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Setting and organization of care for persons living with HIV/AIDS (Review)

Handford C, Tynan AM, Rackal JM, Glazier R

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[Intervention Review]

Setting and organization of care for persons living with HIV/AIDS

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ABSTRACT

Background

Treating the world's 40.3 million persons currently infected with HIV/AIDS is an international responsibility that involves unprecedented organizational challenges. Key issues include whether care should be concentrated or decentralized, what type and mix of health workers are needed, and which interventions and mix of programs are best. High volume centres, case management and multi-disciplinary care have been shown to be effective for some chronic illnesses. Application of these findings to HIV/AIDS is less well understood.

Objectives

Our objective was to evaluate the association between the setting and organization of care and outcomes for people living with HIV/AIDS.

Search methods

Computerized searches from January 1, 1980 to December 31, 2002 of MEDLINE, EMBASE, Dissertation Abstracts International (DAI), CINAHL, HealthStar, PsychInfo, PsychLit, Social Sciences Abstracts, and Sociological Abstracts as well as searches of meeting abstracts and relevant journals and bibliographies in articles that met inclusion criteria. Searches included articles published in English and other languages.

Selection criteria

Articles were considered for inclusion if they were observational or experimental studies with contemporaneous comparison groups of adults and/or children currently infected with HIV/AIDS that examined the impact of the setting and/or organization of care on outcomes of mortality, opportunistic infections, use of HAART and prophylaxis, quality of life, health care utilization, and costs for patient with HIV/AIDS.

Data collection and analysis

Two authors independently screened abstracts to determine relevance. Full paper copies were reviewed against the inclusion criteria. The findings were extracted by both authors and compared. The 28 studies that met inclusion criteria were too disparate with respect to populations, interventions and outcomes to warrant meta-analysis.

Main results

Twenty-eight studies were included involving 39,776 study subjects. The studies indicated that case management strategies and higher hospital and ward volume of HIV-positive patients were associated with decreased mortality. Case management was also associated with increased receipt of ARVs. The results for multidisciplinary teams or multi-faceted treatment varied. None of the studies examined quality of life or immunological or virological outcomes. Healthcare utilization outcomes were mixed.

Authors' conclusions

Certain settings of care (i.e. high volume of HIV positive patients) and models of care (i.e. case management) may improve patient mortality and other outcomes. More detailed descriptions of care models, consistent definition of terms, and studies on innovative models suitable for developing countries are needed. There is not yet enough evidence to guide policy and clinical care in this area.

PLAIN LANGUAGE SUMMARY

Setting and organization of care for persons living with HIV/AIDS

Policy makers and health workers need evidence about how and where to provide care for people living with HIV/AIDS. This review identified 28 studies involving 39,776 study subjects that examined these questions. Centres with a lot of HIV/AIDS patients often had lower death rates. The number of patients needed to get these results was very different in each study so it is not clear what the right number is. Settings with case management had fewer deaths and had higher use of antiretroviral medications. There were several other promising interventions to increase antiretroviral use (using several health interventions at the same time and using computerized reminders), to reduce hospital admissions (using multiple health disciplines and increasing hours of operation), and reducing length of hospital stay (telephone notices and advice for providers). Unfortunately, the design of these studies, the small number of studies on each intervention and the lack of standard terms and definitions limits their usefulness to health providers and policy-makers. This is especially true for developing countries as no studies were found from those settings.

BACKGROUND

Despite falling prevalence rates in some countries, and advances made in care and treatment, the global HIV/AIDS epidemic continues to surge. At the end of 2005, 40.3 million people were living with HIV infection and in 2005 alone, 3.1 million people died of HIV-related causes (UNAIDS/WHO 2005). HIV/AIDS is now the fourth largest cause of death world-wide (WHO2003). Without a concerted global effort, another 45 million persons will be infected with the human immunodeficiency virus by 2010 (UNAIDS 2004). The burden of new infections and of death is highest in developing countries (UNAIDS/WHO 2005; UNAIDS 2004).

In the 1990s, highly active antiretroviral therapy (HAART) became widely available in many industrialized countries which resulted in a sharp and sustained decline in the incidence of AIDS and AIDS-related mortality in those countries (Sepkowitz 2001). The United Nations' 2001 Declaration of Commitment on HIV/AIDS emphasized that all people infected with HIV have the right to treatment (UN2001). Furthermore, the Declaration recognized that treatment, care and support, including antiretroviral therapy, are fundamental components of any effective response (UN2003).

However, there are substantial challenges to the provision of care and of antiretroviral medications in both developed and developing country settings. Several of the key issues involved relate to where care should be provided and how it should be organized. For example, there is debate about whether care should be concentrated in regional centres or decentralized to communities, what type of health workers and what kind of health worker teams are needed, which interventions and mix of programs are best and what hours of operation are most appropriate. There is evidence from examining other types of health conditions that disease management models for chronic illnesses can improve a variety of health outcomes (Ofman 2004, Badamgarav 2003). Case management approaches have been effective for certain chronic diseases including chronic obstructive pulmonary disease (COPD) (Egan 2002), congestive heart failure (Taylor 2005) and diabetes mellitus (Choe 2005, Howe 2005, Krein 2004, Aubert 1998). Care provided by multidisciplinary teams has been shown to be effective in depression (Katon 2004), diabetes mellitus (Maislos 2004, Majumdar 2003) and COPD (Rea 2004). Regionalization of care and high volume care have been associated with improved outcomes of several kinds of specialized care and procedures, most likely as a result of accumulated expertise of the health care team and better adherence to evidence-based care (Glance 2006, Battaglia 2006). The application of this evidence to HIV/AIDS is much less well understood. It is also unclear whether settings that teach students and residents or that perform clinical trials provide better HIV/AIDS care.

The purpose of this review is to determine the current state of the evidence on setting and/or organizational interventions to improve healthcare for persons living with HIV/AIDS. An update to April 2006 is in process. An underlying assumption of the review is that certain interventions of setting and organization may have an effect on patient outcomes including mortality and the use of antiretroviral therapy. These outcomes were specifically chosen as the focus for this review because of their importance for patients living with HIV/AIDS.

OBJECTIVES

The objective of this review was to determine the effectiveness of the setting of care (concentration and volume of patients, participation in clinical trials, incorporating trainees, travel time to providers) and the organization of care (case management, multi-disciplinary care, multi-faceted treatment, hours of service, outreach, health information systems) on medical, immunological/virological, psychosocial and/or economic outcomes for persons living with HIV/AIDS.

METHODS

Criteria for considering studies for this review

Types of studies

Randomized controlled trials (RCTs) controlled clinical trials (CCTs) cohort studies, case control studies, cross-sectional studies and controlled before and after designs.
Studies without a comparison group were excluded. No geographic or language restrictions were applied.

Types of participants

Persons known to be infected with HIV/AIDS. Studies of men, women, or both, children, adults, or both, and pregnant women were eligible.

Types of interventions

To be considered, studies had to describe any or more of the following interventions:

1. Setting of care: concentration and volume of HIV patients, participation in clinical trials, incorporating trainees and travel time to providers. Incorporating trainees included health care students, interns or residents.

2. Organization of care: case management, multidisciplinary teams, multifaceted treatment and clinic organization (hours of operation, outreach, health information systems). Case management was often used without any explanation of how care was organized or provided and for that reason we excluded studies if they did not fully describe the term "case management." Multidisciplinary care referred to the use of "two or more providers other than standard physician, nursing or nurse practitioner care". Multi-faceted care referred to the use of "two or more or treatment programs other than standard physician, nursing or nurse practitioner care".

We also excluded studies that used computer-based interventions that did not affect the organization or provision of care. For example, studies that looked at patient use of or access to a computer database that did not otherwise influence care delivery were excluded. This type of intervention, aimed at only the patient, would be part of a review of patient support and education but was not relevant to settings or organization of care.

We excluded studies that had specific programs as the sole intervention, such as methadone maintenance programs and counseling programs, if the organization of care was otherwise the same between the study and control groups. Our rationale was that these programs warranted independent reviews of their own, with revised search criteria specific for each particular program. However, studies with such programs were still eligible for inclusion

in this review if these programs were part of a multi-disciplinary or multi-faceted treatment intervention.

Studies that included insurance status only were excluded as this topic warranted separate review.

Types of outcome measures

For the purposes of this study, we were interested in the following outcome measures:

1. Medical outcomes: studies that included mortality, progression to AIDS, opportunistic infections and cancers, hospitalizations, proportion of patients on antiretroviral medications, proportion of patients on indicated prophylaxis, and functional status/disability.

2. Immunological or virological outcomes: studies that measured CD4 and/or viral load.

3. Psychosocial outcomes: studies that included an outcome measure for quality of life (such as MOS-HIV score) and/or illness intrusiveness.

4. Economic outcomes: studies that included information about healthcare utilization (length of hospital stay, emergency department use, visits to providers) and treatment costs.

Studies that examined pregnancy specific outcomes only such as prematurity or low birth weight were excluded.

Search methods for identification of studies

Electronic searches were run for the period January 1,1980 to December 2002. This time period will be extended to April 30, 2006 for the next revision which is planned by the end of 2006. We searched the following databases:

MEDLINE, EMBASE, Dissertation Abstracts International (DAI), Cumulative Index to Nursing & Allied Health (CINAHL), HealthStar, PsycInfo, PsycLit, Social Sciences Abstracts, and Sociological Abstracts. Electronic searches were also performed for abstracts from major AIDS conferences such as ICAAC, CROI and international and world AIDS conferences. We also searched the related articles feature of PubMed to help us identify relevant studies.

