The Impact of Ageing in People with Intellectual and Developmental Disability

Emma J. Glasson$^{1,2}$ and Alan H. Bittles$^{1,3}$

$^1$School of Exercise, Biomedical and Health Sciences, Edith Cowan University, Australia
$^2$School of Population Health, The University of Western Australia, Australia
$^3$Centre for Comparative Genomics, Murdoch University, Perth, Australia

Summary: In the countries of Western Europe, death rates declined rapidly during the 20th century, resulting in present-day life expectancies that range from 75–79 years for males and 80–84 years for females. Premature mortality among people with intellectual and developmental disability (IDD) also decreased very significantly, especially over the course of last 50 years, with the result that life expectancy estimates are now over 70 years for people with mild IDD and 60 years for those with severe levels of IDD. The pattern of increasing survival of people with IDD means that in future years they almost inevitably will be at greater risk of age-related ill-health. There are many disorders that arise later in adulthood which commonly affect those with IDD, such as obesity, osteoporosis, epilepsy, cardiovascular disease, and dementia. Generally, the age-related ill-health experienced by people with IDD occurs at younger ages than in the general population, and greater focus is needed on disorders which emerge during middle age to senescence so that appropriate management regimes can be implemented. These are important considerations in terms of the types and continuity of care to be made available, especially since many people with IDD already outlive their parents and other family members.

Key words: Intellectual disability, ageing, health, life expectancy.

Introduction

Intellectual and developmental disability (IDD) is formally defined in terms of significant limitations in intellectual functioning and adaptive behaviour, as expressed conceptually, socially and practically, with onset before 18 years of age (AAIDD 2002). A diagnosis of IDD is made when scores obtained on standardized IQ and adaptive behaviour tests are more than two standard deviations below the mean (i.e., less than 70 points). As indicated in Table 1, the level of disability experienced by an individual is categorized by the absolute scores obtained on both of these tests. Individuals with a mild level of disability (IQ 55–69) form the largest sub-group, representing some 85% of all people with IDD, whereas approximately 10% of cases have moderate disability (IQ 40–54) and 5% have severe disability (IQ <40) (APA 1994).
Table 1: Levels of intellectual and developmental disability (IDD) by practical abilities.

<table>
<thead>
<tr>
<th>IQ/Adaptive behaviour score</th>
<th>Descriptive level of IDD</th>
<th>Functional age equivalence</th>
<th>Expected abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>90–110</td>
<td>Average</td>
<td></td>
<td></td>
</tr>
<tr>
<td>85–89</td>
<td>Low average</td>
<td>9–12 years</td>
<td>Developmental milestones often delayed. Learning difficulties displayed but can learn practical skills. Usually able to work, contribute to society and maintain good social relationships.</td>
</tr>
<tr>
<td>70–84</td>
<td>Borderline</td>
<td>6–9 years</td>
<td>Noticeable developmental delays are common and physical disabilities probable. May learn independence in self-care and communication. Need support to live and work in the general community.</td>
</tr>
<tr>
<td>55–69</td>
<td>Mild</td>
<td>&lt;6 years</td>
<td>Marked and obvious developmental delays. Few communication skills present. May learn routine or repetitive tasks. Continuous support needed in all areas of living.</td>
</tr>
<tr>
<td>40–54</td>
<td>Moderate</td>
<td>&lt;6 years</td>
<td></td>
</tr>
</tbody>
</table>

An estimated 0.6–2.0% of people in developed countries have some form of IDD (Roeleveld et al. 1997, WHO 2001, AIHW 2003, Walsh et al. 2003), with 0.5–1.0% requiring daily support because of their disability (AIHW 2003). Determining the exact population prevalence of IDD is difficult because: i) people with IDD have high rates of premature mortality; ii) variations exist in the methods of case ascertainment, which may be exacerbated by incomplete psychological testing; and iii) individuals who develop good adaptive behaviour skills may exceed the minimum definition of IDD in their adult years (AIHW 2003). It is even more difficult to calculate prevalence rates of IDD in developing countries, but estimates have ranged from 3.0–8.4% (Durkin et al. 1998, Christianson et al. 2002, Durkin 2002), with poor living conditions, inadequate diet and high rates of endogamy and consanguineous marriage in some regions cited as important contributory factors (Bittles and Glasson, in press).

