

Increasing HIV infection among adults aged 50 years and over: a call for heightened awareness

The number of adults aged 50 years and over living with diagnosed HIV is on the increase. This increase is not only due to an aging cohort of HIV-infected individuals experiencing better survival rates as a result of effective antiretroviral therapy, but also as a result of greater numbers of diagnoses among this group, many of whom were infected when aged 50 years and older. Describing the unique challenges HIV presents to both older adults living with HIV and relevant health professionals, we raise the profile of HIV among persons aged 50 years and over, and highlight the importance for age-specific research activities in promoting earlier testing and treatment.

KEYWORDS: HIV infection ■ HIV transmission ■ late diagnosis ■ older adult ■ short-term mortality

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Effective antiretroviral therapy has led to a reduction in HIV-related deaths and has improved the life expectancy of individuals infected with HIV. In countries where antiretroviral therapy is widely available, mortality rates among people living with HIV are now approaching the same levels as those in the HIV-uninfected population [1]. Modeling studies have estimated as much as 50 years of life remaining in individuals who are diagnosed at an early stage of infection [2–4]. As a result, the median age of people living with HIV in developed countries is increasing [101–103]. In the UK, the median age of individuals living with diagnosed HIV rose from 36 years in 2000 to 41 years in 2009 [103]. A total of one in five (12,063/65,319) adults seen for HIV care in the UK in 2009 was aged 50 years or above (older adults) compared to one in ten (2432/22,575) in 2000 [103]. Similarly, older adults now represent a quarter of people living with HIV in the USA, an increase from 17% in 2000 [102]. The majority of older adults accessing HIV-related care in the UK in 2009 were aged between 50 and 59 years (72%), with 5% aged 70 years and over [103].

The increase in prevalent cases of HIV among older adults is due to an aging cohort of HIV-infected persons on effective therapies, as well as a rise in new diagnoses among this age group. In the UK in 2009, one in 12 adults newly diagnosed with HIV and one in four adults with an AIDS diagnoses, were aged 50 years or over [104]. The ratio of one in 12 new HIV diagnoses is lower than that reported in the USA in 2005 (one in seven) [102], France (one in six in 2008) [5] or Italy (one in eight between 2004 and 2007) [6]. In Western Europe as a whole in

2007, adults aged 50 years and above represented one in eight of all new HIV diagnoses [7]. By contrast, older people comprise one in 11 and one in 25 newly diagnosed persons in central and eastern Europe, respectively, and are experiencing more recent epidemics primarily driven by intravenous drug use among young people [7].

The increase in new diagnoses among older adults suggests that the overall rise in the number of older adults living with diagnosed HIV is also due to the onward transmission of HIV. Using a Markov Chain of HIV progression [8], based on CD4⁺ cell count, it was estimated that 48% of the 4001 older adults newly diagnosed with HIV in the UK between 2000 and 2007 probably acquired their infection aged 50 years and over [9]. This finding has important health promotion implications for this group.

An examination of older adults newly diagnosed in the UK between 2000 and 2007, which was recently published by our group, revealed that, compared with younger adults (15–49 years), those aged 50 years and over comprised a significantly ($p < 0.001$) higher proportion of males, of individuals infected through sex between men (men who have sex with men [MSM]) and of adults of white ethnicity [9]. Although older heterosexual adults as a whole, as compared to younger heterosexual adults, were more likely to have acquired their infection within the UK, a sizeable proportion (80%) of older UK-born heterosexual men probably acquired their infection whilst traveling abroad [9]. Similar to the UK, studies based in Italy [6], France [5] and Germany [10] found a higher proportion of males among older age

groups newly diagnosed with HIV. However, unlike the UK, a higher proportion of older adults in Italy and France, as compared to younger adults, reported heterosexual contact as their probable route of infection [5,6].

Studies conducted in Europe reveal a large proportion of late presenters among older adults [6,9,11–16]. In our study, newly diagnosed older adults in the UK were significantly more likely to be diagnosed late (CD4⁺ cell count <200 cells/ μ l) compared with younger adults (48 vs 33%; $p < 0.001$) [9]. This difference was significant both among MSM (40 vs 21%; $p < 0.001$) and heterosexual women (51 vs 36%; $p < 0.001$). Late diagnosis among heterosexual men was high for both older and younger men (53 vs 45%) [9]. This elevated rate of late diagnosis among older age groups is consistent with other European countries [6,12,13]. In Italy, as compared with younger adults, older adults were at a significantly greater risk of being diagnosed late (55 vs 28%; $p < 0.001$, respectively) [6]. Further studies in Italy and France identified the risk of late diagnosis to be up to four-times higher amongst older adults [12,13]. In the USA, the odds of an older adult being diagnosed late were seven-times that among younger adults [16].

