Preventive Home Visits for Older People: A Systematic Review*

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RÉSUMÉ

L'augmentation du nombre de personnes âgées présentant des incapacités et ayant des maladies chroniques entraîne une hausse des besoins en services de santé à domicile. Le nombre d'études et de revues systématiques traitant des approches préventives pour cette clientèle a proliféré, générant un besoin de synthèse des connaissances. Nous avons mené une revue systématique de revues systématiques évaluant l'effet des programmes de visite préventive pour les personnes âgées. Des 5 973 citations identifiées dans plus de 30 bases de données de littérature grise et scientifique, 10 articles répondaient à tous les critères d'inclusion. Les revues systématiques étaient retenues si elles comprenaient des essais randomisés contrôlés comparant des interventions de soins à domicile offerts par un professionnel de la santé et ceux sans professionnels. Les interventions sont souvent des évaluations gériatriques globales et s'accompagnent de visites de suivi. Il ressort que les visites préventives multidimensionnelles à domicile ont le potentiel de diminuer la mortalité, en particulier chez les personnes âgées plus jeunes, et offrent aussi un potentiel d'amélioration de l'autonomie fonctionnelle. Toutefois, ces résultats doivent être interprétés avec prudence vue la diversité des interventions analysées.

ABSTRACT

The rising number of older people living with disabilities and chronic diseases has increased home care needs. Studies and reviews exploring preventive approaches have proliferated, creating a need for a synthesis of evidence. We conducted a systematic review of systematic reviews to evaluate the effectiveness of preventive home visiting approaches for older people. Of the 5,973 citations identified in over 30 scientific and grey literature databases, 10 papers met all inclusion criteria. Systematic reviews were considered if they included controlled trials comparing interventions with and without professional home care. We found that interventions often included comprehensive geriatric assessments and follow-up visits. Results indicate that multidimensional preventive home visiting programs might have the potential to reduce mortality, in particular for younger subjects, and show a potential to improve functional autonomy, but these findings should be interpreted with caution due to the diversity of the interventions analysed.

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The increase of life expectancy and decrease of disability rates since the 1980s (Manton, 2008) bear witness to society's progress in terms of health and welfare, as well as of living conditions. However, with these achievements come considerable challenges brought about by the arrival of baby boomers joining the "over 65" cohort. Although some health indicators show an improvement of the population's health status, the number of individuals living with disabilities or chronic diseases is rising. It is estimated that this segment of the population will double between 2009 and 2036 in Québec and, more generally, in Canada (Statistique Canada, 2010). These changes – paired with the ones modifying health and social services organizational models – make the development of home care services an important priority of health care policies, both at the local (Ministère de la Santé et des Services sociaux du Québec [MSSS], 2003) and international (Tarricone & Tsouros, 2008) levels.

Home care services are defined as an array of professional care and services that allow people to stay at or to return home soon after an episode of care (MSSS, 2003). This includes the participation of a large spectrum of professionals: physicians, nurses, social workers, physiotherapists, occupational therapists, and so on. Geriatrists, pharmacists, and other specialists can also collaborate to extend the range of services (MSSS, 2003). Preventive home visits (PHV) programs represent one category of home care services. For the purpose of this review, we have defined PHV as visits carried out by professionals in the older person's home, and aimed towards health promotion or preventive care. They include a "multidimensional medical, functional, psychosocial, and environmental evaluation of their problems and resources" (Bouman, Rossum, Nelemans, Kempen, & Knipschild, 2008). Hence, the purpose of these programs is to help individuals increase their control of their own health and so improve it, or to help them modify their behaviors in order to actively avoid illness, detect it early, or maintain function. (Markle-Reid et al., 2006)

Over the past decades, some countries (e.g., Australia, Denmark, and Japan) have invested in PHV programs in hopes of averting the health or functional decline of older people living at home and of decreasing service use. In contrast, others (e.g., the United Kingdom) have opted out of these programs because they found that they had little impact on patient outcomes (Bouman et al., 2008).

In Canada, Québec was one of the provinces that had invested the least in home care services. It has recently decided to increase budgets for this sector (MSSS, 2005). In light of the fact that the demand for this type of service increases faster than the intensity of services offered, it is imperative that decision-makers prioritize interventions based on the most reliable evidence available.

However, recent evidence seems to call into question the implementation of some home care services programs because of the lack of benefits found on health (Bouman et al., 2008) or service use (Huss, Stuck, Rubenstein, Egger, & Clough-Gorr, 2008) outcomes. Hospital at home, for example, "provides active treatment by health care professionals in the patient's home for a condition that would otherwise require acute hospital in-patient care." (Gervais & Pépin, 2002) The limited applicability of hospital-at-home programs, despite some significant reduction in institutionalization (Shepperd, Doll, Angus, et al., 2009; Shepperd, Doll, Broad, et al., 2009), has further cast doubt on the relevance of such programs. In view of these results and in order to better understand the impact of home care on patient, clinical, and service use outcomes, there is a need to systematically review existing evidence to determine the relevance of home care services rendered by professionals or identify the lack thereof.

Considering the fact that, in the health care sector alone (Bastian, Glasziou, & Chalmers, 2010), approximately 75 trials and 11 systematic reviews (SRs) are being published daily, we decided to carry out a systematic review of systematic reviews, an approach that is also called an overview. As stated in the *Cochrane Handbook for Systematic Reviews,* this type of review aims to summarize the plethora of evidence produced by SRs analysing the same intervention (Higgins, & Green, 2011), which was our case.

This systematic review of SRs was initiated in order to advise the Ministère de la Santé et des Services sociaux du Québec (Québec's department of Health and Welfare)

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on the effectiveness of home care services programs. Considering the breadth of this field of research, an advisory council was mandated to identify and prioritize home care services issues that needed scrutiny and would be tackled by the research team. This consensual decision-making process united researchers, practitioners, and decision-makers from the local and provincial levels (Gervais & Pépin, 2002). The effectiveness of PHV programs aimed at the older population was one of the prioritized questions.

Research Objective

Our objective was to conduct a systematic review of SRs that evaluated the effectiveness of professionally led PHV for people aged 65 and older living at home (as compared to their not receiving those visits) on functional autonomy, quality of life, service use, hospitalizations, and admissions to nursing homes or long-term care.