Increases in life expectancy

The overall health of people in developed regions increased significantly during the 20th century due to a combination of advances in medicine, better health care resources and treatments, and improvements in lifestyle, housing and nutrition (CDC 1999, Bittles and Glasson, in press). In countries such as Australia these advances were reflected by reductions in infant mortality rates (i.e., death up to one year of
age) from 107 to 5 per 1,000 births between 1902 and 2002 (ABS 2004), and improvements in life expectancy from 55 to 76 years for males and 59 to 82 years for females (ABS 2002). In the U.S.A., life expectancy increased by 30 years over the past century, of which 25 years were attributed to advances in public health (CDC 1999). Similarly, in Western European countries, current life expectancy ranges from 75–79 years for males and 80–84 years for females (PRB 2006), and country-specific data from the European Commission-funded Healthy Ageing Project indicate that 2.3–5.3% of all Europeans are over 80 years of age (SNIPH 2007).

In earlier times people with IDD were subject to major discrimination and from the late 19th century until the 1960s children and young adults with IDD could be sterilized in many parts of North America and Europe, while in Nazi Germany euthanasia was legally permissible for those with IDD between 1939 and 1945 (Bittles and Chew 1998). More recently there has been a major change in public attitudes to IDD, with greater acceptance that people with intellectual disabilities should be enabled to live independently in the community and be integrated into the education sector and workforce.

The gradual closure of large institutions caring for people with IDD, and the introduction of smaller, better-resourced centres with trained health care workers and specialised care regimes, has greatly assisted in improving their overall health and life expectancy (Bittles and Glasson, in press). By the end of the 20th century in most developed countries, survival estimates for those with IDD were approaching the levels in the general population, with estimates of 70 or more years of age for people with mild IDD and 60 years for those with severe levels of IDD (Janicki et al. 1999, Bittles et al. 2002). This trend is illustrated by data from Western Australia, based on a study sample of 8,274 people with IDD investigated via record linkage of population-based health data sets (Bittles et al. 2002). As shown in Table 2, life expectancy was inversely related to the severity of IDD and, as in the general population, the median life expectancy of women was greater than men at all levels of IDD.

*Based on a sample of 8,274 people with IDD in Western Australian (Bittles et al. 2002).

There also have been increased opportunities for people with IDD to contribute more widely to social, sporting and economic roles (Carek et al. 2002), although continuing progress is needed to ensure equality in the community, especially in health care (Mencap 1998, Hogg et al. 2001, US Public Health Service 2001, Mansell 2006). Within Europe, thirteen member countries of the European Union

<table>
<thead>
<tr>
<th>Level of IDD</th>
<th>Male median life expectancy (yr)</th>
<th>Female median life expectancy (yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>72.8</td>
<td>75.2</td>
</tr>
<tr>
<td>Moderate</td>
<td>65.9</td>
<td>73.2</td>
</tr>
<tr>
<td>Severe</td>
<td>57.6</td>
<td>60.3</td>
</tr>
</tbody>
</table>

Table 2: Median life expectancy by level of IDD and gender*.
are involved in the Pamona project, which aims to develop a set of health guidelines based on the European Community Health Indicators, to eliminate disparities in health, and improve the quality of life and health equity for people with IDD (Walsh et al. 2003).

**Down syndrome and ageing**

Down syndrome is the most commonly recognized genetic form of IDD and has been the subject of extensive research since its initial description by Dr. James Langdon Down in 1866. In developed countries, Down syndrome accounts for 12–15% of all cases of IDD (Wellesley et al. 1991, Alessandri et al. 1996, Hou et al. 1998, Bittles et al. 2002), with 1 in 650–1000 live births affected with the disorder (Baird and Sadovnick 1987, Stoll et al. 1998, Frid et al. 1999). Globally, it has been estimated that some 217,000 cases of Down syndrome are born per year (March of Dimes 2006). Despite the availability of prenatal testing and the option of termination of affected pregnancies, the number of Down syndrome live births has remained constant or even increased within Europe and in other developed regions over the last generation, primarily due to an overall increase in mean maternal age (Nicholson and Alberman 1992, O'Leary et al. 1996, Binkert et al. 2002, Dolk et al. 2005, Metneki and Czeizel 2005, Crane and Morris 2006).