Reference lists from pertinent articles, books and review articles were scanned to identify further studies for possible inclusion.

Web of Science and Social Sciences Citation Index (SSCI) were searched for authors of key pertinent articles. Internet searches were performed to find web sites describing studies pertinent to the review.

We searched for any unpublished journal articles relevant to the review. Hand searching of tables of contents of the following journals was also performed: Aids Patient Care and STDs, Clinical Infectious Diseases, European Journal of Clinical Microbiology and Infectious Diseases, International Journal of STDs and AIDS, Journal of Acquired Immune Deficiency Syndromes, Journal of the International Association of Physicians in AIDS Care.

We employed the following librarian-developed search string to identify relevant studies for this review when we performed our electronic searches:

1 exp hiv/ or exp hiv infections/ or exp anti-hiv agents/ or exp hiv protease inhibitors/ or exp reverse transcriptase inhibitors/ or (hiv or human immunodeficiency or acquired immunodeficiency syndrome or acquired immune deficiency syndrome).tw. (154553)
2 aids.tw. (64836)
3 1 or 2 (166959)
4 clinical competence/ or exp professional-patient relations/ (84492)
5 ((provider or professional or physician: or nurs: or clinician: or practitioner:) adj (experience: or skill: or train: or competenc:)).tw. (5988)
6 exp Patient Care Planning/ (26822)
7 exp Managed Care Programs/ (30095)
8 (clinical adj skill:).tw. (1101)
9 exp insurance, health, reimbursement/ or exp reimbursement mechanisms/ (21524)
10 "health services needs and demand"/ or needs assessment/ (20743)
11 outreach.tw. (2205)
12 professional practice/ (9417)
13 Physician practice patterns/ (0)
14 exp "Outcome and Process Assessment (Health Care)"/ (158024)
15 or/4-14 (340184)
16 random:.tw,sh,pt. (313180)
17 clinical trial.pt. (326947)
18 controlled clinical trial.pt. (61071)
19 multicenter study.pt. (43578)
20 exp case-control studies/ or exp cohort studies/ or exp longitudinal studies/ or exp cross-sectional studies/ (614071)
21 Cross-Over Studies/ (10576)
22 Intervention Studies/ (2136)
23 exp Research Design/ (149678)
24 Comparative Study/ (976681)
25 exp Evaluation Studies/ (412608)
26 meta-analy:.sh,pt,tw. (12151)
27 (latin square: or control: or prospectiv: or volunteer: or metaanaly: or (clinic: adj (trial: or study or studies))).tw. (1288964)
28 (medline or embase or cinahl or psycinfo or psychinfo or psyclit or psychlit or scisearch).tw. and review.pt. (5438)
29 (data adj synthes:).tw. (2476)
30 double-blind method/ or single-blind method/ or placebo:.tw,sh. or ((singl: or doubl: or tripl: or trebl:) adj (mask: or blind:)).tw. (123932)
31 exp data collection/ or survey:.tw. (603678)
32 or/16-31 (3171869)
33 3 and 15 and 32 (3891)
34 (animal not human).sh. (2547409)
35 (mi or pa or pc).fs. (1766261)
36 ra.fs. (369274)
37 or/34-36 (4247427)
38 33 not 37 (2710)
39 limit 38 to yr=1980-2002 (2696)

Data collection and analysis

Studies that met the selection criteria for inclusion were identified according to the selection criteria described above. There were four stages to the review process:

Stage 1
Titles of studies that were identified by the search were screened independently by two reviewers (AMT, CH, JR, SI) in order to

eliminate titles/topics that were not pertinent to the research question. If there was any uncertainty or disagreement between the two reviewers based on the title, a review of the abstract was conducted.

Stage 2
Following the initial title screen, two reviewers (AMT, CH) independently evaluated each selected abstract using an identical, pre-determined checklist of the inclusion criteria If both reviewers determined that the study was not eligible for inclusion, no further action was taken. If one or both reviewers determined that the study might be eligible for inclusion, the full text of the article was obtained.

Stage 3
Each reviewer (AMT, CH) independently read full paper copies of the studies and determined whether they fulfilled the inclusion criteria. Disagreements between the reviewers were resolved either by discussion and consensus or through the involvement of a third, independent reviewer (RG).

Stage 4
Data were extracted independently by two reviewers (AMT,CH) from the relevant studies using a data extraction tool and then data were compared. Data extracted included: gender of subjects, ethnicity of subjects, total number of subjects included in the study, mean age and range of participants, study design, description of the intervention, and outcomes measured. Study authors were contacted for further information as required. Any disagreements were resolved by discussion or by a third reviewer (RG). Assessment of quality was undertaken independently by two reviewers (AMT, CH, RG).

As the heterogeneity of study design, comparison of groups, intervention types, settings and patients was substantial, an overall estimate of effect would have little practical meaning. Therefore, a qualitative summary of the findings is presented in the Characteristics of Included Studies Table.

RESULTS

Description of studies

The search of the computerised databases identified a total of 11 266 citations. After excluding duplicates and studies clearly not related to the objective of our review, 1335 abstracts were considered in the selection procedure. Based on full text review, 16 studies were included in the review. Screening of references and re-evaluation of studies with a refined inclusion criteria resulted in another 12 studies that met the inclusion criteria. Consequently, 28 studies were included in the review.

-Included studies:

There were 28 studies that fully met our inclusion criteria and were included in this review. These 28 studies comprised 27 patient samples, as two of the included studies were of the same patient population (Bennett 1995, Bennett 1996b).

-Design of Included Studies:

There was one randomized controlled trial (Keitz 2001) one controlled clinical trial (Safran 1995), five prospective cohort studies (Aiken 1999, Holzemer 1992, Katz 2001, Messeri 2002, Smith 1996) and 21 retrospective cohort studies (Bennett 1992, Bennett 1995, Bennett 1996a, Bennett 1996b, Chan 2002, Curtis 1997, Horner 1995, Laine 1998, Laine 1999, Laraque 1996, Le 1998, Markson 1998, Newschaffer 1998a, Newschaffer 1998b, Newschaffer 1999, Stone 1992, Turner 1992, Turner 1998, Turner 1999, Turner 2001, Turner2000)
that were included in the review.

One study had the concentration of HIV/AIDS patients as the intervention (Aiken 1999). 13 studies had clinic, hospital or hospital ward volume as an intervention (Bennett 1992 Bennett 1995, Bennett 1996a, Bennett 1996b, Curtis 1997, Horner 1995, Keitz 2001, Laine 1998, Markson 1998 ,Newschaffer 1998b, Stone 1992, Turner 1992, Turner 1998). Four studies had conducts clinical trials as the intervention (Turner 1999, Turner2000, Turner 2001, and Newschaffer 1998b). Three studies had incorporation of trainees as the intervention (Bennett 1992, Bennett 1995, Horner 1995).

There were three included studies with a fully described case management intervention (Katz 2001, Laraque 1996, Messeri 2002). Six studies looked at multidisciplinary or multi-faceted treatment interventions (Le 1998, Newschaffer 1998a, Newschaffer 1999, Chan 2002, Turner 1999, Turner2000). Three studies looked at the impact of health information systems (Holzemer 1992, Safran 1995, Smith 1996) and three studies (Laine 1999, Newschaffer 1998b, Markson 1998) had hours of service as the intervention.

There were no studies included that had outreach or travel time to providers as an intervention.

-Participants of Included Studies:

There were a total of 39 776 study subjects included in this review, all of whom were HIV positive. Most personal characteristics were reported inconsistently across the studies.

-Outcomes of Included Studies:

Twelve of the included studies contained a mortality outcome for various interventions of interest (Aiken 1999, Bennett 1992 Bennett 1995, Bennett 1996a, Bennett 1996b, Curtis 1997, Horner 1995, Laine 1998, Laraque 1996, Safran 1995, Stone 1992, Turner 1992). Ten studies had receipt of antiretrovirals (ARVs) or indicated prophylaxis as an outcome (Bennett 1996a, Bennett 1996b, Katz 2001, Keitz 2001, Newschaffer 1998a, Safran 1995, Turner 1998, Turner 1999, Turner2000, Turner 2001). There were five studies with hospitalization as an outcome (Katz 2001, Keitz 2001, Laine 1999, Newschaffer 1998b, Safran 1995) Two studies (Safran 1995, Turner 1998) had progressing to AIDS as an outcome. One study (Holzemer 1992) had a functional status outcome.

There were no studies that had immunological or virological outcomes.

One study (Keitz 2001) had a quality of life outcome.

Several studies had a variety of healthcare utilization outcomes such as: emergency department use; visits to providers; length of hospital stay; and cost of treatment (Bennett 1992, Bennett 1996a, Bennett 1996b, Chan 2002, Curtis 1997, Katz 2001, Keitz 2001, Laine 1999, Le 1998, Markson 1998, Messeri 2002, Newschaffer 1998b, Newschaffer 1999, Safran 1995, Smith 1996, Stone 1992).

Risk of bias in included studies

As the majority of studies were observational rather than experimental, we did not use the methodological criteria developed for randomized trials. Rather, we identified the main threat to validity in these studies as uncontrolled confounding, including age, sex, route of HIV transmission, race, case mix, and insurance status. Each study was rated on each of these six factors by three reviewers independently (CH, AMT, RG) and scores out of six were tallied. Conflicts between reviewers were resolved through discussion or through the intervention of a third reviewer. The scores were not used as continuous measures of quality but rather studies that controlled for case mix (in our judgment the most serious potentially confounding factor) were considered of higher quality as were those that controlled for at least 4 out of 6 factors.

