs and the factors affecting utilization in Taiwan.

Method The subject cohort was 168 individuals with ID who were cared for by a large public disability institution from 1999 to 2002 in Taipei, Taiwan.

Results On the examination of the inpatient care that these persons underwent, it was found that these individuals had a heightened need (inpatient rate: 10.1–14.9%) for inpatient care compared with the general population with disabilities (9.37%) in Taiwan. The main reasons for hospitalization were pneumonia, gastrointestinal disorders, cellulites,

orthopaedic problems, epilepsy and bronchitis. Using the full model of Generalized Estimating Equations for inpatient care utilization, the factors including low income family, living in an institution, being a subject with cerebral palsy and being a high outpatient user all influenced the use of inpatient care.

Conclusions This study highlights that health authorities need to promote health planning more in order to ensure an excellent quality of health monitoring and health promotion among people with ID cared for by institutions.

Keywords health management, inpatient care, institution, longitudinal study

Introduction

Historically, public health has focused on preventing disabling conditions; people with disabilities have not been a target of healthcare policy (Lollar & Crews 2003). However, disability ranks as one of the greatest priorities among public health problems (Pope & Tarlov 1991). To ensure the quality of health care for people with intellectual disabilities (IDs), *The European Manifesto on Basic Standards of Health Care for*

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People with Intellectual Disabilities (Meijer *et al.* 2004) stated that health care should have greater availability and access for people with ID, that there should be increased competencies among ID health professional, educators and researchers, that a greater reliance needs to be placed on multidisciplinary approaches to health care, that more specialist services are needed, and that a proactive emphasis on personal health management is required. Furthermore, the six core goals of *US Surgeon General Report* for improving the health of people with ID included integration of health promotion into community environments, increased knowledge and understanding, improved quality of health care, better training of healthcare providers, more effective healthcare financing and increases in sources of health care (US Public Health Service 2002).

Numerous studies have reported that people with ID suffer from a range of accompanying medical conditions (Bond *et al.* 1996; Jones & Kerr 1997; Lin *et al.* 2003a, 2005a) and have a higher rate of medical care utilization (Meerding *et al.* 1998; Lin *et al.* 2003a, 2004). In securing access to the medical care system, people with ID experience challenges that are different in kind and degree from those that face other individuals (Singer *et al.* 1986; Palfrey *et al.* 1994). Vital questions about medical care are often addressed by analysing medical care utilization data (Diehr *et al.* 1999). Adequate information concerning medical care utilization is critical to the success of efforts to improve the quality of care for people with ID. However, data concerning the medical care utilization of people with ID in Taiwan is very limited. The medical needs and problems of people with ID have received limited attention in the medical care system, and have been largely overlooked during the current medical care policy debate in Taiwan (Lin *et al.* 2003a). The aim of the present study is to provide a profile of medical care utilization and its determinants for people with ID who are cared for by a large institution through reviewing inpatient care data between 1999 and 2002.

Methods

Setting

The study setting is the largest residential institution in Taipei, Taiwan that mainly cares for persons with

severe or profound ID and multiple disabilities (individuals with ID accompanied with another disability). This institution is a public institution that was set up in 1982; the Social Welfare Department of Taipei Municipal Government supervises and financially supports the operation of the institution directly.

Subjects

There are two branches of this institution that are located in different areas. We chose the better organized of the two branches with more complete medical records. A total of 211 individuals with ID were cared for by this branch of the institution during 2002. The subject cohort was made up of 168 of these 211 persons with ID who have been cared for continuously in this institution from 1999 to 2002, thus providing 4 years of medical data. The individuals with ID were either residing in or accepting day care from the institution. The remaining 43 non-participants were excluded from the study because they did not have four consecutive years of care at the institution. We found that the age and gender characteristics of the two groups, participants and non-participants, did not significantly differ.