Methods

Search Strategy and Selection Criteria

Methods used for literature search, selection, inclusion, and analysis were determined in advance and were defined in a protocol. (This protocol, written in French, was not formatted for publication; however, procedures and forms are available from the corresponding author).

We searched more than 30 scientific and grey literature databases and websites (including PubMed, Embase, Cochrane Database of Systematic Reviews, Cumulative Index to Nursing and Allied Health Literature [CINAHL], PsycINFO, PsyArticles, AgeLine, Canadian Home Care Association, and The King's Fund Library Database. For complete list, see Table A in the Appendix) for January 1, 2000, through May 31, 2011 (authors AB, MER, and MM). Search terms were combined to identify SRs on home care for older people, in both English and French. The search terms we used aimed to identify reviews (e.g., quantitative review, systematic review, quantitativ*, and synthes*) that concerned home care (e.g., health visitor, home-based care, visiting nurses). (See Tables B and C in the Appendix for a list of keywords and PubMed search strategy) Bibliographies of retrieved articles were hand-searched for relevant references (AB, MER, MM, and AF). For several databases, existing filters were used to identify relevant articles. If none existed for a specific database, we adapted existing filters.

Selection of papers corresponding to inclusion and exclusion criteria followed a two-step process carried out by two independent reviewers. Articles were prescreened on the basis of their title, keywords, and abstract or table of contents (MM, AB, and MER). The full text of selected articles was then used to confirm eligibility based on inclusion criteria and relevance to the research question. Disagreements were resolved by discussion. If we could not reach a consensus, a third reviewer was consulted. When one review article was clearly the update of another review, only the most recent publication was kept. Information retrieved from included SRs about the studies they contained could be used to complete missing information in reviews still being evaluated for inclusion. Figure 1 shows the flowchart of the selection process.

Inclusion Criteria

We evaluated reviews according to the PICOS approach, which stands for Population, Intervention, Comparator, Outcome, Study design (Centre for Reviews and Dissemination, 2009).

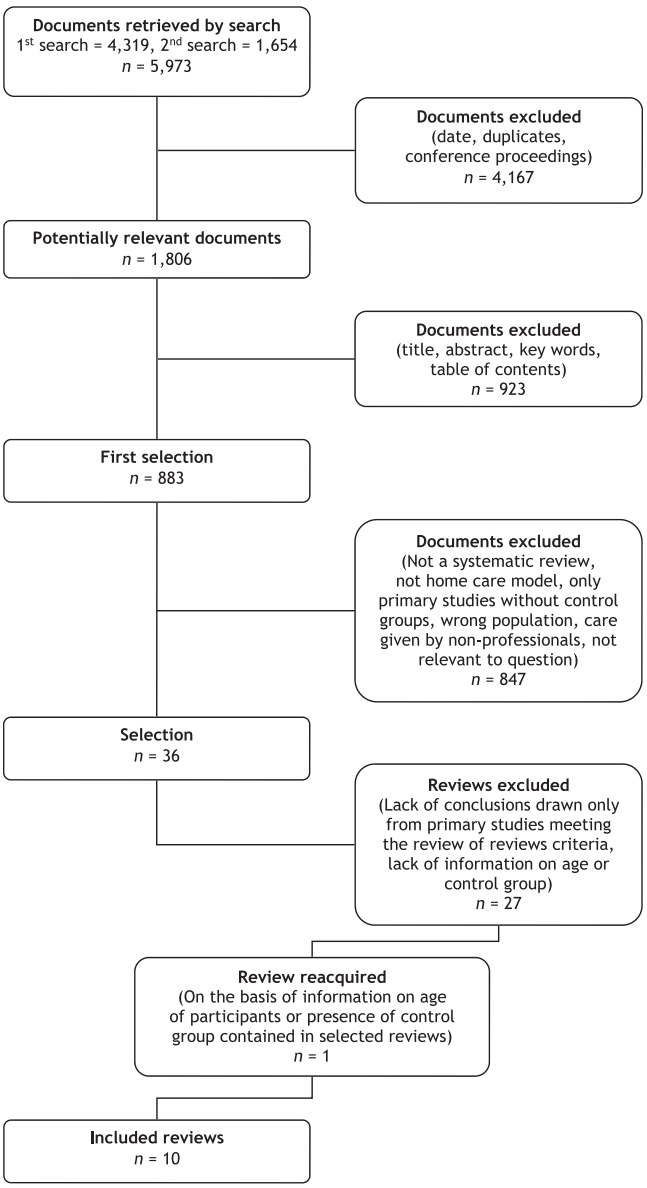

Figure 1: Flowchart of publication selection process

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Population

The population of our review was older people (aged 65 and older) needing home care and identified as "frail" or exhibiting one or more of the following conditions: loss of autonomy due to aging; neurodegenerative illness; stroke; chronic obstructive pulmonary disease; cardiovascular disease; diabetes; knee or hip replacement; hip fracture.

Interventions

Reviews had to evaluate PHV approaches or models carried out by health professionals or in which follow-ups were done under their supervision. They could also centre on transition or coordination programs between different providers (e.g., hospital, community) as long as they were carried out, at least partly, in the participants' home.

Comparators

Control groups could be those who received care as usually given, but comparisons needed to be made between interventions offering PHV and interventions without PHV. "Before and after" studies were not considered to have a control group. SRs including studies with and without control groups were included if the controlled studies were analysed separately from those without control groups.

Outcomes Considered

Our review considered all impacts on patients (including but not limited to mortality and function), on caregivers (health and well-being) and on professionals; as well as on use of services and organization of care.

Study Design

SRs or SRs of systematic reviews that included controlled primary studies were included. Reviews were considered systematic if four conditions were met: (1) the question was clearly stated and well-targeted; (2) the methodology was detailed and rigorous (e.g., the study selection and evaluation process were clearly described and both were carried out by at least two independent reviewers; inclusion and exclusion criteria were stated; extraction and analysis methods were detailed; results were presented); (3) reviewers searched at least two scientific databases; and (4) the quality of included studies was evaluated and considered.

Inclusion criteria were applied to the studies contained within the SRs. SRs that we ultimately included had to present analyses or conclusions that specifically targeted the studies that met all inclusion criteria.