Since the 1950s the survival of people with Down syndrome in Western countries has improved in response to better health care opportunities, with an increase in life expectancy of just over one year for each calendar year to almost 60 years by the end of the century (Bittles and Glasson 2004). In contrast to the general situation of higher female life expectancy among people with IDD (Table 2), males with Down syndrome have a significantly greater median life expectancy than females (Glasson et al. 2003). The survival disadvantage of women with Down syndrome is possibly related to interaction between pre-existing cardiac defects that are more common in females with the disorder and changes in oestrogen levels following menopause, the onset of which usually is observed at a comparatively young age.

**The health status of people with intellectual and developmental disabilities**

People with IDD vary widely in terms of their IDD aetiology, clinical profile, degree of impairment and support needs. The care of each individual with IDD is unique and often complex, and health concerns may be compounded by communication difficulties when there is dependence on others for monitoring and responding to needs. In general terms, people with IDD experience poorer health than the general population and they encounter greater barriers in accessing health care (Walsh et al. 2003). They also are less likely to participate in health screening programmes or to undergo regular medical checks (Sullivan et al. 2003, Owens et al. 2006). Furthermore, factors such as limited social networks, poor self-esteem and limited supports for life stresses may contribute to the health disparities associated
with such a vulnerable population (Walsh et al. 2003). Education and awareness is necessary for carers and the professional health community so that they can effectively and proactively monitor patterns of ill-health arising with age, and be aware of syndrome-specific health concerns (WHO 2000).

**Childhood and young adulthood**

For many people with IDD, specific conditions are present at birth or develop in early childhood. Congenital heart defects have been reported in 42%–60% of children with Down syndrome (Tubman et al. 1991, Wells et al. 1994, Venugopalan and Agarwal 2003, Vida et al. 2005), and their incidence of childhood leukaemia is more than 20 times higher than the comparable general population (Fong and Brodeur 1987, Hasle et al. 2000, Chessells et al. 2001, Hogg et al. 2001, Hill et al. 2003, Goldacre et al. 2004, Sullivan et al. 2007). Other syndromes with specific health conditions need to be monitored from an early age. For example, disorders of the thyroid gland are common in children with Williams syndrome (Selicorni et al. 2006), seizures have a high prevalence in children with Angelman syndrome (Guerrini et al. 2003), and scoliosis affects a large proportion of young women with Rett syndrome (Kerr et al. 2003b).

Children with IDD more commonly require hospitalization for infections and gastrointestinal illness, as well as central nervous system and mental health problems (Williams et al. 2005). Despite their greater need for specialist care, the diagnosis and treatment of health disorders for children and adults with IDD are often poorly managed within health care systems that are primarily designed for the mainstream public (Krahm et al. 2006). Care is often complicated by special needs and multiple ailments and, as previously noted, it also may be hampered by communication difficulties and the presence of behavioural problems in patients (Millar et al. 2004). For this reason, substantial parental or caregiver assistance may be required to ensure that patients’ health care needs are properly met (Iacono and Davis 2003a, Iacono and Davis 2003b).

**The biological impact of ageing in people with IDD**

Age-related conditions experienced by people with IDD usually commence at younger ages than in the general population, and they can progress rapidly in a poorly managed environment or if the problems are not communicated to carers. As with older people in general, individuals with IDD may be at increased risk of polypharmacy, i.e., the prescription of multiple medications for one or several disorders. In such instances, serious behavioural side-effects and adverse health outcomes can result (WHO 2000).

Sensory impairments are more common in people with IDD and these problems can develop more frequently with advancing age and as comorbidities of specific syndromes. Visual impairment is more common in older and more severely disabled persons (Owens et al. 2006), and in conditions such as Down syndrome. Age-related hearing loss in people with Down syndrome also is observed some three decades earlier than expected and it is thought to affect all adults with Down syndrome over the age of 60 years (Meuwese-Jongejeugd et al. 2006). In general terms, hearing
loss may be 40–100 times more prevalent in people with IDD than in the wider population (Carvill 2001), but conductive hearing loss or impacted ear wax may remain undiagnosed or be underestimated without regular testing (Evenhuis 1996, Carvill 2001, Kerr et al. 2003a).

Although poor oral health is widespread among people with IDD (Owens et al. 2006), behavioural or physical barriers frequently prevent them from undergoing routine procedures without general anaesthesia and hospitalization. Obesity (Rimmer and Yamaki 2006), dementia (Janicki and Dalton 2000), and cardiovascular disease (van den Akker et al. 2006) all usually increase in prevalence during adulthood and can pose additional health issues with advancing age. The risk of osteoporosis increases with age, especially among females, individuals with severe immobility, or those prescribed long-term anti-convulsant medications (Jaffe et al. 2005).