Data collection

One contracted public regional teaching hospital in Taipei has catered for the clinical care of people with ID cared for by this institution since 1986. If a resident of the institution requires inpatient care, they are transferred to the public regional teaching hospital. The disability institution has set up a specific outpatient clinic (health station) and recruited skilled nurses to run the clinic. The medical care procedure for people with ID in this institution is the same as for the general population in the society; namely the ID individuals need to hold a Taiwanese National Insurance Card to register at the clinic. The main difference is that no co-payment is needed when visiting a physician at the clinic, while persons from general society need to provide co-payment at a clinic. This hospital offered between six and seven different clinics per week between the years 1999 and 2002. The medical care data included medical history and medical care utilization by persons with ID from the institution and were stored in the medical center,

which was managed by the institutional nursing chief. After obtaining approval from the institutional authority after showing adequate protection of the confidentiality of the medical records, the second author recorded all the information related to the 168 subjects' information from their medical charts. The information included medical care utilization, demographic data (age, gender, disability status, physical weight and height), number of years cared for by the institution and family economic information.

Data analysis

The data were entered into a database and analysed using SPSS 11.0 and STATA 8.0 software. Analyses included frequency distributions and percentages for the demographic data and inpatient care utilization. We used Generalized Estimating Equations (GEEs) to compare the relationship of the demographic profile and the four consecutive years of inpatient care utilization.

Results

Based on the demographic data of the year 1999, Table 1 shows that the average age of the subjects was 19.3 years and 62.5% were male. In total, 41.1% of subjects suffered from ID only, while 58.9% suffered from multiple disabilities. There were 76.2% of subjects who suffered profound disabilities and more than half of the subjects have a cerebral palsy. The average length of stay in the institution was 6.64 years and nearly one-third of the subjects had stayed more than 10 years. With regard to the household economic status, more than 30% of the subjects come from low income families with their total family annual income 2.5 times less than the average annual income of the general population in Taiwan (Ministry of the Interior 2004). Nearly 89% of the subjects resided at this institution while about 11.3% received daycare service and commuted between their families and the institutional setting. Generally speaking, the demographic characteristics between males and females showed no statistically difference except for height (males taller than females, $P < 0.001$).

Tables 2 and 3 summarize the inpatient care utilization of the study subjects for the years 1999–2002. Between 10.1% and 14.9% of the subjects had

Table 1 Distribution of demographic characteristics of the study subjects*

| Variable | Number | Percent |
|--|--------|---------|
| Gender | | |
| Male | 105 | 62.5 |
| Female | 63 | 37.5 |
| Age (year) (mean = 19.30 ± 6.66; range: 8.25–51.03) | | |
| 0–14 | 42 | 25.0 |
| 15–19 | 56 | 33.3 |
| 20–29 | 57 | 33.9 |
| 30–39 | 12 | 7.1 |
| ≥40 | 1 | 0.6 |
| Disability type | | |
| ID | 69 | 41.1 |
| Multiple (ID and another disease) | 99 | 58.9 |
| Disability level | | |
| Medium | 6 | 3.6 |
| Severe | 34 | 20.2 |
| Profound | 128 | 76.2 |
| Cerebral palsy | | |
| No | 78 | 46.4 |
| Yes | 90 | 53.6 |
| Care type | | |
| Institutional dwellers | 149 | 88.7 |
| Day care | 19 | 11.3 |
| Years in the institution (mean = 6.64 ± 5.60; range: 2.25–17.50) | | |
| 0–4 | 93 | 55.4 |
| 5–9 | 21 | 12.5 |
| 10–14 | 32 | 19.0 |
| 15–19 | 22 | 13.1 |
| Low income family | | |
| No | 117 | 69.6 |
| Yes | 51 | 30.4 |

*Based on the subjects' demographic data in the year 1999. ID, intellectual disability.

received inpatient care during these 4 years. The average annual inpatient care utilization over these 4 years was 1.56 times. The annual rate for year 2002 was significantly higher than those for the other years. The average length of stay in hospital varied from 3.71 to 6.65 days over the 4 years. Table 4 summarizes the main reasons for hospitalization as pneumonia, gastrointestinal disorders, cellulites, orthopaedic problems, epilepsy and bronchitis, all common diseases that affected people with ID in the institution.