Exclusion Criteria

SRs that did not specifically analyse PHV were excluded, as were SRs in which age of participants could not be assessed or in which the control group intervention was insufficiently described. PHV led by non-professionals (i.e., volunteers, family or informal caregivers) were also excluded. We did this to ensure a higher level of comparability between interventions.

Data Collection

One member of the research team (AB, AF, MER, and MM) completed a data extraction form, which was revised by a second reviewer. Disagreements were settled through discussion. If consensus could not be reached, a third team member was consulted. Data extracted included (a) objectives, (b) methodology, (c) inclusion and exclusion criteria, (d) results, and (e) conclusions. We kept only results and conclusions relating to the included primary studies for analysis.

Quality Evaluation

The quality of eligible reviews was assessed by two independent reviewers using the NICE (National Institute for Health and Clinical Excellence [NICE], 2006) checklist as translated and adapted into French by Jacob (2008). We assessed quality in six key areas: (a) appropriate and clearly focused question (in keeping with the PICOS approach); (b) method description and relevancy; (c) quality of literature search method and execution; (d) method and inclusion of quality evaluation for included studies; (e) comparability of included studies; and (f) link between the SR's objectives and the objectives of our systematic review of SRs. We resolved disagreements by discussion. If consensus could not be reached, a third reviewer was consulted. Each SR was given a score based on the included study designs (1 = SRs and meta-analyses of randomized controlled trials [RCTs]; 2 = SRs including both RCTs and other types of trials), and on the risk of bias ("++", "+", "–"). A ++ rating meant that all or most criteria were fulfilled, and that the conclusions were very unlikely to be altered by sources of bias. A – rating meant that few or no checklist criteria were fulfilled; therefore, conclusions were likely or very likely to be altered by sources of bias. When not all primary studies included by the SR were eligible for inclusion in this systematic review of systematic reviews, the rating was contingent on the study designs of included studies. No SR was excluded on the basis of a low-quality rating. However, during analysis, the quality rating influenced the weight given to the conclusions put forth by the SR authors.

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Data Analysis

Data extracted from SRs was transferred into summary tables outlining the content of included SRs (number of studies, objective, population, description of interventions), as well as the results, conclusions, and quality ranking of studies by authors AB, MER, MM, and AF. When possible, we grouped reviews by intervention type. Once information was combined in the summary tables, methodological quality of SRs and risk of publication bias were taken into consideration, as was the quality evaluation done by SR authors of included primary studies. Results were reviewed and summarized in a statement of evidence (narrative form) by all authors.

Results

Of the 5,973 documents we initially identified, 1,806 potentially relevant titles were screened for retrieval (Figure 1). After screening, 883 were retrieved and the full text of 36 potentially relevant reviews was examined in detail. After scrutiny, nine SRs remained. Information contained in these nine reviews (population age and control groups of the reviewed primary studies) was compared to the reviews that had been rejected because of lack of information on one or both of these topics. After this verification, an additional review was kept, which meant that 10 SRs were included in this review (Bouman et al., 2008; Elkan et al., 2000; Elkan et al., 2001; Frich, 2003; Huss et al., 2008; Liebel, Friedman, Watson, & Powers, 2009; Markle-Reid, Browne, Weir, Gafni, Roberts, & Henderson, 2006; McWilliam, Diehl-Jones, Jutai, & Tadrissi, 2000; Stuck, Egger, Hammer, Minder, & Beck, 2002; van Haastregt, Diederiks, van Rossum, de Witte, & Crebolder, 2000), of which four conducted a meta-analysis (Elkan et al., 2000; Elkan et al., 2001; Huss et al., 2008; Stuck et al., 2002).

Description of Included Reviews

Table 1 details characteristics of included reviews. SRs included trials from North America, Europe, Asia, and Australia. The 10 reviews analysed between six and 21 documents. Overall, included SRs reported on 49 primary studies. Among these, 45 were RCTs, and 26 appear in several SRs. The remaining studies were two quasi-experimental studies: one RCT with a crossover design, and one matched control trial. Two SRs (Elkan et al., 2000; Elkan et al., 2001) were led by Elkan et al. and defined a very similar group of trials. Two authors contributed to two different SRs: Stuck et al. (2002) and Huss et al. (2008); the one published by Huss et al. included nine new primary studies.

The studies examined interventions offering PHV for the general older population or for older people said to be frail, vulnerable, in poor health, or at risk. Mean age was most often over 75 years. Results compared PHV interventions to standard care, or to other interventions without PHV. All but one SR centred on home visiting interventions. McWilliam et al. (2000) included different intervention sites; however, for the purposes of our systematic review, we kept only the primary studies reporting on PHV.

Interventions were predominantly led by nurses, who made the home visits, but sometimes other professionals such as general practitioners or geriatricians collaborated. More than half included comprehensive geriatric assessments (CGAs), or similar types of programs, and included follow-up visits. Some included health education, information, or advice; problem identification and management; or referrals. Programs could last from a few months to several years. Reported frequency varied from one to 12 or more visits annually. Mean frequency could not be calculated, but it seems realistic that two or three visits were carried out every year. The majority of SRs excluded discharge programs as well as studies limited to one specific condition or problem (e.g., diabetes). Most SRs also excluded or limited the importance of studies dealing with case management, service coordination, or chronic disease management. Primary studies often excluded participants with cognitive impairments, so the results might not be appropriate for that population.

Methodological Quality of Included Reviews

The quality of SRs varied but the majority was judged to be of good to excellent quality (see Table 2 for details of quality analysis). Three reviews scored high (1++) (Bouman et al., 2008; Stuck et al., 2002; van Haastregt et al., 2000), while two were of lesser quality (1–) (Frich, 2003; McWilliam et al. 2000). Five SRs scoring 1+ (Huss et al., 2008; Markle-Reid et al. 2006) or 2+ (Elkan et al., 2000; Elkan et al., 2001; Liebel et al., 2009) were considered of good quality. The included SRs and the primary trials they reported on had methodological limitations. Interventions were complex; they often contained different components and took place in various environments. Comparators, targeted populations, and outcome measures were also diverse. Interventions were not always described in detail, and some authors indicated that studies were sometimes imperfectly explained. This weakness is also apparent in the lack of information on compliance with the intervention. SR authors reported on the quality of included primary studies through a variety of methods, and primary study quality was evaluated from low to high. These evaluations contributed to our analysis.