The association between late diagnosis and short-term mortality is well documented and this association becomes stronger with older age [17]. The effect of age on short-term mortality remains important even after adjusting for risk factors such as stage of HIV infection, CD4⁺ cell count and history of opportunistic infections [17]. MSM diagnosed late (CD4⁺ cell count <200 cells/ μ l) within the UK were ten-times more likely to die within 1 year of diagnosis (short-term mortality) than MSM diagnosed earlier [15]. Among heterosexuals diagnosed late the increased risk of short-term mortality was ninefold [18]. These differences in risk were more dramatic amongst older adults. Short-term mortality was on average 14-times more likely among older adults diagnosed late than among those diagnosed more promptly (14 vs 1%) [9]. When compared to younger adults diagnosed late, the risk of short-term mortality was 2.4-times higher for older adults [9]. Older adults are also at greater risk of morbidities and mortality as a result of faster disease progression [19,20], lower CD4⁺ cell counts following seroconversion and steeper CD4⁺ decline thereon [21], and the presence of either HIV-related and non-HIV-related comorbidities, such as cardiovascular disease, hypertension, renal disease, peripheral neuropathy, depressive symptoms, osteoporosis and dementia [12,22–25].

The benefits of earlier diagnosis extend beyond the individual. Those unaware of their infection will remain infectious and are more likely to continue to engage in risky behaviors [26]. Delays in diagnosis and treatment may therefore result in a higher likelihood of onward transmission. The need for new strategies to reduce late diagnosis of HIV has been recognized in recent years and has led to the development of new testing guidelines by national and international authorities [27,28,105,106]. In addition to a continued targeted approach of populations most at risk of HIV, many guidelines call for the ‘normalization’ of HIV testing in a variety of health settings. The shift away from lengthy pretest risk assessment and counseling towards the universal offer of a HIV test with informed consent is welcomed. Nevertheless, opportunities to offer an HIV test to older adults are particularly challenging.

With evidence of a higher risk of late diagnosis and of related morbidity and mortality, the importance of an early diagnosis among older adults cannot be overstated. It is therefore of concern that a survey of older adults in the USA found only 27% of at-risk older adults (sexually active in the past year and with a relationship status of single or having more than one partner) reported having an HIV test in the past year, with an additional 34% reporting having never had an HIV test [29].

There is evidence to suggest that older adults remain more vulnerable to missed opportunities for testing [12,30,107], often due to difficulties in distinguishing health problems experienced as a result of aging from those related to HIV infection [108]. Low-risk perception, on behalf of the individual and/or the healthcare professional, has also been identified as a key barrier to older adults being offered and accepting an HIV test [6,12,13,31–33,109]. In a cross-sectional study of older women seeking medical care in the USA, only approximately a fifth reported being interested in an HIV test despite more than half being assessed as having moderate or high risk for lifetime exposure to HIV [32].

Several studies report high levels of sexual activity among older adults. In two community-based studies in the UK [34] and USA [35], over half (65 and 54%, respectively) of adults aged 50 years and over reported being sexually active, with 7% reporting risky behavior (defined as having more than one partner in the last 5 years and not consistently using condoms) [110]. It has also been reported from the USA that as compared to at-risk individuals

aged 20–29 years, older adults at risk were estimated to be six-times less likely to use a condom during sex [36].

Alongside the potential risk of HIV infection among older adults not being recognized by either the individual or health professional, older adults are rarely a feature in health promotion campaigns aimed at increasing HIV awareness and testing [34,109]. Current national and global surveillance outputs are not immune to ignoring this population, with published documentation typically showing rates for children younger than 15 years of age and for adults aged 15–59 years [111,112]. National guidelines for HIV testing in the UK recommend testing of adults aged 15–59 years in high prevalence areas [105,112]. Equivalent guidelines in the USA recommend HIV screening to be performed routinely for individuals aged between 13 and 64 years, and that persons aged 64 years and over should be counseled to receive HIV testing if they have risk factors for HIV infection [106]. Given the overall low rates of HIV infection among older adults (5.7 per 10,000 people aged 50 years and over in the UK) [103,113], these guidelines remain appropriate. However, increased awareness of HIV as a possible diagnosis in both older adults and their health professionals is required. Evidence-based testing strategies in healthcare settings not normally associated with sexual health are needed.