When the four successive years of inpatient care utilization are correlated, they need to be treated as

Table 2 Distribution of inpatient care characteristics

| Variables | 1999 Number (%) | 2000 Number (%) | 2001 Number (%) | 2002 Number (%) |
|--------------------------------------|--------------------|--------------------|--------------------|--------------------|
| Inpatient episodes | | | | |
| No | 151 (89.9) | 148 (88.1) | 143 (85.1) | 143 (85.1) |
| Yes | 17 (10.1) | 20 (11.9) | 25 (14.9) | 25 (14.9) |
| Total number of inpatient episodes | 25 | 35 | 30 | 46 |
| Average number of inpatient episodes | 1.47 ± 0.87 | 1.75 ± 1.25 | 1.2 ± 0.41 | 1.84 ± 1.60 |
| Total length of inpatient episodes | 153 | 165 | 159 | 156 |
| Average length of inpatient episodes | 6.65 | 5 | 5.89 | 3.71 |

Table 3 Frequency of hospitalization from 1999 to 2002

| Frequency | Year (persons) | | | |
|----------------------|----------------|------|------|------|
| | 1999 | 2000 | 2001 | 2002 |
| 1 | 12 | 13 | 20 | 17 |
| 2 | 3 | 3 | 5 | 3 |
| 3 | 1 | 1 | 0 | 2 |
| 4 | 1 | 2 | 0 | 0 |
| 5 | 0 | 1 | 0 | 2 |
| 6 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 1 |
| Total (person-times) | 25 | 35 | 30 | 46 |

Table 4 The main reasons for hospitalization between 1999 and 2002

| Year | Diseases or disorders (number of persons) |
|------|--|
| 1999 | Pneumonia (5), gastrointestinal disorders (3), cellulites (3), epilepsy (3), choke (2), others (0) |
| 2000 | Orthopaedic problems (6), pneumonia (3), cellulites (3), bronchitis (3), epilepsy (2), others (0) |
| 2001 | Pneumonia (7), allergy (6), gastrointestinal disorders (4), bronchitis (3), fever (3), others (0) |
| 2002 | Pneumonia (10), gastrointestinal disorders (8), cellulites (2), wound infection (2), others (0) |

fixed samples statistically. Therefore, we used GEEs to compare the differences and to identify determinants for use/non-use of inpatient care. We first tested the use of inpatient care (yes/no) for different years and showed that there was no significant difference in the percentage hospitalization of subjects over the past 4 years ($P > 0.05$).

Table 5 summarized the determinants of inpatient care utilization. Family economic status, residential status, age, length of stay, body mass index (BMI = kg/m²) and rate of outpatient visits were all related to hospitalization by the GEEs single variable model. Those ID individuals from low income families were 2.31 times more likely to be inpatient care users than those ID individuals who were not. The residential status of the subjects indicated that a person in residence was 6.15 times more likely to become an inpatient care user than those individuals who were only accepting daycare services at the institution. Adults with ID were more likely to use inpatient

care (1.61 times) than children with ID. Those subjects who also suffered from cerebral palsy were also more likely to become an inpatient care user (1.58 times) than individuals without cerebral palsy. The subject group who had stayed 5–9 years in the institution was 2.55 times more likely to use inpatient care than those subjects who had stayed less than 4 years. Body stature was also a factor that affected inpatient care with thin subjects being 2.31 times more likely to use inpatient care than those subjects with a standard, overweight or obese BMI. In addition, an outpatient care user with more than 24 visits annually was 2.81 times more likely to be an inpatient care user than a subject who was not a high outpatient care user. The remaining factors such as gender, age, disability type and level were not significantly correlated with inpatient care.

The full GEEs model was used to evaluate the factors determining inpatient care utilization while controlling the interaction of the factors tested.