Key Findings of Included Reviews

Four good-quality SRs concluded that PHV programs may reduce mortality for the general (Elkan et al., 2000; Elkan et al., 2001; Huss et al., 2008; Stuck et al., 2002) or

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Table 1: Characteristics of included reviews

Systematic Review	Stated Aims	*n* Studies in SR of SRs / *n* Studies in Review	Design of Studies Included in SR of SRs	*n* Participants in SR of SRs	Inclusion Criteria (Participants)	Intervention[a]	Conclusions[b]	Quality of Review[c]
1. Elkan et al., 2000	To assess the effectiveness and cost-effectiveness of home visiting; and, the impact of home visiting on a range of client groups, including both the young and the elderly To discuss the relative merits of professional versus non-professional home visiting; and, the relative merits of universal versus targeted home visiting strategies Review and meta-analysis	15/17[d]	12 RCTs, 1 RCT with cross-over design, 2 non-RCT	5,714 (for 14/15, 1 study [NS])	Elderly people and/or their carers	Home visiting	Home visiting programs to elderly people are effective in significantly reducing mortality (Elderly people in general, $n = 3,329$: pooled OR = 0.75, 95% CI, 0.63 to 0.89 [χ^2 test for heterogeneity; $p = .22$] and Frail Elderly: $n = 1,457$, pooled OR = 0.75, 95% CI, 0.57 to 0.98 [χ^2 test for heterogeneity; $p = .88$]) but have no significant effect on health or functional status. No significant effect on admissions to hospital. Home visiting to "at-risk" elderly people was successful in reducing admissions to long-term institutional ($n = 796$, Pooled OR = 0.58, 95% CI, 0.37 to 0.92 [χ^2 test for heterogeneity; $p = .24$]), which was not the case for the general elderly population.	2+
2. McWilliam et al., 2000	To capture an evidence-based overview of how health care delivery approaches might promote seniors' independence	9/65	RCTs	NS	Seniors (≥ 55 years)	Geriatric assessment and Management (GEM)	In-home geriatric health assessments and health care management approaches have significant health benefits for frail older people, and can promote independence.	1–
3. van Haastregt et al., 2000	To assess the effects of preventive home visits on physical function, psychosocial function, falls, admissions to institutions, and mortality in elderly people living in the community	15/15	RCTs	8,932	Elderly people living in the community (≥ 65 years)	Preventive home visits	No clear evidence exists for the effectiveness of preventive home visits to elderly people living in the community. Observed effects of interventions are considered to be fairly modest and inconsistent, especially as preventive home visits are costly and time-consuming.	1++

continued

Table 1: Continued

Systematic Review	Stated Aims	*n* Studies in SR of SRs / *n* Studies in Review	Design of Studies Included in SR of SRs	*n* Participants in SR of SRs	Inclusion Criteria (Participants)	Intervention[a]	Conclusions[b]	Quality of Review[c]
4. Elkan et al., 2001	To evaluate the effectiveness of home visiting programs that offer health promotion and preventive care to older people Review and meta-analysis	15/15	12 RCTs, 1 RCT with cross-over design, 2 non-RCT	5,685	Older people living at home, including frail older people at risk of adverse outcomes	Home visiting programs, health promotion, and preventive care	Home visiting is effective in reducing mortality for the general elderly population (*n* = 2,297, OR = 0.76, 95% CI, 0.64 to 0.89 [Q test for homogeneity; *p* = .44]), and frail older people (*n* = 1,266, OR = 0.72, 95% CI, 0.54 to 0.97 [Q test for homogeneity; *p* = .83]) who are at risk of adverse outcomes. These programs were also effective in reducing admission to long-term institutional care for the general elderly population (*n* = 2,143, OR = 0.65, 0.46 to 0.91, 95% CI, 0.54 to 0.97 [Q test for homogeneity; *p* = .36]) and the frail elderly (*n* = 796, OR = 0.55, 95% CI 0.35 to 0.88 [Q test for homogeneity; *p* = .27]). No significant reduction in admissions to hospital. Findings from the meta-regression suggest that the exclusion of people who are not at increased risk or who are "younger" elderly people from such interventions is not justified. More work is required to test these findings.	2+

continued

Table 1: Continued

Systematic Review	Stated Aims	*n* Studies in SR of SRs / *n* Studies in Review	Design of Studies Included in SR of SRs	*n* Participants in SR of SRs	Inclusion Criteria (Participants)	Intervention[a]	Conclusions[b]	Quality of Review[c]
5. Stuck et al., 2002	To evaluate the effect of preventive home visits on functional status, nursing home admission, and mortality Review and meta-analysis	16/17	RCTs	12,924	Older people living in the community (mean age > 70 years)	Preventive home visits	A meta-analysis of 13 RCTs showed a modest and non-significant reduction of the risk of nursing home admission. In another meta-analysis, in which trials were stratified by tertiles of the number of follow-up visits, the estimated reduction in the risk of admission was significantly lower (34%) for trials in the upper tertile, i.e., 9 visits or more annually (*n* = 2,319: RR = 0.66; 95% CI, 0.48–0.92; no reported test of heterogeneity for this tertile).	1++
6. Frich, 2003	To investigate specialized long-term nursing interventions provided during home visits to older people or patients with a chronic condition	6/16	RCTs	3,155	Older people in general with no described chronic disease; patients with diabetes or rheumatoid arthritis were kept for investigation.	Long-term nursing interventions	Best outcome in older populations is reached if target populations are "the younger-old", or if intervention is tailored to elders who have stated health problems.	1–