The majority of studies controlled for relevant potentially confounding factors. Only four studies did not control for case mix (Chan 2002, Holzemer 1992, Turner 1998, Markson 1998) and only four studies controlled for fewer than 4/6 potentially confounding factors (Bennett 1996a, Holzemer 1992, Messeri 2002, Safran 1995). Omitting the results of these studies would have removed one negative study of the relationship between patient volumes and mortality (Bennett 1996a) but would not have affected any of the conclusions about mortality or ARV use. Findings about social services case management and entry and continuity in appropriate health care (Messeri 2002) and the relationship between computer prompts and proportion of patients on ARVs and indicated prophylaxis (Safran 1995) would have been affected. These results would not have been considered significant if the relevant studies had been removed. See Quality (Table 1).

Effects of interventions

For the purposes of this section we have divided the results between studies that examined the 'setting of care' and studies that examined the 'organization of care'. In some cases studies evaluated both setting and organization. We have listed under each heading the intervention of interest and ordered the outcomes reviewed in each section as: 1) medical outcomes, especially mortality and antiretroviral treatment; 2) psychosocial outcomes; and 3) utilization and economic outcomes. There were no studies that measured immunological or virological outcomes.

A. Setting of Care

Intervention: Concentration of HIV/AIDS Patients

One prospective cohort study (Aiken 1999) demonstrated lower 30-day mortality in groups of AIDS patients that were hospitalized in facilities that contained units dedicated to HIV/AIDS care as compared to patients that were hospitalized in facilities without units dedicated to HIV/AIDS care. The mortality benefit in the facilities with units dedicated to HIV/AIDS care seemed to occur both with patients on the dedicated AIDS units themselves, as well as with HIV positive patients in scattered-bed units elsewhere in the hospital. Patients on both of these units showed more than a 40% lower 30-day mortality as compared to conventional hospitals with no unit dedicated to HIV/AIDS care. However, only the AIDS hospital scattered-bed units achieved statistical significance (OR 0.53, CI 0.36-0.89). The dedicated AIDS units themselves may have failed to achieve statistical significance (OR 0.57, CI 0.25-1.10) due to inadequate power. There were approximately three times the number of HIV patients in the units dedicated to HIV/AIDS care compared to the scattered bed units. In this study, hospitals that did not have a unit that was dedicated to HIV/AIDS care, but that were considered to be 'magnet' hospitals also showed a statistically significant lower 30-day mortality as compared to the conventional scattered-bed hospitals (OR 0.36, CI 0.14-0.92). However, no data on the volume or concentration of HIV patients in these 'magnet' hospitals were provided.

Intervention: Volume of HIV/AIDS Patients

Nine retrospective cohort studies describing eight study samples - Bennett 1995 and 1996b were two different papers of the same sample - had patient mortality as one of the outcomes. Five of these studies (Bennett 1992, Bennett 1996b, Laine 1998, Stone 1992, Turner 1992) concluded that there was a benefit in terms of mortality for patients who were cared for in high volume institutions. The definition of high volume varied considerably in these studies: ≥ 43 annual hospital discharges (Stone 1992), ≥ 100 clinic patients from 1986-1992 (Laine 1998), ≥ 160 annual hospital patients (Bennett 1992), and 2798 annual discharges (Bennett 1996b).

Four of the studies (Horner 1995, Bennett 1995, Bennett 1996a, Curtis 1997) showed no statistically significant benefit in mortality in the high-volume group. The definition of high volume in this group was somewhat different: greater than or equal to 300 hospital patients in 3 years (Horner 1995 and Bennett 1995), high volume having four times as many hospital patients as low volume in three years (Bennett 1996a) and high volume having 5 times the number of hospital patients as low in 3 years.

Three of the four negative studies had small sample sizes (see Characteristics of Included Studies Table), perhaps too small to demonstrate a significant mortality outcome. Despite analyzing the same sample of patients, Bennett 1995 and Bennett 1996b defines high volume differently in each study, as volume of PCP cases and hospital caseload of people with HIV/AIDS, respectively, thus resulting in one positive and one negative outcome.

Keitz (Keitz 2001), the only RCT in the review, examined the difference between 214 HIV-infected adults who were randomized to either a high-volume HIV infectious diseases practice (1100 HIV-infected patients) or a low-volume (<50 HIV-infected patients) general medicine practice. The proportion of patients on ARVs and indicated prophylaxis and the rate of hospitalization was similar between the two groups.

The Keitz 2001 study also showed significantly fewer emergency department (ED) visits (31 vs. 43 visits, p=0.01) and shorter hospital stays (5.3 days vs. 9.0 days, p=0.01) in patients randomized to the high volume practice. There was no difference between the groups in terms of patient visits to the home clinic. There was also no statistically significant difference in psychosocial outcomes between these two groups. Markson (Markson 1998) demonstrated that higher volume institutions had significantly fewer patients with 2 or more ED visits (aOR 0.56, 0.44-0.71) when compared with patients from lower volume institutions.

Five of the retrospective cohort studies looked at the effect of HIV-volume on length of hospital stay. Two studies (Bennett 1996a, Stone 1992) demonstrated longer hospital stays in facilities with higher HIV-volume with differences of 5.0 and 2.7 days, respectively,

while three studies (Bennett 1992, Bennett 1996b & Curtis 1997) had differences of 2.0 days or less which were not statistically significant.

Intervention: Conducts Clinical Trials

Four studies (Turner 1999, Turner 2000, Turner 2001 and Newschaffer 1998b) evaluated clinical trials as a feature of the setting of care. The three Turner studies reported that conducting clinical trials led to a significantly larger proportion of patients being on antiretroviral therapy: (OR 1.78, CI 1.37-2.32 Turner 1999; p<0.001 Turner2000; and OR 1.43, CI 1.01-2.04 Turner 2001respectively). However, Newschaffer (Newschaffer 1998b) did not show any difference in the number of patients on HAART (OR 1.24, CI 0.90-1.72) despite having a comparable sample size to the Turner studies. The Newschaffer (Newschaffer 1998b) study also did not show any significant difference in terms of hospitalization rates when clinical trials were conducted.

Intervention: Incorporates Trainees

Three studies (Bennett 1992, Bennett 1995 and Horner 1995) assessed the effect of the incorporation of trainees in the delivery of healthcare. None of these studies demonstrated a statistically significant impact on in-hospital mortality with this feature (OR 1.57, CI 0.94-2.62, OR 0.96, CI 0.68-1.35, and OR 1.58, CI 0.94-2.65 respectively).

B. Organization of Care

Intervention: Case Management

Three studies included a case management intervention. Katz (Katz 2001) defined a case manager as "a social worker, nurse, AIDS service organization staff member, staff in other service organizations, or anyone else who is assigned to help [one] get and coordinate care". A case manager in Laraque (Laraque 1996) "assessed the patient's needs and helped in obtaining financial entitlements, such as social security, medical insurance, welfare, food stamps, safe housing, and access to medication. The case manager offered nutritional advice, ensured adequate medical management by monitoring each patient's medical progress, and made certain that all patients were discharged with appropriate housing and support. Finally, the case manager visited the patients and their families to provide psychosocial support." Messeri (Messeri 2002) divided case managers into three types:
(i) case manager, medical referral: "case manager has referred respondent to a specific medical service"; (ii) case manager, counseling: " case manager has counseled respondent about personal problems, drug use, safe sex, combination therapy and has checked how client is doing"; (iii) case manager, social services: "case manager has developed a care plan, coordinated specific social services, filled out forms for entitlements."

Laraque (Laraque 1996) was the only study that evaluated a mortality outcome. It showed improved two-year survival (86% vs. 64%, p<.001) for patients who were actively involved in an Early Intervention Program (EIP) as compared to patients who were not actively involved in this program. This EIP included case management (as described above).

Katz (Katz 2001) showed that contact with a case manager resulted in an increased number of patients on a protease inhibitor (PI) or a non-nucleotide reverse transcriptase inhibitor (NNRTI) (aOR 1.29 (CI 1.02-1.64)). Sustained contact (ie. contact both at baseline and at follow up) with a case manager resulted in an even larger effect (aOR 1.53, CI 1.22-1.92). Sustained contact with a case manager also led to a significantly greater number of patients on antibiotic prophylaxis (aOR 1.77, CI 1.28-2.46).

Katz (Katz 2001) did not find a difference in hospitalization rates (OR 1.11, CI 0.83-1.50).

Messeri (Messeri 2002) demonstrated that a 'social services' case manager resulted in a statistically significant increase in both entry (OR 3.3, p<0.05) and continuity (OR 2.9, p<0.01) in appropriate medical care.

Katz (Katz 2001) showed no significant association between case management and emergency room visits.

Intervention: Multidisciplinary or Multi-faceted Treatment

Six of the twenty-eight studies had interventions under the category of multidisciplinary or multi-faceted treatment (Le 1998, Newschaffer 1998a, Newschaffer 1999, Chan 2002, Turner 1999 and Turner 2000). All six studies were retrospective cohort studies.

None of these six studies included mortality as an outcome.

Newschaffer (Newschaffer 1998a), Turner (Turner 1999) and Turner (Turner 2001) looked at antiretroviral (ARV) treatment as an outcome. The multi-faceted interventions differed considerably between the studies. The subjects in these studies were pregnant females and were drawn from New York State Medicaid files. Turner's studies showed a statistically significant association between receipt of comprehensive care and receipt of ARVs (aOR 3.23, CI 2.42-4.31, aOR 1.67, CI 1.24-2.25 respectively). The two Turner studies describe their multifaceted intervention as one that consisted of providers who "guaranteed they would offer certain HIV-specific services, including access to specialists in HIV care; pre- and post-test counseling; referral for special studies, tests, consultations, or psychosocial services; care coordination; and after-hours care."