The management of older adults with HIV and their associated multiple comorbidities present challenges to geriatric and infectious disease specialist physicians. Older adults currently living with HIV who were diagnosed in the 1980s or 1990s were often subject to experimental treatments and frequently changing standards of clinical care [114]. Many of these individuals never expected to live to an old age and,

therefore, are particularly ill-equipped to cope with the challenges of aging, with many having been advised to leave work, cash in pensions and live as well as possible in the time they had left [114].

Older adults are increasingly overlooked at a time when their HIV management is more complex, posing challenges for service delivery. Similar to the existing model of HIV-related care for children, the provision of HIV-related care for older adults may prove to be more efficient and effective if based within existing age-specific services already accustomed to dealing with the complexities of age-specific needs. High rates of long-term polypharmacy in this group poses an additional challenge, with side effects and toxicities of antiretroviral drugs occurring more frequently in older patients, especially those taking medication for other conditions [33]. This is an area that warrants further research to examine age-specific tolerability and adverse effects.

Conclusion & future perspective

Addressing the HIV prevention needs of older adults requires a multifactorial approach, involving the targeting of older adults at higher risk of HIV infection with prevention messages, educating older adults living with HIV on how to prevent onward transmission, and training healthcare professionals working with older adults about the risk factors and symptoms of HIV infection. It is essential that the needs of individuals aged 50 years and over are specifically targeted in HIV health promotion campaigns in order to reduce recent trends of transmission in this group. Further research is needed to identify specific behaviors that put older adults at risk of HIV infection as well as better understand the long-term effects of treatment,

Executive summary

- Increases in the number of adults aged 50 years and over (older adults) living with diagnosed HIV have been reported in a number of developed countries.
- The increase in the number of older adults living with diagnosed HIV is due to a rise in diagnoses among adults aged 50 years and over, as well as an aging cohort of persons diagnosed with HIV when aged less than 50 years.
- There is evidence of onward transmission of HIV among older adults.
- The proportion of older adults living with HIV who are diagnosed late is significantly higher than in younger age groups.
- Short-term mortality (death within 1 year of diagnosis) is elevated in older adults diagnosed late as compared to younger adults diagnosed late.
- Low risk perception among adults aged 50 years and over and healthcare professionals is a key barrier to older adults being offered and accepting an HIV test.
- It is essential that the needs of individuals aged 50 years and over are specifically targeted in HIV health promotion campaigns in order to reduce recent trends in transmission in this group and raise their profile in relation to HIV prevention, testing and treatment activities.
- Age-specific prevention, testing and treatment activities should be monitored so that their effectiveness in promoting earlier testing and treatment can be assessed.

their tolerability and adverse events on an aging population who often also have comorbidities. Such developments will help raise the profile of older adults in relation to HIV prevention, testing and treatment activities. Only by doing so and by monitoring the effectiveness of age-specific activities in promoting earlier testing and treatment will the onward transmission of HIV among older adults and the impact of high rates of late diagnoses be reduced.

Acknowledgements

The continuing collaboration of those who contribute to HIV surveillance in the UK is gratefully acknowledged.

Without their generosity, time and effort the current level of understanding of the epidemic could not have been obtained.

Financial & competing interests disclosure

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.