continued

Table 1: Continued

Systematic Review	Stated Aims	*n* Studies in SR of SRs / *n* Studies in Review	Design of Studies Included in SR of SRs	*n* Participants in SR of SRs	Inclusion Criteria (Participants)	Intervention[a]	Conclusions[b]	Quality of Review[c]
7. Markle-Reid et al., 2006	To review the effectiveness and efficiency of home-based-nursing health promotion	12/12	RCTs	4,646	Older persons living in the community (not residing in a hospital, a nursing home, or residential care) (≥ 65 years).	Home-based nursing health	A diversity of home visiting interventions carried out by nurses can have favorable effects on many outcomes for older people. There is a lack of consensus on the type of target population that would most benefit from these programs: older persons at high risk or at low risk of functional decline. Despite the positive findings, conflicting results and limitations in the design of the interventions and measures of effectiveness and efficiency limit the usefulness of the study findings for policy decisions. Evidence favorable to preventive home visits have not yet been proven beyond doubt.	1+
8. Bouman et al., 2008	To assess the effectiveness of intensive home visiting programs targeting older people with poor health or otherwise with functional impairments	7/8	RCTs	2,154 [for 6/7, 1 study NS])	Older people with a poor health status based on either subjective (e.g., self-rated health) or more "objective" measures (e.g., [self-reported] functional impairments or dependencies in IADL/ADL)	Intensive home visiting programs	Intensive home visiting programs (≤ 4 visits/yr. and for ≤ 12 months) have no effect on mortality, health, or use of services for older people with a poor health status.	1++

continued

Table 1: Continued

Systematic Review	Stated Aims	*n* Studies in SR of SRs / *n* Studies in Review	Design of Studies Included in SR of SRs	*n* Participants in SR of SRs	Inclusion Criteria (Participants)	Intervention[a]	Conclusions[b]	Quality of Review[c]
9. Huss et al., 2008	To systematically review RCTs examining the effect of home visit programs on mortality, nursing home admissions, and functional status decline Review and meta-analysis	21/21	RCTs	14,603	Older adults (mean age ≤70 years) living in the community	Home visiting programs	Preventive home visit programs focusing on younger study populations (mean age 77 or less, *n* = 3,484) produced significant beneficial effects on mortality (OR = 0.74, 95% CI, 0.58–0.94; I^2 test for heterogeneity = 12.6%, $p < .06$]), and programs prevented or significantly delayed functional status decline if they included a clinical examination as part of the initial assessment (*n* = 3,123, OR = 0.64, 95% CI, 0.48–0.87; [I^2 test for heterogeneity = 31.0%; $p = .02$]). The hypothesis that they could diminish nursing home admissions wasn't confirmed. No effect on any outcome was seen in programs with more intensive interventions. The use of multidimensional geriatric assessment that included a clinical examination and regular follow-up was an important determinant of program effects on functional status outcomes.	1+
10. Liebel et al., 2009	To present a critical review of nurse in-home visiting interventions that includes only patients with existing disability (i.e., frail elderly)	9/10	8 RCTs, 1 matched control trial	5,338	Older adults with existing disability or a subpopulation of older adults with disability (≥ 65 years)	Nurse in-home visiting	Nurse home visiting programs have the potential to bring positive outcomes on functional autonomy (disability).	2+

[a] As defined by the review authors.
[b] These conclusions pertain only to studies included in this systematic review of systematic reviews.
[c] See Table 2 for detail of analysis.
[d] Limited to studies included in section on elderly people in the review.
NA = not applicable; NS = not specified; RCT = randomized controlled trial; QoL = quality of life; IADL = instrumental activities of daily living; ADL = activities of daily living

Table 2: Quality rating for included reviews[a]

Systematic Review	The review addresses an appropriate and clearly focused question (PICOS).	The methodology is adequately described and is appropriate.	The literature search is sufficiently rigorous to identify all the relevant studies.	The study quality of included studies is appropriately assessed and reported.	Studies are sufficiently similar to make valid comparisons.	Global quality evaluation for review[b]	Link between SRs' conclusion and objective of our SR of SRs
1. Elkan et al., 2000	A	C	A	B	A	2+	Neutral
2. McWilliam et al., 2000	B	C	B	C	C	1–	Neutral
3. van Haastregt et al., 2000	A	A	B	A	A	1++	Excellent
4. Elkan et al., 2001	A	C	A	A	A	2+	Excellent
5. Stuck et al., 2002	A	A	A	A	A	1++	Excellent
6. Frich, 2003	A	C	C	C	A	1–	Good
7. Markle-Reid et al., 2006	A	B	A	A	B	1+	Excellent
8. Bouman et al., 2008	A	A	A	A	B	1++	Excellent
9. Huss et al., 2008	A	A	C	A	A	1+	Excellent
10. Liebel et al., 2009	A	B	B	A	B	2+	Good

Quality rating: A = entirely satisfied; B = appropriately satisfied; C = inappropriately satisfied; D = inadequately reported; E = not reported; F = does not apply.
PICOS = Population, Intervention, Comparator, Outcome, Study design.

[a] The questions and categories are based on the National Institute for Health and Clinical Excellence (NICE) Quality appraisal checklist (NICE, 2006), as they were translated and adapted into French by the Institut national de santé publique (Jacob, 2008).

[b] Quality rating based on design of studies included in this systematic review of SRs as well as on methodological quality of each SR. [1] = Review of randomized controlled trials (RCTs) or systematic reviews; [2] = Review of controlled clinical trials (RCTs or CCTs) and/or quasi-experimental design studies; [++] = All or most of the checklist criteria have been fulfilled; where they have not been fulfilled the conclusions are very unlikely to alter; [+] = Some of the checklist criteria have been fulfilled; where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter; [–] = Few or no checklist criteria have been fulfilled, and the conclusions are likely or very likely to alter. (Jacob, 2008)

frail (Elkan et al., 2000; Elkan et al., 2001) older population, particularly in the younger age group (Huss et al., 2008; Stuck et al., 2002). The meta-analyses conducted by Stuck (2002) and Huss (2008) found that studies in which mean age of participants was in the lower tertile of their respective reviews (between 72 and 77.5 years) showed a statistically significant effect of preventive home visits on mortality. Two other high-quality SRs (Bouman et al., 2008; van Haastregt et al., 2000) found either fairly modest or no effects on this outcome for the general (van Haastregt et al., 2000) or the frail (Bouman et al., 2008) older population.