Newschaffer (Newschaffer 1998a) concluded that participation in a multi-faceted prenatal care assistance program (PCAP) was not associated with increased receipt of ARVs. The PCAP "developed plans of care, coordinated services across a range of providers, provided risk assessment, health education, nutritional counseling, HIV testing and counseling, and psychosocial assessment… included [were] provisions that clinics [had] plans for referring women to drug treatment, HIV management and genetic and mental health services when necessary."

Le (Le 1998) concluded there was a decrease in the total number of hospital admissions for patients receiving multidisciplinary treatment vs. non-multidisciplinary treatment (21% vs. 24% respectively, OR 0.63; CI 0.46-0.85). The stated purpose of the interdisciplinary team was to "improve access to health education, nutrition, psychosocial, psychiatric and pharmacy services by personnel specifically trained in the management of HIV-related issues."

Two studies (Le 1998, Newschaffer 1999) included emergency department (ED) use as an outcome. Le (Le 1998) showed no difference between multidisciplinary vs. non-multidisciplinary groups in terms of ED use. Newschaffer (Newschaffer 1999)

indicated that patients enrolled in a multidisciplinary practice had an increased use of the emergency department. According to the authors, the increased use might be explained by the fact that women who had received more education and counseling might be more aware of potentially serious symptoms and thus more inclined to visit an emergency department. Alternate explanations for this association were that the women enrolled in the PCAP program may have been sicker to begin with or may have had a predisposition to higher use of services.

Chan (Chan 2002) reported increased primary medical care visits ($p \leq 0.05$ and retention in primary care $p \leq 0.01$) in a multifaceted ancillary services group. This multifaceted program provided clients with "a range of services that include[d] case management, dental care, drug reimbursement, health insurance, home health care, hospice care, mental health therapy, nutritional services, rehabilitation services, substance use treatment, and other services of a treatment nature."

Intervention: Health Information Systems

Three studies were available for this comparison (Smith 1996, Holzemer 1992, Safran 1995). Safran (Safran 1995), a controlled clinical trial of 349 HIV positive patients in Israel, demonstrated that using computer alerts and reminders about immunizations, test results and prescribing for primary care providers did not show any benefit in the computer-prompt group (n=191) in terms of mortality (one year survival rate 91% in intervention group vs. 88% in control group, p=0.19). However, the computer prompts did appear to significantly hasten initiation of recommended treatments for patients with HIV/AIDS. Treatments included initiating antiretroviral treatment (median of 7 days vs. 43 days, no p value provided) as well as initiating indicated PCP prophylaxis (median of 11 days vs. 122 days, p<0.0001). This study did not show any difference in hospital admissions between the groups receiving and not receiving prompts.(35% versus 44%, respectively, p=0.47).

Holzemer (Holzemer 1992), a prospective cohort study, did not show any difference in functional status between patients who were cared for in hospital with a computer-generated nursing pathway vs. a manually- generated nursing pathway. Nursing pathways described interventions and expected outcomes for defined groups of patients.

Smith (Smith 1996), a prospective cohort study, concluded that the average length of hospital stay decreased over a two year period in a group of HIV positive patients whose GPs were given discharge information from and 24/7 phone access to an infectious diseases specialist. Mean length of hospital stay in this intervention group decreased from 16.6 days in 1992 to 8.0 days in 1994 (p=0.004). The control group had a decrease of 17.1 days to 13.1 days (p=0.79).

Safran (Safran 1995) did not show any differences in healthcare utilization outcomes (physician visits p=0.29 and emergency department visits p=0.24).

Intervention: Hours of Service

None of the twenty-eight studies evaluated the impact of hours of service on mortality, functional status, immunological or virological outcomes. However, three studies (Laine 1999, Newschaffer 1998b and Markson 1998) examined of the effect of clinic hours on healthcare utilization outcomes on patients from NY State Medicaid files. Laine (Laine 1999) determined that evening and weekend clinic hours significantly decreased the rate of hospitalization in the year prior to AIDS diagnosis (AOR 0.77, CI 0.63-0.93).

Newschaffer (Newschaffer 1998b) did not detect a significant difference in hospitalization rates in the mid-AIDS interval when clinic hours were 'increased'. It was unclear whether the increased clinic hours in the Newschaffer study were similar to the evening and weekend clinic hours of the Laine (Laine 1999) study. Neither of these two studies showed any difference in hospitalization rates when on-call physicians are available by phone.

Markson (Markson 1998) showed that evening and weekend clinic hours were associated with fewer emergency department visits (OR 0.77, CI 0.64-0.93). The availability of an on-call physician was also associated with fewer emergency department visits (OR 0.77, CI -0.65-0.92).

DISCUSSION

Nine studies examined the relationship between hospital, ward or clinic concentration or volume of patients and the majority of these found lower mortality in settings with greater concentration or volume. Among the studies that showed non-significant results, confidence intervals were wide in three (Horner 1995, Bennett 1996a, Curtis 1997) and one was a duplicate report of a study that reported positive results with a different measure of volume (Bennett 1995).

High concentration and high volume were variously defined, not permitting estimation of threshold numbers that would be relevant for practice. Nonetheless, these findings suggest that hospital, ward or clinic experience may be important for reducing mortality. The mechanisms of this potential benefit are not available in the included studies as results for proportion on ARVs or indicated prophylaxis or on health care utilization were examined in only a few of these studies and the results were inconsistent. More experienced health care professionals and teams may have practiced closer to recommended guidelines or been more aggressive, but this cannot be confirmed using available evidence. Although these observational studies attempted to control for potentially confounding factors and all controlled for case mix, residual confounding could still have affected the results. Because high volume settings often are tertiary care centres, it is possible that they attracted sicker patients, thus under-estimating the extent of benefit from high concentration and volume of patients.

Four studies examined use of ARVs in relation to settings that conduct clinical trials and three of these found higher proportions of patients on ARVs in settings that conduct trials. One study that examined hospitalization found no difference between settings that did and did not conduct trials. Patient volumes were not reported for any of these settings but it is likely that some centres both have higher volumes and conduct trials. Many large academic centres would fit this description. Incorporating trainees might also be expected to take place more often in academic centres but there were no relationships found between incorporating trainees and in-hospital mortality. The confidence intervals were very wide in these studies. This evidence suggests that there is higher ARV use in settings that conduct trials, possibly due to the presence of ARV trials or increased comfort with ARVs among providers or patients

in those settings. This finding could also be related to volume or concentration of patients or expertise of providers but the included studies do not include that information.

The only study (Laraque 1996) that examined mortality in relation to case management found significantly lower mortality in the case management group. Another study of case management found higher rates of ARVs use and indicated prophylaxis in the case management group but no difference in hospital admission rates (Katz 2001). Case management was described somewhat differently in these studies, precluding direct comparisons. Case management was associated with increased entry and continuity of medical care in one study (Messeri 2002), but there is otherwise little indication in these studies of the pathways through which case management may improve outcomes. The small number of studies does not allow any firm conclusions about case management but case management models should be priorities for further research.

The outcomes for other setting of care and organization of care interventions demonstrated mixed results. Multidisciplinary or multi-faceted treatment was associated with increased ARV use by pregnant women in two studies, but not in a third study, and with decreased hospitalization in one study. Health care information systems were not associated with mortality or hospital admission in one study but in the same study computer alerts and reminders for primary care physicians appeared to increase the initiation of ARVs and indicated prophylaxis. Evening and weekend clinic hours were associated with decreased hospitalization rates in one study but another study did not find that relationship with increased hours. It is difficult to draw conclusions for practice from these results but there are enough promising findings to indicate that multidisciplinary and multi-faceted treatments, health information systems and hours of operation should be considered when designing health services and should be research priorities.

The relationship between interventions and health care utilization outcomes was mixed. The only finding that was consistent across multiple studies was decreased ER use in high volume settings (two studies). Interventions that could be considered promising but which were found in only one study each included improved entry and continuity in appropriate medical care with a social services case manager, increased primary medical care visits in a multifaceted ancillary services group, decreased length of hospital stay with discharge information to GPs from and 24/7 phone access to an infectious diseases specialist and a decrease in ER visits in relation to evening and weekend clinic hours and the availability of an on-call physician.

This systematic review has several important limitations including the limited number of studies examining each intervention and outcome, the observational design of most available studies, the possibility of residual confounding being responsible for study results, the lack of ability to perform a meta-analyses due to heterogeneous populations, interventions and outcomes, and the lack of detailed descriptions of many interventions. None of the studies in this review were conducted in resource-poor settings. It may be difficult for policy makers to replicate the setting and/or organization of care in these settings due to the large differences that exist between industrialized and developing world healthcare infrastructures.

AUTHORS' CONCLUSIONS

Implications for practice

Implications for practice and policy

Policy makers and clinicians are faced with a serious gap in evidence about the characteristics of settings that are most effective for HIV/AIDS care and ways in which services should be organized to maximize beneficial outcomes. Existing studies suggest that centralizing care in high concentration high volume centres could lead to improved outcomes including mortality. Unfortunately, this evidence is mixed and is limited to developed country settings. Appropriate care settings in resource poor countries, especially those with large rural populations, cannot be determined from the available evidence. Case management may also associated with improved outcomes but the limited number of studies and the varying definitions of case management leave considerable doubt about how best to implement such programs. Multidisciplinary and multi-faceted treatments, health information systems and extended hours of operation are promising interventions but evidence about their effectiveness is so far lacking.