General psychiatric morbidity, including emotional and/or behavioural problems, are thought to affect around 40% of people with IDD, approximately three times the rate observed in the general population (Emerson 2003). Major psychotic disorders have been identified in up to 15% of people with IDD (Stromme and Diseth 2000, Gustavson et al. 2005), including conditions such as schizophrenia, clinical depression, maladaptive disorders, pervasive developmental disorders and behavioural abnormalities. These disorders occur as part of the known phenotype of specific syndromes causing IDD, with clinical dementia often diagnosed in older people with Down syndrome (Coppus et al. 2006), autism more prevalent in people with Fragile X syndrome (Hatton et al. 2006), and eating disorders, self-injury and obsessive compulsive disorders common among children and adults with the epigenetic disorder Prader-Willi syndrome (Dykens et al. 1996, Hartley et al. 2005, Thomson et al. 2006).

The prevalence of cancer in people with IDD is comparable to levels reported in the general population (Patja et al. 2001, Sullivan et al. 2004), but with some differences observed across populations by age, severity of IDD and gender. On a gender-specific basis, testicular cancer, brain and stomach cancers are increased in males with IDD, with an increased prevalence of ovarian and uterine cancers and colorectal cancer in females (Sullivan et al. 2004). In the specific example of Down syndrome, higher overall rates of pancreatic, skin cancers, retinoblastoma, and malignant tumours of the brain have been observed (Hasle et al. 2000, Patja et al. 2001). Conversely, lower rates of breast cancer were reported among women of reproductive and post-reproductive age with Down syndrome (Hasle et al. 2000), although this finding may in part reflect poorer uptake of breast screening and hence breast cancer diagnosis (Piachaud and Rohde 1998, Sullivan et al. 2003). As indicated by the life expectancies listed in Table 2, women with all forms of IDD are surviving to ages where the incidence of breast cancer increases sharply, and so the implementation of good practice guidelines for breast and cervical cancer screening is a matter of increasing importance (NHSCSP 2000).
Psychological, social and emotional changes with ageing

The psychological and social life stages that characterize adulthood in the general community have been poorly researched in the IDD population. Issues surrounding irregular employment and retirement from paid or voluntary work at older ages need further investigation (Ashman et al. 1995), mainly because of their potential psychological impact and resulting quality of life (Rogers et al. 1998, Esbensen and Benson 2006). Loneliness and depression can occur in people with IDD who lose existing friends and fail to develop new friendships, and whose limited social networks may result in excessive unstructured free time (Duvdevany and Arar 2004). Behavioural disturbance and emotional distress has been reported in people with IDD following the death of a parent, but these conditions may largely go unrecognized. Specialised counselling and coping strategies for bereavement can have positive effects (Dowling et al. 2006), however, further research is needed into related subjects such as pain recognition, palliative care, and general end-of-life support mechanisms (Tuffrey-Wijne 2003).

It is now accepted that adults with IDD, especially those who are mildly affected, express a need for romantic and sexual relationships, but they also may have a very limited knowledge of sexual issues (Elkins et al. 1990, Siebelink et al. 2006). Under certain circumstances parenthood is regarded as an emerging right for people with IDD, but the situation is made more complex by the levels of support required (Kandel et al. 2005). Further biological research and improved education and advice on sexuality issues is therefore needed (WHO 2000), including an understanding of the physical signs and effects of menarche and menopause, and access to contraceptive advice where desired.

Meeting the future needs of older people with intellectual and developmental disability

As identified in the Healthy Ageing Project sponsored by the European Commission and the World Health Organization (SNIPH 2007), improved care and interventions have enhanced overall community health, resulting in more people living longer lives albeit with greater risks of ill-health. The survival of people with IDD to more advanced ages will result in greater numbers living in the community, but with increased demands for specialist care given the particular patterns of comorbidity that can arise at certain life stages (Bittles et al. 2007). Greater focus is needed on disorders which are diagnosed during middle age to senescence so that appropriate management regimes can be implemented. In particular, more detailed investigations are needed to ascertain the pattern of specific age-related problems in particular syndromes and the influence of environmental factors, including diet and exercise, on these emergent problems. The World Health Organization has
recommended that health care providers adopt a total lifespan approach to meeting
the health needs of people with IDD, which recognizes the progression of specific
diseases and the requirement for appropriate therapeutic interventions (WHO 2000).
With this in mind, a number of priority areas that have been identified in the
literature to improve and sustain good health outcomes for people with IDD are
presented in Table 3.