Bibliography

- Bhaskaran K, Hamouda O, Sannes M *et al.*: Changes in the risk of death after HIV seroconversion compared with mortality in the general population. *JAMA* 300(1), 51–59 (2008).
- Lohse N, Hansen AB, Pedersen G *et al.*: Survival of persons with and without HIV infection in Denmark, 1995–2005. *Ann. Intern. Med.* 146, 87–95 (2007).
- Lima VD, Hoggs RS, Harrigan PR *et al.*: Continued improvement in survival among HIV-infected individuals with newer forms of highly active antiretroviral therapy. *AIDS* 21, 685–692 (2007).
- The Antiretroviral Therapy Cohort Collaboration: Life expectancy of individuals on combination antiretroviral therapy in high-income countries: a collaborative analysis of 14 cohort studies. *Lancet* 372, 293–299 (2008).
- Cazein F, Pinget R, Pillonel J *et al.*: HIV diagnoses among people aged 50 and older, France, 2003–2008: a high proportion of late diagnoses. *Program and abstracts of the XVIII International AIDS Conference*. Vienna, Austria, 18–23 July 2010 (Abstract TUPE0432).
- Orchi N, Balzano R, Scognamiglio P *et al.*: Ageing with HIV: newly diagnosed older adults in Italy. *AIDS Care* 20, 419–425 (2008).
- Lazarus JV, Nielsen KK: HIV and people over 50 years old in Europe. *HIV Med.* 11(7), 479–481 (2010).
- Satten GA, Longini IM: Markov chains with measurement error: estimating the 'true' course of a marker of the progression of human immunodeficiency virus disease. *Appl. Stat.* 45, 275–309 (1996).
- Smith RD, Delpech VC, Brown AE, Rice BD: HIV transmission and high rates of late diagnoses among adults aged 50 years and over. *AIDS* 24, 2109–2115 (2010).
- Reuter S, Oette M, Kaiser R, Haussinger D: Comparison between elder and younger treatment-naïve HIV positive patients in Germany. *Program and abstracts of the XVIII International AIDS Conference*. Vienna, Austria, 18–23 July 2010 (Abstract WEPE0046).
- Adler A, Mounier-Jack S, Coker RJ: Late diagnosis of HIV in Europe: definitional and public health challenges. *AIDS Care* 21(3), 284–293 (2009).
- Grabar S, Weiss L, Costagliola D: HIV infection in older patients in the HAART era. *J. Antimicrob. Chemother.* 57, 4–7 (2006).
- Longo B, Camoni L, Boros S, Suligoi B: Increasing proportion of AIDS diagnoses among older adults in Italy. *AIDS Patient Care STD* 22(5), 365–371 (2008).
- Castilla J, Sobrino P, De La Fuente L, Nogueira I, Guerra L, Parras F: Late diagnosis of HIV infection in the era of highly active antiretroviral therapy: consequences for AIDS incidence. *AIDS* 16, 1945–1951 (2002).
- Chadborn TR, Baster K, Delpech VC *et al.*: No time to wait: how many HIV-infected homosexual men are diagnosed late and consequently die? (England and Wales, 1993–2002). *AIDS* 19, 513–520 (2005).
- Duffus WA, Weis K, Kettinger L, Stephens T, Albrecht H, Gibson JJ: Risk-based HIV testing in South Carolina health care settings failed to identify the majority of infected individuals. *AIDS Patient Care STD* 23(5), 339–345 (2009).
- Butt AA, Dascomb KK, DeSalvo KB *et al.*: Human immunodeficiency virus infection in elderly patients. *South Med. J.* 94, 397–400 (2001).
- Chadborn TR, Delpech VC, Sabin CA, Sinka K, Evans BG: The late diagnosis and consequent short-term mortality of HIV-infected heterosexuals (England and Wales, 2000–2004). *AIDS* 20, 2371–2379 (2006).
- Nogueras M, Navarro G, Anton E *et al.*: Epidemiological and clinical features, response to HAART, and survival in HIV-infected patients diagnosed at the age of 50 or more. *BMC Infect. Dis.* 6, 159 (2006).
- Stoff DM, Khalsa JH, Manjan A, Portegies P: Introduction: HIV/AIDS and ageing. *AIDS* 18, S1–S2 (2004).
- CASCADE collaboration: Differences in CD4 cell counts at seroconversion and decline among 5739 HIV-1-infected individuals with well-estimated dates of seroconversion. *J. Acquir. Immune Defic. Syndr.* 34, 76–83 (2003).
- Luther VP, Wilkin AM: HIV infection in older adults. *Clin. Geriatr. Med.* 23, 567–583 (2007).
- Shah SS, McGowan JP, Smith C, Blum S, Klein RS: Comorbid conditions, treatment, and health maintenance in older persons with human immunodeficiency virus infection in New York City. *Clin. Infect. Dis.* 35(10), 1238–1243 (2002).
- Heckman TG, Heckman BD, Kochman A, Sikkema KJ, Suhr J, Goodkin K: Psychological symptoms among persons 50 years of age and older living with HIV disease. *Aging Mental Health* 6, 121–128 (2002).
- Goulet JL, Fultz SL, Rimland D *et al.*: Aging and infectious diseases: do patterns of comorbidity vary by HIV status, age, and HIV severity? *Clin. Infect. Dis.* 45, 1593–1601 (2007).
- Marks G, Crepaz N, Senterfitt JW, Janssen RS: Meta-analysis of high-risk sexual behaviour in persons aware and unaware they are infected with HIV in the United States: implications for HIV prevention programs. *J. Acquir. Immune Defic. Syndr.* 39(4), 446–453 (2005).