Implications for research

Whether to centralize care in regional centres or distribute it in the community and what types of health care workers and teams are best able to provide effective care are key questions in the organization of HIV/AIDS care, especially in developing countries. We did not identify sufficient evidence to guide these decisions. Concentration of hospitalized patients and hospital, ward and clinic volume require further research, as does the effectiveness of case management, the use of multidisciplinary teams and multi-faceted interventions, the use of health information systems, hours of operation and other aspects of care settings and organization of care.

Investigators should aim to have control groups whenever possible, to describe interventions fully, to develop common terminology about teams and case management and to measure and control for differences in case mix, age, sex, route of transmission, ethnicity, and insurance status when relevant.

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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Aiken 1999

Methods	Prospective cohort study
Participants	1205 patients in 40 units in 20 hospitals The proportion male was 87.5%.
Interventions	CLINIC, HOSPITAL OR HOSPITAL WARD VOLUME OF HIV/AIDS PATIENTS Control group was conventional scattered-bed unit. Intervention groups were: 1) magnet hospitals 2) dedicated AIDS units 3) AIDS scattered-bed units
Outcomes	MEDICAL: 30-day mortality of patients. 1) Magnet hospitals: OR 0.36 (CI .14-0.92). P=.01 2) Dedicated AIDS units: OR=0.57 (0.25-1.10) P=0.01 3) AIDS scattered-bed units: OR 0.53 (.36-0.89) P=0.05
Notes	30 day mortality was significantly lower in hospitals with dedicated AIDS units & magnet hospitals.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Bennett 1992

Methods	Retrospective cohort
Participants	3126 patients with AIDS and PCP. 82.6% Male Mean age= 31.1 years Age range=18-65 years 40.4% White 33.2% Black 26.2% Hispanic
Interventions	1)CLINIC, HOSPITAL OR HOSPITAL WARD VOLUME OF HIV/AIDS PATIENTS High volume PCP hospital=160+ 1st episode of PCP. Low volume PCP hospital = less than 160 patient episodes in 1987 2)INCORPORATES TRAINEES IN CARE DELIVERY Major, Minor or None.
Outcomes	MEDICAL Mortality of Patients: a) Hospital volume 1)In-hospital death: High (160+ cases of PCP) 20.7%. Low (Less than 160 cases of PCP) 30.1% P=<0.05 Adjusted Odds Ratio 0.64 (0.46-0.88) P=0.05 2)Death within 30 days of admission: OR=0.51 (.36-.73) P=0.05 3) LENGTH OF HOSPITAL STAY

Bennett 1992 *(Continued)*

	Low PCP=24.0 days High PCP= 24.3 days Not significant b) Major Teaching Affiliation: In-hospital mortality: OR1.57 (.94-2.62) 2) Death within 30 days: OR 1.34 (.77-2.36)
Notes	Hospitals with less than 160 cases of PCP had double the in-hospital mortality than higher volume hospitals. No association with teaching affilation noted for mortality.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Bennett 1995

Methods	Retrospective cohort
Participants	2174 patients VA hospitals: Black=98% Male, Avg age 40.9 years +/- 8.4 White=99% Male, Avg age 43.5 years +/- 9.4 Hispanic=100% Male, Avg age 41.1 years +/- 8.2 Non-VA Hospitals: Black=79% Male, Avg age 36.7 years old, +/- 8.6 White=96% Male, Avg age 38.4 years old, +/- 9.3 Hispanic=91% Male, Avg age 37.6 years old, +/- 9.6
Interventions	1)CLINIC, HOSPITAL or HOSPITAL WARD VOLUME OF HIV/AIDS PATIENTS and 2)INCORPORATES TRAINEES IN CARE DELIVERY 1) Low (less than 35 cases of PCP btwn 1987-1990) 2) Medium (35-299 cases PCP btwn 1987-1990) 3) HIgh (greater than or equal to 300 cases PCP 1987-1990). #2 & #3 combined in study.
Outcomes	MEDICAL MORTALITY In-hospital death at hospital with medium or high PCP experience RR: 1.00 0.73-1.36 P=1.00 TEACHING AFFILIATION Relative Odds: 0.96 0.68-1.35 P = .81
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Bennett 1996a

Methods	Retrospective cohort
Participants	229 patients (136 county patients and 93 VA patients). All patients have HIV-related PCP. Male (county) - 75.7% Male (VA) - 100% White (county) - 36.8% Black (county) - 39.7% Hispanic (county) - 23.9% White (VA) - 48.4% Black (VA) - 48.4% Hispanic (VA) - 3.2%
Interventions	CLINIC, HOSPITAL OR HOSPITAL WARD VOLUME OF HIV/AIDS PATIENTS VA Hospitals - 1/4 as many AIDS patients as County hospitals.
Outcomes	IN-HOSPITAL DEATH: County - 24.3% VA - 22.6% LENGTH OF STAY: County - 13.9 days VA - 18.9 days p=.004 p = 0.77 PROPORTION OF PATIENTS ON ARVS (mean day of starting PCP) County - day number 1.7 VA - day number 2.9 p=<.001
Notes	Timing of initiation of anti-PCP medications delayed by 1 day at the VA hospital.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Bennett 1996b

Methods	Retrospective cohort
Participants	2174 patients 100% Male (? - check table 1; different % of males - need to f/u with author). "Approximately equal numbers of white, black and hispanic" (see p 417) Mean age: Public - 36.0 (SD 9.1) Private - 38.3 (SD 9.1) VA - 42.1 (SD 8.9) Age range: 18+
Interventions	CLINIC, HOSPITAL OR WARD VOLUME OF HIV/AIDS PATIENTS: Determined by annual hospital caseloads Public - 2798 Private - 1057 VA - 831 (see p. 419)

Bennett 1996b *(Continued)*

Outcomes	IN-HOSPITAL DEATH: Public - 20.2% Private - 17.6% VA - 23.6% p=<.01 PROPORTION OF PATIENTS ON ARVS (use of anti-PCP in first 2 days): Public - 79.8% Private - 74.8% VA - 73.5% ECONOMIC OUTCOMES - LENGTH OF STAY: Public - 12.0 days Private - 14.0 days VA - 20.0 days
Notes	Waiting to hear from author re discrepancies in study demographics.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Chan 2002

Methods	Retrospective cohort
Participants	391 (hypothesis #2) 270 (hypothesis #1) 82.6% Male 17.4% Female 49.1% Caucasian 28.4% Latino 18.4% Black <20 - 0.5% 20-29 - 8.7% 30-36 - 27.6% 37-44 - 31.5% >44 - 31.7%
Interventions	MULTI-FACETED TREATMENT: High vs Low ancillary service use
Outcomes	ECONOMIC OUTCOMES: 1) Primary medical care visits Low service use (LSV) - 8.26 High service use (HSV) - 13.41 p=<\ .05 2) RETENTION IN PRIMARY MEDICAL CARE: OR = 1.26 CI - 1.19-1.34 p=<\.01
Notes	Positive relationship exists between receipt of ancillary services and access to primary medical care.

Risk of bias

Chan 2002 *(Continued)*

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Curtis 1997

Methods	Retrospective cohort
Participants	345 subjects (Hospital A = 209, Hospital B = 136). Hospital A = 96.7% Male 2.9% Female 83.3% White 4.8% Black 6.2% Hispanic Mean age = 36 years Hospital B = 75.7% Male 24.3% Female 28.7% White 39.7% Black 23.5% Hispanic Mean age = 37 years.
Interventions	CLINIC, HOSPITAL, OR WARD VOLUME OF HIV/AIDS PATIENTS: Hospital B cared for five times more patients with PCP than Hospital A.
Outcomes	MORTALITY: Survival to hospital discharge OR = 1.2 (CI: .7-2.0). HEALTHCARE UTILIZATION: # of days in hospital: Hospital A - 14.8 days Hospital B - 13.9 days p value = 0.5
Notes	No significant difference in hospital survival btw the two institutions.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Holzemer 1992

Methods	Prospective cohort
Participants	74 male patients admitted for HIV-related pneumocystis carinii pneumonia (PCP) 100% - Male Mean age - 37.7 years (SD 7.0)
Interventions	HEALTH INFORMATION SYSTEMS: Computer vs manually generated care plans
Outcomes	PSYCHOSOCIAL

Holzemer 1992 *(Continued)*

	QAM: Quality of Audit Marker (functional status section) Manual (n=37) 33.5 (SD 4.1) Computer-generated: (n=37) 32.5 (SD 5.5) p=.43
Notes	No difference observed between two systems.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Horner 1995

Methods	Retrospective cohort
Participants	890 patient charts.
Interventions	CLINIC, HOSPITAL OR WARD VOLUME OF HIV/AIDS PATIENTS: Number of PCP patients treated from 1987-1990 1) <35 low 2) 35-299 = medium 3) 300+ = high (med/high combined in one category for comparison) INCORPORATES TRAINEES IN CARE DELIVERY: Teaching-affiliation Yes/No
Outcomes	MORTALITY: Relative odds of dying in hospital 1) Volume: Med/High AOR 0.82 (0.45-1.52) 2) Teaching Affiliation AOR 1.58 (.94-2.65)
Notes	No significant findings.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Katz 2001

Methods	Prospective cohort
Participants	2437 patients Male - 1728/2437 Female - 709/2437 White - 1241/2437 Non-white - 1196/2437