According to some reviews, functional autonomy has the potential to benefit from PHV programs (Huss et al., 2008; Liebel et al., 2009; Stuck et al., 2002). Only two reviews analysed the results for this outcome with greater scrutiny. They found that the benefit seems to be particularly true when programs combine CGAs with a clinical examination and follow-ups (Huss et al., 2008; Stuck et al., 2002). One author (Stuck et al., 2002) concluded that CGAs are the most important element determining the effects on functional autonomy. However, the authors of three high-quality SRs stressed that results for this outcome are either contradictory (Markle-Reid et al. 2006; van Haastregt et al., 2000) or not effective for frail older people (Bouman et al., 2008), and two other good-quality reviews saw no difference for this outcome (Elkan et al., 2000; Elkan et al., 2001).

Generally, SRs have not proven that PHV prevents or delays nursing home admissions (Bouman et al., 2008; Huss et al., 2008; Stuck et al., 2002), except for two SRs published by Elkan et al. in 2000 and 2001. The first SR found a positive impact for older people at risk (Elkan et al., 2000), and the second showed a reduction of admissions to long-term institutional care for all types of participants (Elkan et al., 2001). Effects on hospital admissions were often limited if not altogether absent (Elkan et al., 2000; Elkan et al., 2001).

Stuck et al. published a review in 2002 stating that a higher number of follow-up visits was associated with a greater reduction in nursing home admissions. Six years later, Bouman et al. (2008) and Huss et al. (2008) both showed that a greater intensity of interventions was not necessarily linked to better results.

The SRs with the lowest quality rating (1–) reported the most favorable patient and service use outcomes (Frich, 2003; McWilliam et al. 2000). Liebel et al. (2009) (2+) published a review that presents the most heterogeneous interventions. Results must therefore be interpreted with caution. Higher-quality narrative SRs (Bouman et al., 2008; Markle-Reid et al. 2006; van Haastregt et al., 2000) often concluded that there is a lack of evidence on the efficiency of PHV programs, even the more intensive ones aimed at frail older people (Bouman et al., 2008). In fact, Markle-Reid et al. (2006) found that although most interventions led by nurses can have favourable effects on multiple outcomes for older people, conflicting results together with limitations in design and measures used lessen the usefulness of these findings and warrant caution. Notwithstanding the diversity in content and intensity of interventions, several authors (Huss et al., 2008; Liebel et al., 2009; Stuck et al., 2002) underlined the possibility that targeting disability risk factors could foster more positive outcomes.

Discussion

We conducted an extensive and systematic review of the 2000–2011 literature that allowed us to identify 10 SRs on PHV programs. This finding suggests that there exists a high level of interest for evidence on the effectiveness of these programs for the older population. However, despite this interest, the evidence is not sufficient to affirm that these programs should or should not be encouraged. As we mentioned, the United Kingdom interrupted its PHV program for the older population in 2004, yet Japan, Denmark, and Australia continue to offer it (Bouman et al., 2008). Anticipated effects of PHV programs on nursing home admissions and function should be re-examined in light of proven risk factors for these specific outcomes (e.g., co-morbidity, cognitive impairment, etc. [Stuck et al., 1999]). One may ask if the programs evaluated consider these risk factors in an optimal manner and if having professionals carry out home visits is the most efficient way to render this service.

Two questions remain: What are the essential components to generate positive effects? Which segment of the population could most likely benefit? Several paths of action were suggested by the authors of the SRs included in our systematic review. Few authors of the included SRs discussed which of the PHV components could have a positive impact on the results. Only Stuck et al. (2002) and Huss et al. (2008) reported that interventions that included CGAs and follow-ups (Stuck et al., 2002) and a clinical examination (Huss et al., 2008) were more effective in improving functional autonomy. Liebel et al. (2009) was the only author who concluded that programs with the most positive impact on function relied on experienced nursing staff, included CGAs, had multiple components, acted on several loss-of-function risk factors, and were interdisciplinary. Conversely, the absence of these elements was identified as limiting positive effects. It seems that interventions in which nurses played a key role had a greater positive impact than those that centred on a specific condition and that offered information or moral support. Further research on the impact of specific intervention components on hospital admissions

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could allow a finer analysis of these components on this outcome.

This systematic review of SRs has several limitations. In view of the nature of the study design, there could be a possibility of primary source data overlapping between different SRs. However, we paid careful attention during analysis to avert this potential redundancy. Although other languages were not considered, our searches of English and French databases, including grey literature, were extensive. We aimed at locating reviews on "home care". Therefore, some SRs reporting on interventions containing PHV programs that were not central to these SRs' objectives might have been overlooked, although this possibility seems remote. The adopted review approach prohibited retrieval of the original results for primary studies to compensate for information lacking in the SRs. Instead, we had to rely exclusively on the SRs' discussion sections.

Trends were revealed despite noticeable heterogeneity between interventions. The diversities, however, limit our capacity to generalize our findings to every segment of the older population or to consider the evidence convincingly positive. Finally, although aging is a worldwide phenomenon, our findings are based on reviews and studies carried out in developed countries. It is therefore possible that effects of these types of programs could be more important in countries with weaker health systems.

Conclusions

Considering the impact of aging on health care systems, and what could logically be expected from prevention programs, the evidence gathered in this systematic review of systematic reviews is relatively scarce and often inconclusive. In that sense, we generally agree with other authors that multidimensional preventive home visiting programs present conflicting results on most outcomes. We nevertheless found that this type of program might reduce mortality, in particular for the participants in the youngest tertile. In addition, it seems that functional autonomy could be enhanced if PHV interventions were to combine CGAs with clinical examination and follow-ups, but further studies should be undertaken to explore this possibility. Despite some promising results regarding mortality outcomes, caution must be applied when implementing this type of program. There is no evidence that preventive home visiting programs have a positive effect on service use, and greater intensity of intervention was not always linked to better results on nursing home admission. Furthermore, our results corroborate other authors' conclusions regarding the need for a coherent definition of PHV programs and of their components in order to achieve a better understanding of their impact.