| Variable | Number | Hospitalization (yes/no) | | P-value |
|--------------------------|--------|-----------------------------|------------|---------|
| | | OR | 95% CI | |
| Gender | | | | |
| Female | 105 | 1.00 | | |
| Male | 63 | 0.67 | 0.42–1.05 | 0.081 |
| Low income family | | | | |
| No | 117 | 1.00 | | |
| Yes | 51 | 2.31 | 1.46–3.65 | <0.001 |
| Residing in institution | | | | |
| No | 19 | 1.00 | | |
| Yes | 149 | 6.15 | 1.48–25.54 | 0.012 |
| Disability type | | | | |
| ID | 69 | 1.00 | | |
| ID and another disease | 99 | 0.88 | 0.56–1.40 | 0.596 |
| Disability level | | | | |
| Medium | 6 | 1.00 | | |
| Severe | 34 | 0.55 | 0.28–1.06 | 0.075 |
| Profound | 128 | 1.64 | 0.59–4.52 | 0.343 |
| Cerebral palsy | | | | |
| No | 78 | 1.00 | | |
| Yes | 90 | 1.58 | 1.35–29.30 | 0.019 |
| Age (year) | | | | |
| ≤18 | 75 | 1.00 | | |
| >18 | 93 | 1.61 | 1.02–2.54 | 0.04 |
| Years in the institution | | | | |
| 0–4 | 94 | 1.00 | | |
| 5–9 | 21 | 2.55 | 1.43–4.55 | 0.002 |
| 10–14 | 35 | 1.67 | 0.27–1.63 | 0.374 |
| 15–19 | 18 | 1.24 | 0.69–2.25 | 0.475 |
| Body Mass Index* | | | | |
| Standard | | 1.00 | | |
| Obese/overweight | | 1.10 | 0.50–2.39 | 0.814 |
| Thin | | 2.31 | 1.42–3.74 | 0.001 |
| Outpatient visits | | | | |
| ≤24 | | 1.00 | | |
| >24 | | 2.81 | 1.77–4.45 | <0.001 |

Table 5 Determinants related to hospitalization as determined by the Generalized Estimating Equations – single variable model

*Body Mass Index (Department of Health 2004): (1) age ≤ 19 years calculated by their percentile; thin: BMI ≤ 15th; standard: 15th < BMI < 85th; overweight: 85th ≤ BMI ≤ 95th; obese: BMI ≥ 95th. (2) age > 19 years; thin: BMI < 18.5; standard: 18.5 ≤ BMI < 24; overweight: 24 ≤ BMI < 27; obese: BMI > 27.
CI, confidence interval; ID, intellectual disability.

Table 6 shows that low income family (OR = 2.31), institutional dwellers (OR = 4.44), subjects who also suffered from cerebral palsy (OR = 2.21) and high outpatient use (OR = 1.93) were variables that were able to significantly predict the inpatient care use level.

Discussion

There has been no previous longitudinal study that has identified the nature and scale of medical care utilization by people with ID in Taiwan. Medical care utilization data have several valuable characteristics

| Variable | Number | Hospitalization (yes/no) | | |
|-----------------------------|--------|-----------------------------|------------|---------|
| | | Odd ratio | 95% CI | P-value |
| Gender | | | | |
| Female | 105 | 1.00 | | |
| Male | 63 | 0.81 | 0.49–1.33 | 0.402 |
| Low income family | | | | |
| No | 117 | 1.00 | | |
| Yes | 51 | 2.31 | 1.37–3.90 | 0.002 |
| Residing in the institution | | | | |
| No | 19 | 1.00 | | |
| Yes | 149 | 4.44 | 1.01–19.54 | 0.049 |
| Disability type | | | | |
| ID | 69 | 1.00 | | |
| ID and other | 99 | 0.66 | 0.37–1.17 | 0.158 |
| Disability level | | | | |
| Medium | 6 | 1.00 | | |
| Severe | 34 | 0.59 | 0.29–1.19 | 0.142 |
| Profound | 128 | 2.81 | 0.82–9.70 | 0.101 |
| Cerebral palsy | | | | |
| No | 78 | 1.00 | | |
| Yes | 90 | 2.21 | 1.2–4.06 | 0.011 |
| Age (year) | | | | |
| ≤18 | 75 | 1.00 | | |
| >18 | 93 | 1.49 | 0.84–2.67 | 0.176 |
| Years in the institution | | | | |
| 0–4 | 94 | 1.00 | | |
| 5–9 | 21 | 1.68 | 0.86–3.25 | 0.127 |
| 10–14 | 35 | 0.94 | 0.36–2.45 | 0.814 |
| 15–19 | 18 | 1.25 | 0.61–2.56 | 0.549 |
| Body Mass Index | | | | |
| Standard | | 1.00 | | |
| Obese | | 0.93 | 0.36–2.42 | 0.884 |
| Skinny | | 1.67 | 0.99–2.82 | 0.055 |
| Outpatient visits | | | | |
| ≤24 | | 1.00 | | |
| >24 | | 1.93 | 1.18–3.17 | <0.009 |

Table 6 Factors related to hospitalization as determined by the Generalized Estimating Equations – full model

CI, confidence interval; ID, intellectual disability.

that are helpful to decision makers. The present study described the four successive years of data for inpatient care utilization among people with ID in an institution. The findings show that 10.1–14.9% of the subjects used inpatient care over the 4 years. This steady figure is higher than the general population with disabilities in Taiwan, for whom the inpatient care rate was 9.37% in 2000 (Ministry of the Interior 2001).