Katz 2001 *(Continued)*

	Age range - <38 - 1193/2437 >\ 38 - 1244/2437
Interventions	CASE MANAGEMENT: 1)Contact with a case manager 2)Sustained contact with a case manager
Outcomes	PROPORTION OF PATIENTS ON ARVs: 1) Contact with a CM 1 ARV - 1.19 (.93-1.53) 2 ARVs - 1.58 (1.23-2.03)* 3 ARVs - 1.34* (1.00-1.80) PI or NNRTI - 1.29 (1.02-1.64)* 2) Sustained contact with a CM 1 ARV - 1.61 (1.15-2.27)* 2 ARVs - 1.72 (1.36-2.16)* 3 ARVs - 1.63 (1.20-2.21)* PI OR NNRTI - 1.53 (1.22-1.92)* * = P</ .05 PROPORTION OF PATIENTS ON INDICATED PROPHYLAXIS: 1) Contact with a CM OR=1.16 (CI .83-1.63) 2) Sustained contact with a CM OR= 1.77 (CI 1.28-2.46) p<.05 HEALTHCARE UTILIZATION: a) ER visits 1) Contact with a CM - OR=1.30 (CI .97-1.73) 2) Sustained contact with a CM OR=1.58 (CI 1.17-2.13) p</ .05 b) Hospitalization 1) Contact with a CM - OR=1.13 (CI .84-1.54) 2) Sustained contact with a CM OR=1.11 (CI 0.83-1.50)
Notes	Case management = greater ARV use

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Keitz 2001

Methods	Randomized controlled trial
Participants	214 subjects (19 died, 15 lost to follow-up) General Medicine Clinic (GMC): 58.7% Male 11.9% White 85.3% African-American Mean age: 35.0 +/- 8.2 Infectious Disease Clinic (IDC): 63.8% Male

Keitz 2001 *(Continued)*

	20.0% White 71.4% African-American Mean age- 34.3% +- 9.0
Interventions	CLINIC, HOSPITAL OR WARD VOLUME OF HIV/AIDS PATIENTS: General Medicine Clinic staffed by internists - <50 HIV patients vs Infectious Disease Clinic (staffed by ID specialists - 1100 HIV patients)
Outcomes	PROPORTION OF PATIENTS ON ARVs: GMC: Use of 0 - 20% Use of 1 - 47% Use of 2 - 20% Use of 3 - 13% IDC: Use of 0 - 24% Use of 1 - 41% Use of 2 - 21% Use of 3 - 14% PROPORTION OF PATIENTS ON INDICATED PROPHYLAXIS: (MAC/PCP) GMC: MAC - 66% Appropriate PCP- 93% IDC: MAC - 56% Appropriate PCP - 98% HEALTHCARE UTLIZATION: a) Visits to home clinic GMC - 4.31 visits (+/- 3.81) IDC - 4.41 visits (+/- 4.69) b) ER Visits GMC - 1.58 (+/- 3.03) IDC - 0.71 (+/- 1.49) p=.01 (p<.05 after adjustment) c) HOSPITALIZ- ATION GMC - 33% IDC - 25% p=.11 (p=.08 after adjustment) d) LENGTH OF HOSPITAL STAY GMC - 9 (+/- 7 days) IDC - 5.3 (+/- 3 days)p=.01 (p=.05 after adjustment) PSYCHOSOCIAL OUTCOME: HRQL Scale (max score is 100) a) physical GMC before 42.1 +/- 12.2 after - 35.7 +/- 11.1 IDC before 42.8 +/- 13.3 after 37.2 +/- 11.7 b) mental GMC before 42.4 +/- 12.5 after 37.8 +/- 11.8 IDC

Keitz 2001 *(Continued)*

	before 40.2 +/- 12.7 after 37.2 +/- 11.7
Notes	Difference btw healthcare utlization btw the two groups

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Laine 1998

Methods	Retrospective cohort
Participants	887 subjects 100% Female
Interventions	CLINIC, HOSPITAL OR HOSPITAL WARD VOLUME OF HIV/AIDS PATIENTS: Cumulative number of all Medicaid enrollees with advanced HIV <20 = low 20-99 = moderate >= 100 = high
Outcomes	PATIENT MORTALITY: MEDIAN SURVIVAL IN MONTHS (after AIDS diagnosis) Low (control group) = 14 months Moderate = 18 months (RH .74; CI .48-1.16; p=.001) High = 25 months (RH .53; CI .35-.82)
Notes	Experience of clinic is significantly associated with survival after AIDS diagnosis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Laine 1999

Methods	Retrospective cohort
Participants	6820 subjects Age range 13-60 73% male 27% female
Interventions	HOURS OF SERVICE a) Evening or weekend clinic hours b) On-call phone access
Outcomes	HEALTHCARE UTILIZATION:

Laine 1999 *(Continued)*

	Hospitalization rates - % hospitalized a) Evening or weekend clinic hours: 45% vs. 53% (AOR = 0.77; CI .63-.93) b) On-call phone access 49% vs. 45%
Notes	Case management not described

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Laraque 1996

Methods	Retrospective cohort
Participants	767 subjects 68.4% Male Mean age - 35 (age range 18-87) Ethnicity: Active White 31% Black 34% Hispanic 35% Inactive White 30% Black 32% Hispanic 37%
Interventions	CASE MANAGEMENT: EIP Active (1+ follow-up visits) EIP Inactive (0 follow-up visits)
Outcomes	PATIENT MORTALITY: (2 year survival rate) Active - 86% Inactive - 64% (p=.001)
Notes	HIV patients who participated in the EIP program survived longer than those who did not participate.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Le 1998

Methods	Retrospective cohort
Participants	4977 total subjects in study

Le 1998 *(Continued)*

	(230 subjects at KPMC-SRO, 4747 patients at KMPC-Others) SRO: mean age 40 age range 22-72 Others - mean age 39 age range 18-86 KPMC-SRO 93.5% Male KPMC-SRO 6.5% Female KPMC Others 92% Male KPMC Other 7.5% Female KPMC-SRO Demographics 87.4% white 1.3% Af Am 3.0% Hispanic Others- 62.5% White 15% - Black 8% - Hispanic
Interventions	MULTIDISCIPLINARY CLINIC: KPMC-SRO Interdisciplinary team clinical care path (see figure 1 p. 648). Pts of the clinical care path (inter care) had access to: HIV coordinator/manager Nurse practitioner Social Worker Vocational Nurse Nutritionist Psychologist SRO was compared to Others
Outcomes	HEALTHCARE UTILIZATION: a)ED Visits: SRO-69/100 patient years Others-78/100 patient years (RR = .92; CI .71-1.16) b)Length of hospital stay per 100 person years all HIV and AIDS pts Days in hospital per 100 person years SRO-157 Others-284 Median length of stay per admission: SRO - 3 days (1-25) Others - 4 days (1-76) Median total days in hospital per person - SRO - 4 days (136) Others - 7 days (1-100) Number of hospital admissions: SRO = 21% Others = 24% (OR=.63; CI .46-.85) Visits to all physicians SRO - 1064 per 100 patient years Others - 1015 per 100 patient years (RR=1.01; CI .89-1.13) 2) Costs of treating pts - cost of HIV-related drugs SRO-$2343 Others-$3289
Notes	

Le 1998 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Markson 1998

Methods	Retrospective cohort
Participants	6820 subjects with HIV infection. 72% Male 28% Female 13-60 years of age. Medicaid enrollees.
Interventions	CLINIC, HOSPITAL OR WARD VOLUME OF HIV/AIDS PATIENTS: 1987-1988 1) 0-15 per year = low 2) 16-50 per year = med 3) 50+ per year = high low and med combined for analysis. HOURS OF SERVICE: 1) Evening and weekend clinic hours 2) On-call physician
Outcomes	HEALTHCARE UTILIZATION: 2 or more ED visits 1) Volume 50+ patients per year AOR 0.56 (0.44-0.71) 2) Hours i) Evening and Weekend hours: AOR 0.77 (0.64-0.93) ii) On-call MD AOR 0.77 (0.65-0.92)
Notes	Statistically significant association found with increased volume and increased hours of service.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Messeri 2002

Methods	Prospective cohort
Participants	577 subjects 61% Male 39% Female 16% White 52% Black

Messeri 2002 *(Continued)*

	31% Hispanic Age range 20+
Interventions	CASE MANAGEMENT a) Medical b) Counselling c) Social Services
Outcomes	HEALTHCARE UTILIZATION: 1) Entry into appropriate medical care: a) Medical: OR=0.9 (ns) b) Counselling: OR=2.0 (ns) c) Social Services OR = 3.3 (p<.05) 2) Continuity in appropriate medical care a) Medical: OR= 2.3 (p<.01) b) Counselling: OR=2.6 (p<.01) c) Social Services: OR=2.9 (p<.01) 3) Entry into care with any medical provider a) Medical OR=3.1 (ns) b) Counselling OR=3.5 (ns) c) Social Services OR=9.4 (p<.05) 4) Continuity with any medical provider a) Medical OR=2.3 (p<.01) b) Counselling OR=2.6 (p<.01) c) Social Services OR=2.9 (p<.01)
Notes	Receipt of ancillary services is significantly associated with increased entry and retention in medical care.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Newschaffer 1998a

Methods	Retrospective cohort
Participants	353 subjects 100% Female 10.5% White 56.7% Black 32.9% Hispanic Age range - 83.6% > 25 years of age
Interventions	MULTIFACETED TREATMENT: PCAP vs. non-PCAP
Outcomes	PROPORTION OF PATIENTS ON ARVs: 1) PCAP 25.4 2) non-PCAP 21.2

Newschaffer 1998a *(Continued)*

	p=0.39
Notes	Did not observe clear beneficial patterns associated with maternal receipt of ARVs.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Newschaffer 1998b

Methods	Retrospective cohort
Participants	1369 subjects IDU 72.2% Male 27.8% Female
Interventions	1) HOURS OF SERVICE 2) CONDUCTS CLINICAL TRIALS 3) CLINIC, HOSPITAL, OR HOSPITAL- WARD VOLUME OF HIV/AIDS PTS: 0-10 11-35 36-80 >80
Outcomes	HEALTHCARE UTILIZATION - Odds of any hospitalization: 1) Hours of Service: a) clinic hours increased - OR 0.70 (CI: 0.45-1.10) b) MDs available on phone: OR .95 (CI .58-1.55) c) MDs on-call: OR 1.17 (CI: .84-1.63) 2) CONDUCTS CLINICAL TRIALS: OR 1.24 (CI: .90-1.72) 3) CLINIC AIDS EXPERIENCE: 0-10 = OR 1.00 11-35 = OR .64 (CI: .40-1.05) AOR = 0.74 (CI:.45-1.24) 36-80 = OR 0.66 (CI:.40-1.08) AOR = 0.71 (CI:0.42-1.21) >80 = OR .57 (CI: .35-.93) AOR = .75 (CI:.43-1.32)
Notes	Increased clinic hours = high use of hospital care. AIDS care experience = no significant association with decreased hospitalization. Query: multi-disciplinary conferences?