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Appendix

Table A: Databases and websites consulted

Database or Portal	Research Site
PubMed (including Medline)	Pubmed (hosted by the National Institute of Health; http://www.ncbi.nlm.nih.gov/pubmed)
Embase	Embase (Embase.com)
Cumulative Index to Nursing and Allied Health Literature (CINAHL)	EBSCO Host
PsycINFO and PsyArticles	APA PsychNET
Psychology and Behavioral Sciences Collection	EBSCO Host
AgeLine	CSA (from ProQuest) in 2010; EBSCO Host in 2011
Sociological Abstracts	CSA (from ProQuest)
Social Services Abstracts	CSA (from ProQuest)
Cochrane Database of Systematic Reviews	The Cochrane Library (by Wiley; http://onlinelibrary.wiley.com/cochranelibrary/search/
Database of Abstracts of Reviews of Effectiveness (DARE)	The Cochrane Library (by Wiley; http://onlinelibrary.wiley.com/cochranelibrary/search/
Health Technology Assessment Database (HTA)	The Cochrane Library (by Wiley; http://onlinelibrary.wiley.com/cochranelibrary/search/
NHS Economic Evaluation Database	The Cochrane Library (by Wiley; http://onlinelibrary.wiley.com/cochranelibrary/search/
The Campbell Library	Campbell Collaboration Library of Systematic Reviews; http://www.campbellcollaboration.org/library.ph
Database of promoting health effectiveness reviews (DoPHER)	DoPHER (hosted by EPPI-Centre); http://eppi.ioe.ac.uk/webdatabases4/Intro.aspx?ID=9
ProQuest – Dissertations and thesis	ProQuest
Canadian Health Technologies Assessment	Canadian Agency for Drugs and Technologies in Health (CADTH)
Evidence Library de EPPI-Centre	The Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre); http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=61&language=en-US
NHS Evidence – Systematic review	Provided by the National Institute for Health and Clinical Excellence (NICE); http://www.evidence.nhs.uk/default.aspx
NHS Evidence –Guidelines	Provided by the National Institute for Health and Clinical Excellence (NICE); http://www.evidence.nhs.uk/default.aspx
CORDIS Library	Community Research and Development Information Service (CORDIS); http://cordis.europa.eu/library/fr/home.html
Library & Information Networks for Knowledge Database of the World Health Organization's library database (WHOLIS)	World Health Organization; http://dosei.who.int/uhtbin/cgisirsi/J4zb27VrdA/201590009/38/1/X/BLASTOFF
System for Information on Grey Literature in Europe (OpenSIGLE)	Managed by the Institut de l'Information Scientifique et Technique (INIST); http://opensigle.inist.fr/
The King's Fund Library Database	The King's Fund; http://kingsfund.koha-ptfs.eu/
National Guidelines Clearinghouse (NGC)	Agency for Healthcare Research and Quality (AHRQ); http://www.guideline.gov/index.aspx\
Guidelines of the Scottish Intercollegiate Guidelines Network (SIGN)	SIGN; http://www.sign.ac.uk/guidelines/index.html
ICIST catalog (ICIST-CNRC's collection)	National Research Council Canada/Conseil national de recherches Canada; http://cat.cisti.nrc.ca/search)
Santécom	Institut national de santé publique du Québec (INSPQ) [National Institute of Public Health, Québec]; http://www.santecom.qc.ca
Health Canada's online departmental library	Health Canada; http://recherche-search.gc.ca/rGs/s_r?st=s&langs=eng&st1rt=0&num=10&cdn=health)
Agence de la santé publique du Canada [Public Health Agency of Canada]	Agence de la santé publique du Canada; http://recherche-search.gc.ca/rGs/s_r?as_q=&st1rt=0&st=a&num=10&langs=eng&cdn=canada&hq=
Réseau informatisé des bibliothèques gouvernementales du Québec - CUBIQ [Electronic network of governmental libraries of Québec – CUBIQ]	Réseau informatisé des bibliothèques gouvernementales du Québec (CUBIQ); http://www.cubiq.ribg.gouv.qc.ca/zonesl/
Base de données du Réseau sur le vieillissement et les changements démographiques (RVCD) [Ageing and Demographic changes Network]	RVCD – Ministère de la Santé et des Services sociaux du Québec [Department of Health and Social Services, Québec]; http://wpp01.msss.gouv.qc.ca/appl/k30/K30RechAv.asp

continued

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Table A: Continued

Database or Portal	Research Site
KUUC Database	Knowledge Utilization/Utilisation des connaissances (KUUC) – Chaire sur le transfert de connaissances et l'innovation [Chair of Knowledge Utilization and Innovation, Université Laval];
Documentation Portal of Santé Montérégie	Portail Santé Montérégie; http://www.santemonteregie.qc.ca/portail/documentation/liste/index.fr.html
Home and Community Care Digest	Longwoods; www.longwoods.com
Canadian Home Care Association/Association canadienne de soins et services à domicile	Canadian Home Care Association/Association canadienne de soins et services à domicile; http://www.cdnhomecare.ca/
The New York Academy of Medicine (NYAM) Library's Online Catalog – Section "Grey Literature Report"	The New York Academy of Medicine (NYAM); http://nyam.waldo.kohalibrary.com/
USA government for Science – Government Science Portal	www.science.gov

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Table B: Example of keyword lists used for literature search
For several databases, existing filters were used to identify systematic reviews. If none existed for a specific database, existing filters were adapted

	Home Care	Systematic Review Filter
PubMed (including Medline)	Home care services Home care agencies House calls	Health Evidence Bulletins
Embase (Embase.com)	Home care Health visitor	BMJ Evidence Center
CINHAL (in EBSCO)	Home health care+ Home health agencies Home health care information systems	SIGN
PsycINFO (in PsycNET)	Home care Home care personnel Home visiting programs	Health Evidence Bulletins
AgeLine (in CSA)	Home care Home care agencies Home health care Home care workers Visiting nurses	Health Evidence Bulletins – PsycINFO filter adapted for CSA query
Free text	Home care* Homecare* Home-care* Home health care or home healthcare or home-healthcare Home health agencies or home health agency House calls Domiciliary care Health visitor* Visiting nurse* Nurse visit* Home rehab* Hospital at home Home nurs* or home-nurs* Telehealth or tele-health Telenursing Telecare or tele-care Telehomecare or tele-homecare or telehome-care Home telemedicine or home tele-medicine Home telemonitoring or home tele-monitoring Medical home Mobile health units Home based care Home-based care (home based or home-based or in-home or domicile or home visit*) and (rehab* or therap* or treatment or testing) or health personnel or health professional* or health care professional* or healthcare professional* or physical* or physician* or psycholog* or psychiatr* or social worker* or social work or pharmacy or pharmaci* or nutritionist* or speech-language pathologist or patient care team* or case management or case manager* or liaison nurse* or collaborative practice* or collaborative care or nurse-led follow-up or interdisciplinary care or interdisciplinary team*or interdisciplinary care team* or team care or multi agency working or inter agency working or multi professional working or interprofessional working or multidisciplinary team* or multidisciplinary care team* or interdisciplinary treatment approach* or telemedicine or tele-medicine or telecommunication or tele-communication or telemonitoring or tele-monitoring)	
Limits	Date: 1995–2009 Language: English or French Age group: 18 years and over	