The average length of stay in hospital varied from 3.71 to 6.65 days over the present study. This figure is similar to the result of Lin *et al.* (2004) who conducted a study among 30 disability institutions in 1996 and showed an average hospital stay of 6 days. The main reasons for hospitalization in the present study were infections or disorders such as pneumonia, gastrointestinal disorders, cellulites and bronchitis. Many of these disorders are acute and can easily

start in an institution. In addition, many chronic diseases such as epilepsy or orthopaedic problems always affect people with ID at an institution. Therefore, it is necessary to examine the health management policy of the institution for these disorders in order to monitor the effectiveness and efficacy of the disease management for people with ID cared for at the institution.

With regard to the determinants of hospital care utilization, the present study shows that factors including family economic status, being an institutional dweller, being a subject with cerebral palsy and being a high outpatient user were variables correlated with inpatient care utilization by the GEEs full model. Family income status is known to affect people's health and healthcare utilization (Andersen 1983). In order to ensure the health equity of people in Taiwan, the Taiwanese National Health Insurance programme regulates that people with disabilities have their insurance premiums partly paid by the government. Within medical care utilization, people with disabilities also receive additional support in the form of ambulatory care and inpatient care (Bureau of National Health Insurance 2004). This kind of universal healthcare system seeks to ensure that people have access to care on a basis of need, rather than income. However, more than 40% of people with disabilities say that medical care expenditure still affects their healthcare utilization under National Health Insurance Plan (Report of the Living Survey of People with Disabilities 2000, Ministry of the Interior 2001). One possible explanation for the linking of family income with in-care utilization in the present study is that participants who came from low income families may have poorer health or be frailer; if this is true, they would proportionately utilize more healthcare services. The real reason for the linkage of household economic status with inpatient care utilization found by the present study needs to be examined further.

People with ID often carry a greater burden of diseases that require treatment than people in the general population (Lin *et al.* 2003b; van Schrojenstein Lantman-de Valk 2004). Moreover, those people with ID residing in the institutions tend to suffer from ill health or comorbidity and thus need continuous monitoring of their health (Lin *et al.* 2005b). Individuals with ID who also suffer from cerebral palsy and those who are higher outpatient users also

show an increased risk of hospitalization. Therefore, the health authorities need careful promotion of health planning for people with ID within disability programmes in order to ensure a high quality of health care and health promotion for people with ID who are cared for by institutions (Lin *et al.* 2005c).

The present study has several limitations. In this study, we did not examine the effects of a range of further factors that may affect inpatient care utilization. The determinants of inpatient care in this study are different from the results of Lin *et al.* (2004), who found that the subject's and carer's age, poor health-care accessibility, time consumed in health care, need for rehabilitation, ill health and having multiple disabilities, were all factors that resulted in increased inpatient care utilization. The main reason is that we collected the information for this study from existing medical care charts and the other variables mentioned above were not available. In addition, we did not analyse follow-up treatments after discharge from hospitals to evaluate the effectiveness or efficiency of care at the institution.

Conclusion

The evidence-based data on medical care utilization provides opportunities to improve the health of people with ID and this, in turn, will foster better scientific health policy making. From this examination of the inpatient care of people with ID cared for by an institution, it was found that these individuals have a heightened need for inpatient care compared to the general population with disabilities in Taiwan. The health authorities need to evaluate more carefully the determinants of inpatient care use and to promote health planning and healthy life style (such as nutrition) to ensure that there is good quality health monitoring among people with ID who are cared for at institutions.