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Newschaffer 1999

Methods	Retrospective cohort
Participants	1826 subjects. 100% Female.
Interventions	MULTIFACETED TREATMENT a) PCAP b) HIV-focused care (described)
Outcomes	HEALTCARE UTILIZATION - Emergency Department Visits a) PCAP vs non-PCAP OR 2.31 (CI: 2.01-2.66) AOR not provided b) HIV-focused care vs no enhanced HIV fee service OR = 1.42 (CI: 1.21-1.66) AOR = 1.11 (CI: .94-1.30)
Notes	Enhanced HIV care is not associated with ED use. PCAP increased ED use in certain subsets.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Safran 1995

Methods	Controlled clinical trial
Participants	349 subjects a) Control group: 17% Female 23% Non-white Mean age - 42 years b) Intervention group: 17% Female 17% Non-white Average age 35.4 years.
Interventions	HEALTH INFORMATION SYSTEMS: Computer prompts vs. Control
Outcomes	PATIENT MORTALITY: Estimated survival rate at 1 year: a) Control = 88% b) Intervention = 91% p = 0.19 PROPORTION OF PTS PROGRESSING TO AIDS (diagnosis of PCP): a) Control = 21 b) Intervention = 20 p = 0.09 PROPORTION OF PTS ON ARVS (# of days til start) a) Control = 43 days b) Intervention = 7 days PROPORTION OF PTS ON INDICATED PROPHYLAXIS (# of days til prophylaxis) a) Control = 122 days b) Intervention = 11 days p = <.0001 HEALTHCARE UTILIZATION 1 or more hospitalizations a) Control 44% b) Intervention 35% p = .47

Safran 1995 *(Continued)*

	2) Visits to primary care providers p = .29 3) ED Visits p = .24
Notes	Computer-based patient records can be an effective vehicle for delivering care guidelines.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Smith 1996

Methods	Prospective cohort
Participants	209 subjects Group A = 55 pts Group B = 36 pts Group C = 42 pts Group D = 76 pts
Interventions	HEALTH INFORMATION SYSTEMS: Group A = Pts whose GPs were in the study - structured out-patient letter - ID physician available through 24 mobile phone - management and treatment guide Group B = Pts whose GPs did not know about their HIV status Group C = Pts with no GP Group D = GPs and patients entered study at a later date
Outcomes	HEALTHCARE UTILIZATION: Mean length of hospital stay: Group A 1992 - 16.6 days (3.1) 1994 - 8.0 days (1.1) p = .004 Groups B&C: 1992 - 17.1 days (6.6) 1994 - 13.1 days (1.8) p = .79 Group D: 1992: 15.2 (2.8) 1994: 11.7 (1.5) p = 0.44
Notes	"Visits to providers" and "number of admissions" data not comparable.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Stone 1992

Methods	Retrospective cohort
Participants	300 subjects. 77% Male 23% Female 61% White 26% Black 11% Hispanic
Interventions	CLINIC, HOSPITAL, OR HOSPITAL WARD VOLUME OF HIV/AIDS PATIENTS: (# of AIDS discharges per 10,000 discharges) Low experience = < 43 High experience = 43-229
Outcomes	PATIENT MORTALITY: a) In-patient mortality - low experience: 19.0% high experience: 9.8% RR = 2.16 (CI: 1.43, 3.26) ARR = 2.92 (CI: 1.37, 6.22). b) 30 day mortality RR = 1.93 (CI: 1.31, 2.84). ARR = 2.51 (CI: 1.22, 5.17). HEALTHCARE UTILICATION: Mean length of hospital stay: a) high experience - 14.1 days b) low experience - 16.8 days p. <.05 COSTS TO PTS OF HEALTHCARE RECEIVED (mean cost/discharge) a) high experience - $11306.00 b) low experience - $12236.00
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Turner 1992

Methods	Retrospective cohort
Participants	10538 adult discharges. 1) HCUP - 89% Male 69% White Mean age = 37 years old 2) Control (1987): 93% Male 61% White Mean age = 37 years old.
Interventions	CLINIC, HOSPITAL, OR HOSPITAL WARD VOLUME OF HIV/AIDS PATIENTS (# of AIDS discharges)
Outcomes	IN-HOSPITAL MORTALITY: OR = 0.9996 (CI: 0.9993, 0.9998)

Turner 1992 *(Continued)*

Notes	AIDS treatment experience is associated with improved patient outcomes.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Turner 1998

Methods	Retrospective cohort
Participants	1876 subjects. Male 75% Male 25% Female Age range- 13-29 - 261/1876 30-39 - 905/1876 40-60 - 710/1876
Interventions	CLINIC, HOSPITAL, OR WARD VOLUME OF HIV/AIDS PATIENTS: 1-60 61-130 131-230 230+
Outcomes	PROPORTION OF PTS PROGRESSING TO AIDS (PCP) 1-60 = 37.6% 61-130 = 36.7% p.=.46 131-230= 42% p.=.93 230+ = 34.8% p.=.75 PROPORTION OF PTS ON INDICATED PROPHYLAXIS (PCP): 1-60 = 39.6% 61-130 = 42.6% p. = 59 131-230 = 46.6% p. = 0.14 230+ = 46.1% p. = .27
Notes	No significant association observed.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Turner 1999

Methods	Retrospective cohort
Participants	2607 subjects.

Turner 1999 *(Continued)*

	100% Female. Period 1: 12.2% White 10.2% Black 9.5% Hispanic Period 2: 33.3% White 26.2% Black 25.4% Latin Period 3: 34.4% White 38.1% Black 47.6% Latin
Interventions	MULTI-FACETED TREATMENT (comprehensive care vs. non-comprehensive care) CONDUCTS CLINICAL TRIALS
Outcomes	PROPORTION OF PTS ON ARVs: 1) MULTI-FACETED TREATMENT Period 1: Comprehensive care: (CC): 16.0% Non-CC: 6.0% OR = 2.35 (CI: 1.31,4.22) Period 2: CC: 33.47% Non-CC: 19.32% OR= 2.03 CI: 1.22, 3.40 Period 3: CC: 55.10% Non-CC: 23.29% OR= 3.23 (CI: 2.42,4.31). CONDUCTS CLINICAL TRIALS: Period 1: Yes - 15.9% No - 7.2% AOR= 2.08 (CI: 1.25,3.47) Period 2: Yes - 36% No - 21.9% OR = 1.66 (CI: 1.05,2.62) Period 3: Yes - 50.2% No - 37.6% OR = 1.78 (CI: 1.37,2.32)
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Turner 2001

Methods	Retrospective cohort
Participants	595 subjects. 100% Female.
Interventions	CONDUCTS CLINICAL TRIALS
Outcomes	PROPORTION OF PTS ON ARVs: 1) Acceptable ARVs - AOR 1.43 (CI: 1.01,2.04) p = .04 2) HAART - AOR = .90 (CI: .66,1.24). p. = .53
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Turner2000

Methods	Retrospective cohort
Participants	2648 HIV + post-partum women.
Interventions	MULTI-FACETED TREATMENT HIV-focused services CONDUCTS CLINICAL TRIALS
Outcomes	PROPORTION OF PATIENTS ON ANTIRETROVIRALS: 1) HIV-focused services AOR 1.67 (1.24-2.25) 2) Conducts Clinical Trials? Yes = 58.7% no use of ARVs No = 76.6% no use of ARVs Yes = 24.0% short-term use of ARVs No = 13.1% short-term use of ARVs Yes = 17.3% long-term use of ARVs No = 10.3% long-term use of ARVs. All comparisons = p value .001
Notes	Findings significant for HIV-focused treatment and clinical trials.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	D - Not used

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Acurcio 1998	No comparison group. Descriptive study.
Afessa 2000	Does not meet our inclusion criteria for type of intervention.
Aiken 1993	Not a study looking at organization of care. Looking at provider training.
Andrulis 1987	Study did not make a comparison between high volume and low volume settings.
Andrulis 1992	Does not meet our inclusion criteria for type of intervention.
Antonucci 2001	Does not meet our inclusion criteria for type of intervention.
Aseltyne 1995	Review article.
Bartlett 2001	Does not meet our inclusion criteria for type of intervention. Not a study.
Baskerville 1989	Does not meet our inclusion criteria for type of intervention. Not a study: interviews.
Benjamin 1993	Does not meet our inclusion criteria for type of intervention.
Berliner 1995	Does not meet our inclusion criteria for type of intervention or outcomes.
Bhagwanjee 1997	Does not meet our inclusion criteria for type of intervention.
Bonuck 1996	Does not meet our inclusion criteria for type of intervention or outcomes. Outcome is self-assessment of unmet need.
Boulton 1999	Does not meet our inclusion criteria for type of intervention. An article about parent diaries and interviews.
Bozzette 1998	Does not meet our criteria for study design.
Bramble	Does not meet our inclusion criteria for type of intervention.
Breitbart 1999	Pain management in HIV/AIDS patients.
Brosgart 1999	No patient data.
Butters 1995	Cannot clearly attribute outcomes to differences between multi-disciplinary types of care. Does not qualify under outreach because home visiting was not measured or reported in a quantitative way.
Carroll 1999	No outcomes of interest.
Celentano 2001	Does not meet our inclusion criteria for type of intervention. IDU vs non-IDU and receipt of HAART.
Conover 2002	Does not meet our inclusion criteria for type of intervention. Study only assesses individual ancillary services. Not multi-faceted treatment.
Conviser	Does not meet our inclusion criteria for study type or outcomes.
Conviser 1995	Does not meet our inclusion criteria for study type.
Conviser 2000	Does not meet our inclusion criteria for study type, intervention or outcomes.
Crystal 1999	Does not meet our inclusion criteria for type of intervention. Not fully described.