*Table 3: Priority areas of age-related research and care for people with IDD.*

- More health care professionals trained in caring for people with IDD
- Provision of ‘case managers’ to liaise between people with IDD and their health
care providers
- Remodelling of community resources and current systems to better
accommodate the individual needs of those with IDD
- More numerous, well-equipped residential facilities, including short-term respite
centres for patients and/or their carers
- Better education of all health practitioners through the wider publication of
information in general medical and health journals
- Regular screening of expected health concerns at ages that are relevant to people
with IDD
- Active targeting of people with IDD and their carers in public education
campaigns
- Encouragement of long-term friendships and social support for people with IDD
- Increased education and support in issues of sexuality
- Greater understanding of, and direct assistance with, bereavement and palliative
care needs

In most developed countries, the majority of people with IDD can experience an
independent or partially independent lifestyle within the wider population. This
trend is continuing and, for example, in 2007 the U.K. National Health Service
announced plans to relocate some 2,000 people with IDD from former hospital
accommodation into community homes by 2010. While progress in this area is
welcome, several potential disadvantages still need to be addressed. Major concerns
include the quality and accessibility of care available to people with IDD living in
the community, and also the implementation of support structures to help people
with IDD seek and maintain good health on their own behalf. In the absence of the
structured lifestyle regimes commonly associated with institutional settings, a
negative impact on health may result with the risk of reduced access to trained and
experienced health professionals and fewer regular health checks (Nottestad and
Linaker 1999, Dovey and Webb 2000). People with IDD generally place greater
demands on the consultation time of medical practitioners (Straetmans et al. 2007),
and due to a lack of relevant experience, medical practitioners serving the general
population may have difficulty in adequately diagnosing and treating people with IDD.

Other consequences of community living include the potential to develop lifestyle diseases, such as obesity, diabetes, blood pressure anomalies and cardiovascular illness, and to engage in risk-taking behaviour, including smoking and substance abuse. Increased exposure to undesirable lifestyle choices may explain the higher levels of obesity in people living either in community-based residential homes, or with family members, by comparison with institutional settings (Rimmer and Yamaki 2006). The overall success of community-based living in terms of levels of health, behaviour and overall satisfaction is often related to the quality of care received and management expertise, rather than dwelling size (Mansell 2006).

Economic perspectives

At least 9% of disease-specific healthcare costs in The Netherlands were found to be devoted to the needs of people with IDD (Polder et al. 2002), and these costs predictably will expand to a significant degree if age-related disorders such as dementia and cancer increase in prevalence. The total lifetime costs for people with IDD born in the U.S.A. in the year 2000 were estimated to be US$51.2 billion, with approximately US$12 billion attributable to direct care and health costs (CDC 2004). Both the Dutch and U.S. data therefore reinforce the need for more efficient prevention programmes, to minimize the adverse impact of IDD through primary care interventions, and to develop schemes that will enable people with IDD to live productively and with personal satisfaction within the community.

The ageing carers of people with IDD

The levels of stress associated with care provision for people with IDD can greatly exceed those experienced with other categories of dependent persons, in large part because of the additional health disorders that need to be monitored and treated (Roach et al. 1999, Canadian Study of Health and Aging Working Group 2002, Hedov et al. 2002, Rymer et al. 2002, Raina et al. 2005, White et al. 2006). Premature ageing at the cellular level has been observed in women caring for chronically ill children (Epel et al. 2004), which may have implications with respect to the availability of health and life insurance cover for carers in countries where such services are not provided by government agencies (Thomson et al. 2006). However, the exact nature of the stress interactions and their long-term physiological impact remain to be fully assessed. As yet, little progress has been made in investigating the health impact of caring for ageing people with disorders such as Down syndrome in whom, as previously described, dementia may develop in early adulthood and require specialist care for the remaining years of their life. These are very important considerations in terms of the types and continuity of care since, given the trend towards pregnancies at older maternal ages, a person with Down syndrome or other forms of IDD will probably outlive their parents, siblings and other relatives.
**Ethical considerations**

Many ethical issues of a medical or social nature have begun to emerge because of the rapidly increasing life expectancies of people with IDD, and these issues frequently are associated with the right to exercise greater control of their own destiny. Decision-making, including residence in a setting appropriate to their needs, their choice of employment, and the ability to choose their own leisure activities, may become more complex for adults with IDD where family members or carers formerly had acted on their behalf (Wong et al. 1999).