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Table C: PubMed search strategy

1.	home care services[Mesh]
2.	home care agencies[Mesh]
3.	house calls[Mesh]
4.	"home care"[tiab] OR "home cares"[tiab] OR "homecare"[tiab] OR "home-care"[tiab] OR "home-cares"[tiab] OR "domiciliary care"[tiab] OR "home health care"[tiab] OR "home healthcare"[tiab] OR "home-healthcare"[tiab] OR "home health agencies"[tiab] OR "home health agency"[tiab] OR "health visitor"[tiab] OR "health visitors"[tiab] OR "house calls"[tiab] OR "visiting nurses"[tiab] OR "visiting nurse"[tiab] OR "nurse visit"[tiab] OR "nurse visits"[tiab] OR "telehealth"[tiab] OR tele-health[tiab] OR "telenursing"[tiab] OR telecare[tiab] OR tele-care[tiab] OR telehomecare[tiab] OR tele-homecare[tiab] OR telehome-care[tiab] OR "home telemedicine"[tiab] OR "home tele-medicine"[tiab] OR "home telemonitoring"[tiab] OR "home tele-monitoring"[tiab] OR "medical home"[tiab] OR "home nursing"[tiab] OR "home nurse"[tiab] OR "home-nurses"[tiab] OR "home-nursing"[tiab] OR "home based care"[tiab] OR "home-based care"[tiab] OR "mobile health units"[tiab] or "mobile health unit"[tiab] OR "home rehabilitation"[tiab] OR "hospital at home"[tiab]
5.	"home based"[tiab] OR "home-based"[tiab] OR "in-home"[tiab] OR "home visit"[tiab] OR "home visits"[tiab] OR "home visiting"[tiab]
6.	rehab*[tiab] OR therap*[tiab] OR treatment[tiab] OR testing[tiab] OR "health care provider"[tiab] OR "health care providers"[tiab] OR "health personnel"[Mesh] OR "health care personnel"[tiab] OR "health professional"[tiab] OR "health professionals"[tiab] OR "health care professional"[tiab] OR "health care professionals"[tiab]OR "healthcare professional"[tiab] OR "healthcare professionals"[tiab] OR physician*[tiab] OR psycholog*[tiab] OR psychiatr*[tiab] OR "social worker"[tiab] OR "social workers"[tiab] OR "social work"[tiab] OR pharmacy[tiab] OR pharmaci*[tiab] OR nutritionist*[tiab] OR "speech-language pathologist"[tiab] OR "speech-language pathologists"[tiab] OR "Patient Care Team"[Mesh] OR "Case Management"[Mesh] OR "patient care team"[tiab] OR "patient care teams"[tiab] OR "case management"[tiab] OR "case manager"[tiab] OR "case managers"[tiab] OR "liaison nurse"[tiab] OR "liaison nurses"[tiab] OR "collaborative practice"[tiab] OR "collaborative practices"[tiab] OR "collaborative care"[tiab] OR "nurse-led follow-up"[tiab] OR "interdisciplinary care"[tiab] OR "interdisciplinary team"[tiab] OR "interdisciplinary teams"[tiab] OR "interdisciplinary care team"[tiab] OR "interdisciplinary care teams"[tiab] OR "team care"[tiab] OR "multi agency working"[tiab] OR "inter agency working"[tiab] OR "multi professional working"[tiab] OR "interprofessional working"[tiab] OR "multidisciplinary team" [tiab] OR "multidisciplinary teams" [tiab] OR "multidisciplinary care teams"[tiab] OR "interdisciplinary treatment approaches"[tiab] OR telemedicine[tiab] OR tele-medicine[tiab] OR telecommunication[tiab] OR tele-communication[tiab] OR telemonitoring[tiab] OR tele-monitoring[tiab]
7.	#5 and #6
8.	#1 OR #2 OR #3 OR #4 OR #7
9.	("meta-analysis"[pt] OR "meta-analysis"[pt] OR meta-anal*[tw] OR metaanal*[tw] OR "quantitative review"[tw] OR "quantitative overview"[tw] OR "systematic review"[tw] OR "systematic overview"[tw] OR "systematic reviews"[tw] OR "systematic overviews"[tw] OR (methodologic*[tw] AND (review*[tw] OR overviews*[tw])) OR "integrative research review"[tw] OR "research integration"[tw] OR (quantitativ*[tw] and synthes*[tw]) OR "medline"[mesh] OR "medlars"[mesh] OR medline[tw] OR medlars[tw] OR embase[tw] OR scisearch[tw] OR psychinfo[tw] OR psycinfo[tw] OR psychlit[tw] OR psyclit[tw] OR "hand search"[tw] OR "manual search"[tw] OR "hand searches"[tw] OR "manual searches"[tw] OR "electronic database"[tw] OR "bibliographic database"[tw] OR "electronic databases"[tw] OR "bibliographic databases"[tw] OR ((pooling[tw] OR pooled[tw]) AND analys*[tw]) OR "mantel haenszel"[tw] OR peto[tw] OR "der simonian"[tw] OR dersimonian[tw] OR "fixed effect"[tw] OR "fixed effects"[tw]) AND (review[pt] OR review*[tw] OR overview*[tw])
10.	#8 AND #9
11.	"1995"[Publication Date] : "2009"[Publication Date]
12.	(french[la] OR english[la])
13.	#10 AND #11 AND #12
14.	#13 NOT ((infant[MeSH] OR child[MeSH] OR adolescent[MeSH]) NOT (adult[MeSH]))

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