Study	Reason for exclusion
Cunningham 1998	Intervention is access to healthcare and not provider training/experience.
D'Herouville 2000	No outcomes of interest.
Davis 1991	No outcomes measures reported. No intervention. Not a controlled trial. Study focuses on migration in and out of state of Iowa.
Dodds 2000	Description of a program; whole life is a theory about a model of care. No comparison group or outcomes.
Emlet 1998	Does not meet our inclusion criteria for type of intervention. No comparison.
Evans 2000	Intervention is health locus of control/distress. Not part of our inclusion criteria for interventions.
Feldman 1999	Not a study.
Ferguson 1998	A review and synthesis of the literature. Not on HIV.
Finkelstein 1998	Not our study type. No outcomes of interest.
Flatley-Brennan 1998	Unsure of functional outcomes.
Fleishman 1994	Does not meet our inclusion criteria for type of intervention. Study looked at patient demographic variables and insurance.
Fleishman 1997	No outcomes of interest. Insurance.
Fournier 1997	No patient-centered outcomes.
Gardner 2002	Does not meet our inclusion criteria for type of intervention.
Geletko 1996	Interventions and outcomes not in our inclusion criteria.
Gerbert 2001	Outcome measures not relevant to our review.
Goodkin 1998	Intervention is a bereavement support group. Not one of our specificied inclusions for interventions.
Hansen 1998	Did not meet our inclusion criteria for type of intervention.
Heckman 1998	Study does not show travel time as a variable but it is described within the text.
Hellinger 2001	Examined hospitalizations based on state and race. Not our inclusion criteria.
HIV Res Network 2002	No interventions of interest.
Horsburgh 1997	Outcomes not relevant to our review.
Jirapaet 2000	Did not meet our inclusion criteria for type of intervention. Study looked at an empowerment program.
Kahn 2001a	Computer generated model and hypothetical outcomes

Study	Reason for exclusion
Kahn 2001b	Not a study. Letter to the Editor.
Katz 1995	Study on insurance. Not our intervention/topic.
Kelly 1989	Did not meet our inclusion criteria for type of intervention.
Kitahata 1996	Did not meet our inclusion criteria for type of intervention.
Kitahata 1998	Review paper.
Kitahata 2002	Review paper.
Knowlton 2001	Case management not fully described.
Kupek 1999	No intervention of interest.
Laine 2002	HIV-focused care only.
Landon 2002	Did not meet our inclusion criteria for type of intervention. A study of provider knowledge and practices.
London 1998	Outcomes not part of our inclusion criteria. Study surveyed caregivers.
Loue 1993	Not applicable to our review.
Lutgendorf 1998	Outcomes not part of our inclusion criteria (coping skills, distress reduction). Intervention is behavioural stress management.
Magnus 2001	Outcome cannot be directly linked to the multi-faceted intervention.
Magnus 2002	No description of case management.
Markson 1994a	Study is looking at medicaid and expenditures. Not our review topic.
Markson 1994b	A provider training study not an organization of care study.
Mauskopf 1994	Not enough description of AIDS specialty clinic.
McCormick 1994	Outcome measure not part of inclusion criteria (prediction by HCP vs case manager) of whether patient was suitable for transfer to long-term care facilities post-hospital.
Mor 1992	Insurance study.
Paauw 1996	Study participants are doctors not people with HIV/AIDs.
Pattullo 1996	There is not an intervention that meets our inclusion criteria.
Randall 1993	Insurance study.
Rotherman-Borus 2001	No outcomes of interest from our inclusion criteria
Sambamoorthi 1999	No direct outcomes except the cost of homecare (which is the intervention.)
Sambamoorthi 2001	Intervention does not meet inclusion criteria.

Study	Reason for exclusion
Samet 1995	Review is about the organization of care and the resultant additional services provided by the DEU model. No comparison group.
Sebit 2000	Intervention is phyto treatment vs conventional medical care. Does not fit inclusion criteria.
Segal 2001	Intervention does not meet inclusion criteria.
Shapiro 1999	Insurance study.
Sherer 2002	Case management not fully described.
Smith 2001	Study is looking at whether health insurance status affects rates of RX use. Not our intervention.
Solomon 1991	Insurance study.
Sowell 1992	Case management not fully described.
Stein 1991	Insurance study
Stoskopf 2001	Outcomes not part of our inclusion criteria.
Strathdee1998	A provider training study.
Turner 1994	No mention of volumes when looking at AIDS specialty clinic.
Turner 1995	Study reports on prenatal outcomes. Not our intervention.
Turner 1996a	Study reported on birth outcomes. Not one of our interventions.
Turner 1996b	HIV speciality clinic not described in enough detail.
Turner 2000	Outcomes not part of our inclusion criteria.
Valenti 2002	Review paper. Intervention is viral load testing/resistance testing.
Weber 2000	No intervention of interest for organization of care.
Wilson 1998	No description of how the two centres discussed in study (FFS/HMOs) were different. Only staff model described.

ADDITIONAL TABLES

Table 1. Quality Assessment Table

Study Author	Study Design	Age	Sex	Route of HIV transmi	Race	Case-Mix	Insurance Status	Final assessment
Aiken 99	Prospective Cohort	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Bennett 92	Retro Cohort	Yes	Yes	No	Yes	Yes	Yes	5/6
Bennett 95	Retro Cohort	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Bennett 96a	Retro Cohort	No	No	No	No	Yes	No	1/6
Bennett 96b	Retro Cohort	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Chan 02	Cohort	Yes	Yes	Yes	Yes	No	Yes	5/6
Curtis 97	Retro Cohort	No	Yes	Yes	Yes	Yes	No	4/6
Holzemer 92	Pros Rec Rev	No	Yes	No	No	No	No	1/6
Horner 95	Retro Cohort	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Katz 01	Pros Cohort	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Keitz 01	RCT	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Laine 98	Retro Cohort	Yes	Yes	Yes	No	Yes	Yes	5/6
Laine 99	Retro Cohort	Yes	Yes	Yes	No	Yes	Yes	5/6
Laraque 96	Retro Cohort	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Le 98	F/u Cohort	Yes	No	Yes	Yes	Yes	Yes	5/6
Markson 98	Retro Cohort	Yes	Yes	Yes	No	No	Yes	4/6
Messeri 02	Prosp Cohort	No	Yes	No	Yes	Yes	No	3/6
Newschaf98a	Retro Cohort	Yes	Yes	No	Yes	Yes	Yes	5/6
Newschaf98b	Retro Cohort	Yes	Yes	No	No	Yes	Yes	4/6

Table 1. Quality Assessment Table *(Continued)*

Newschaf99	Retro Cohort	Yes	Yes	No	Yes	Yes	Yes	5/6
Safran 95	CCT	?	Yes	No	Yes	Yes	No	3/6
Smith 96	Prosp Cohort	Yes	Yes	Yes	Yes	Yes	Yes	6/6
Stone 92	Retro Cohort	No	Yes	Yes	Yes	Yes	Yes	5/6
Turner 01	Retro Cohort	Yes	Yes	No	Yes	Yes	Yes	5/6
Turner 92	Retro Cohort	Yes	Yes	No	Yes	Yes	No	4/6
Turner 98	Retro Cohort	Yes	Yes	Yes	No	No	Yes	4/6
Turner 99	Retro Cohort	Yes	Yes	No	Yes	Yes	Yes	5/6
Turner 00	Retro Cohort	Yes	Yes	Yes	No	Yes	Yes	5/6

WHAT'S NEW

Date	Event	Description
17 June 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 3, 2003
Review first published: Issue 3, 2006

Date	Event	Description
24 May 2006	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

Richard Glazier: writing of review, editing, data abstraction, quality assessment, methods refinement
Julia Miranda Rackal: development of data abstraction and quality assessment tools, data abstraction, quality assessment, methods refinement
Anne-Marie Tynan: writing of review, editing, data abstraction, quality assessment,
Curtis Handford: major writing of review, editing, data abstraction, quality assessment,
Sheila Iacono: methods refinement, preliminary title screening

DECLARATIONS OF INTEREST

None.

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INDEX TERMS

Medical Subject Headings (MeSH)

Acquired Immunodeficiency Syndrome [mortality] [therapy]; Case Management [*organization & administration]; HIV Infections [mortality] [*therapy]; Patient Care Team [*organization & administration]; Therapy, Computer-Assisted [*organization & administration]

MeSH check words

Humans