Examples of medical care situations that may be affected include the potential role of people with IDD as organ recipients or donors, access to medical procedures and priority status on waiting lists, and the provision of informed consent for treatment. In the past, IDD was usually considered an absolute contra-indication for patients to be accepted for major organ transplantation, on the grounds of compliance with medical regimes and quality of life issues (Savulescu 2001, Martens et al. 2006). In fact, one-year survival rates following kidney transplantation have shown that IDD per se does not affect the likelihood of post-transplantation complications or poor outcomes (Martens et al. 2006). The collection and use of additional information of this nature for the middle and later years of life will thus be very important in formulating and addressing ethical questions.

The recent recommendation that, irrespective of maternal age, all pregnancies in the U.S.A. should be screened for Down syndrome (ACOG 2007) is of equal significance. Not surprisingly, this recommendation has met with resistance from the National Down Syndrome Society, which has urged that expectant mothers should not be unduly influenced either to undergo prenatal testing for the condition or to terminate a pregnancy if a positive diagnosis is received (NDSS 2007).

**Particular problems faced by indigenous and migrant communities**

Major problems may be encountered in accurately defining the levels of IDD in the indigenous populations of developed countries, given the overall lack of credible and representative disease prevalence data, and failure to accurately identify individuals of indigenous origin in many key data sets (Glasson et al. 2005, AIHW 2007). Despite these qualifications, indigenous people are frequently over-represented in IDD studies (Glasson et al. 2005), a finding that is most readily explained by social and economic disadvantage and degraded physical environments (Najman et al. 1992, Durkin 2002).

In Europe, these types of problems are exemplified by the estimated 12 million Roma whose distribution across the continent, semi-itinerant lifestyle, and endogamous and often consanguineous marriage structure (Bittles 2000) complicate data collection and analysis. All available data point to poorer living conditions, low literacy, and lower health standards and life expectancy among the Roma, with high rates of IDD. However, their close family and clan networks mean that strong
support mechanisms are available within the Roma community. Despite similar social advantages, a study of the Irish Travellers, a genetically distinct indigenous community analogous to the Roma, showed high overall levels of ill-health, and average life expectancies which were almost 10 and 12 years less for men and women respectively than for the general Irish population (Barry et al. 1989).

The recent widespread migration of ethnically diverse communities into Europe also merits monitoring, especially since attention has been drawn to a higher prevalence of IDD in some of these groups (Fernell 1998, Mitchell et al. 1998). Many migrant communities, such as Maghrebians in France, Belgium and the Netherlands, Turks and Kurds in Germany, and Pakistanis in the U.K. traditionally favour consanguineous marriage, and as a result higher levels of IDD would be expected due to the expression of detrimental recessive genes (Bittles 2001, Bittles 2003). Given the sensitivity of the subject, and the young age profiles of most immigrant communities in Europe, reliable information is not yet available on the potential scale of the problems that might ensue. However, as with the Roma, the strongly cohesive social structure that is characteristic of a large majority of migrant communities should prove beneficial in caring for community members with IDD as they age.

**Conclusions**

The global trend of continued integration of people with IDD into the community has important implications in terms of the resources that are needed to provide services appropriate to their needs, and also meet the requirements of their families and carers. Advice in successfully navigating local and national health systems, ethical decisions that are associated with care, and positive general attitudes from the government, business sector and the wider community are all needed to support these processes. Although some improvement has already occurred, further focus on closing the gaps in health and wellbeing that exist between individuals with IDD and the general public is required, via the opening of new health care channels and the development of appropriate systems to adequately cater for the needs of people with IDD as they age. Under these circumstances the health targets set by the World Health Organization for people with IDD can become a reality, allowing all Europeans to be included in a Healthy Ageing future.

**References**


E. J. Glasson and A. H. Bittles


Ageing in people with intellectual disability


Mailing address: A.H. Bittles
Centre for Comparative Genomics
Murdoch University
South Street
Perth WA 6150
Australia
abittles@ccg.murdoch.edu.au