- 27 World Health Organisation: Guidance on provider-initiated HIV testing and counselling in health facilities. WC 503.1.2007. World Health Organisation, Geneva, Switzerland (2007).
- 28 Haute Autorité de Santé: Dépistage de l'infection par le VIH en France – Stratégies et dispositif de dépistage. Saint-enis La Plaine, Haute Autorité de Santé (2009).
- 29 Shick V, Herbenick D, Reece M *et al.*: Sexual behaviours, condom use, and sexual health of Americans over 50: implications for sexual health promotion for older adults. *J. Sex Med.* 7(Suppl. 5), 315–329 (2010).
- 30 Casau NC: Perspective on HIV infection and ageing: emerging research on the horizon. *Clin. Infect. Dis.* 41, 855–863 (2005).
- 31 Leigh BC, Temple MT, Trocki KF: The sexual behaviour of US adults: results from a national survey. *Am. J. Pub. Health* 83, 1400–1408 (1993).
- 32 Akers A, Bernstein L, Henderson S, Doyle J, Corbie-Smith G: Factors associated with lack of interest in HIV testing in older at-risk women. *J. Womens Health* 16(6), 842–858 (2007).
- 33 Pratt G, Gascoyne K, Cunningham K, Tunbridge A: Human immunodeficiency virus (HIV) in older people. *Age Ageing* 39, 289–294 (2010).
- 34 Gott CM: Sexual activity and risk-taking in later life. *Health Soc. Care Comm.* 9, 72–78 (2001).
- 35 Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muirheartaigh CA, Waite LJ: A study of sexuality and health among older adults in the United States. *N. Engl. J. Med.* 357, 762–774 (2007).
- 36 Stall R, Catania J: AIDS risk behaviours among late middle-aged and elderly Americans. *Arch. Intern. Med.* 154, 57–63 (1994).
- **Websites**
- 101 European Centre for Disease Prevention and Control/WHO Regional Office for Europe: HIV/AIDS surveillance in Europe 2008 (2009)
www.ecdc.europa.eu/en/publications/Publications/Forms/ECDC_DispForm.aspx?ID=470
(Accessed 1 November 2010)
- 102 CDC: HIV/AIDS Surveillance report: Cases of HIV infection and AIDS in the United States and dependent areas, 2005 (2007)
www.cdc.gov/hiv/surveillance/resources/reports/2005report/#1
(Accessed 14 October 2010)
- 103 Health Protection Agency: Numbers accessing HIV care (2009)
www.hpa.org.uk/web/HPAweb&HPAwebStandard/Page/1201094588891?p=1201094588891
(Accessed 15 October 2010)
- 104 Health Protection Agency: New HIV diagnoses (2009)
www.hpa.org.uk/web/HPAweb&HPAwebStandard/Page/1201094588891?p=1201094588891
(Accessed 15 October 2010)
- 105 BHIVA: UK national guidelines for HIV testing 2008 (2008)
www.bhiva.org/HIVTesting2008.aspx
(Accessed 18 October 2010)
- 106 CDC: Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings (2006)
www.cdc.gov/mmwr/preview/mmwrhtml/rr5514a1.htm
(Accessed 13 October 2010)
- 107 Bernard EJ: Ageing HIV population cause for concern (2005)
www.aidsmap.com/en/news/67ad7fa8-3504-4006-9b1c-87bbafc81939.asp
(Accessed 5 December 2009)
- 108 ACRIA: HIV and older adults (2008)
www.acria.org/files/hiv-older-adults.pdf
(Accessed 18 October 2010)
- 109 The Well Project: Older women: at risk for HIV infection (2009)
www.thewellproject.org/en_US/Womens_Center/HIV_and_Older_Women.jsp
(Accessed 14 October 2010)
- 110 SAGA: Frisky 50s not ready to retire from bedroom (2008)
www.saga.co.uk/health/healthyliving/bodymatters/frisky-50s-not-ready-to-retire-from-bedroom.asp#top
(Accessed 19 February 2009)
- 111 UNAIDS: 2008 report on the global AIDS epidemic (2008)
www.unaids.org/en/KnowledgeCentre/HIVData/GlobalReport/2008/2008_Global_report.asp
(Accessed 18 October 2010)
- 112 Health Protection Agency: Diagnosed HIV prevalence by Strategic Health Authority (SHA) and Primary Care Trust (PCT) in England, 2008 (2009)
www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1228207185359
(Accessed 2 November 2010)
- 113 Office for National Statistics: **Mid Year Population Estimates 2009: 24/06/10** (2010)
www.statistics.gov.uk/statbase/product.asp?vlnk=15106
(Accessed 2 November 2010)
- 114 Power L, Bell M, Freemantle I: A national study of ageing and HIV (50 Plus). September 2010. Joseph Rowntree Foundation
www.tht.org.uk/binarylibrary/peoplesexperienceofhiv/50-plus-final-report.pdf
(Accessed 2 November 2010)