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References

- Andersen A. (1983) Exploring dimensions of access medical care. *Health Services Research* **18**, 48–74.
- Bond L., Kerr M., Dunstan F. & Thapar A. (1996) Attitudes of general practitioners towards health care for people with intellectual disability and the factors underlying these attitudes. *Journal of Intellectual Disability Research* **41**, 391–404.
- Bureau of National Health Insurance (2004) *National Health Insurance Profile 2004*. Department of Health, Taiwan.
- Department of Health (2004) *The Definition of Obesity and Management Principles*. Available at: http://www.doh.gov.tw/NewVersion/content.asp?class_no=79&now_fod_list_no=2452&array (retrieved 1 April 2004).
- Diehr P., Yanez D., Ash A., Hornbrook M. & Lin D. (1999) Methods for analyzing health care utilization and costs. *Annual Review of Public Health* **20**, 125–44.
- Jones R. G. & Kerr M. P. (1997) A randomized control trial of an opportunistic health screening tool in primary care for people with intellectual disability. *Journal of Intellectual Disability Research* **41**, 499–515.
- Lin J. D., Wu J. L. & Lee P. N. (2003a) Healthcare needs of people with intellectual disability in institutions in Taiwan: outpatient care utilization and implications. *Journal of Intellectual Disability Research* **47**, 169–80.
- Lin J. D., Lee P. N., Wu J. L. & Yen J. F. (2003b) Health profile of persons with intellectual disabilities in institutions in Taiwan. *Journal of Medical Sciences* **23**, 285–90.
- Lin J. D., Wu J. L. & Lee P. N. (2004) Utilization of inpatient care and its determinants among people with intellectual disabilities in daycare centers in Taiwan. *Journal of Intellectual Disability Research* **48**, 655–62.
- Lin J. D., Yen J. F., Li C. W. & Wu J. L. (2005a) Patterns of obesity among children and adolescents with intellectual disabilities in Taiwan. *Journal of Applied Research in Intellectual Disabilities* **18**, 1–7.
- Lin J. D., Yen J. F. & Wu J. L. (2005b) Importance and satisfaction of preventive health strategies in institutions for people with intellectual disabilities: a perspective of institutional directors. *Research in Developmental Disabilities* **26**, 267–80.
- Lin J. D., Yen J. F., Loh C. H., Chow M. J., Wu J. L. & Tung H. J. (2005c) Perceptions of program administrators toward health planning for persons with intellectual disabilities: a national survey in Taiwan. *Journal of Policy and Practice in Intellectual Disabilities* **2**, 38–46.
- Lollar D. J. & Crews J. E. (2003) Redefining the roles of public health in disability. *Annual Review of Public Health* **24**, 195–208.
- Meerding W. J., Binneux L., Polder J. J., Koopmanschap M. A. & Maas P. J. (1998) Demographic and epidemiological determinants of healthcare costs in Netherlands: cost of illness study. *British Medical Journal* **317**, 111–15.
- Meijer M. M., Carpenter S. & Scholte F. A. (2004) European manifesto on basic standards of health care for people with intellectual disabilities. *Journal of Policy and Practice in Intellectual Disabilities* **1**, 10–15.
- Ministry of the Interiors (2001) *Report of Living Survey of People with Disabilities 2000*. Ministry of the Interior, Taiwan.
- Ministry of the Interior (2001) *The Living Survey of People with Disabilities (II): Healthcare in 2000*. Ministry of the Interior, Taiwan.
- Ministry of the Interior (2004) *Living Assistance for the Low-Income Households*. Available at: <http://sowf.moi.gov.tw/10/new10.htm> (retrieved 10 March 2005).
- Palfrey J. S., Samuels R. C., Haynie M. & Cammisia M. L. (1994) Health care reform: what's in it for children with chronic illness and disability. *Journal of School Health* **64**, 234–7.
- Pope A. M. & Tarlov A. R. (1991) *Disability in America: Toward A National Agenda for Prevention*. National Academic Press, Washington, DC.
- van Schrojenstein Lantman-de Valk H. M. J., te Wierik M. J. M., van de Akker M., Wullink M., Schellevis F. G., Dinant G. J. & Metsemakers J. F. M. (2004) Morbidity and health-care use in people with intellectual disabilities in general practice: first results of a survey in the Netherlands. *Journal of Policy and Practice in Intellectual Disabilities* **1**, 107–9.
- Singer J. D., Butler J. A. & Palfrey J. S. (1986) Health care access and use among handicapped students in five public school system. *Medical Care* **42**, 1–13.
- US Public Health Service (2002) *Closing the Gap: A National Blueprint for Improving the Health of Individuals with Mental Retardation*. Report of the Surgeon General's Conference of Health Disparities and Mental Retardation, 2001. US Department of Health and Human Services, Washington, DC.

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