

Quality of care of nurse-led and allied health personnel-led primary care clinics

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- Objectives** To review the literature regarding quality of care of nurse-led and allied health personnel-led primary care clinics with specific attention to the quality indicators for fall prevention, continence care, pulmonary rehabilitation, mental health, pharmaceutical care, and wound care services.
- Data sources** Literature search from 1990 to 2010 including Ovid Medline, Cochrane Database, RAND (Research and Development) Corporation Health Database, the ACOVE (Assessing the Care of Vulnerable Elders) project and clinical guidelines from the United Kingdom, Australia, Canada, and the United States.
- Study selection** This review was limited to studies involving adult, primary care patients. Where available, evidence from systematic reviews and meta-analyses were used to synthesise findings.
- Data extraction** Combinations of the following terms (and related terms) were used to identify studies: primary care, clinic, allied-health, nurse-led, fall prevention, continence care, incontinence, chronic obstructive pulmonary disorder, pulmonary disease, respiratory rehabilitation, mental health, mental wellbeing, depression, anxiety, wound care, leg ulcer, venous ulcer, dressings clinic, wound clinic, medication review, pharmacist-led, pharmaceutical care.
- Data synthesis** A total of 21 international guidelines and 33 studies were selected for data synthesis. Despite a lack of consistent outcomes data, it is apparent that certain aspects of organisational structure and clinical care processes are important though not necessarily sufficient indicators of quality of care, because they themselves can influence care outcomes. Seven key factors were identified which seem important determinants of the quality of care provided by nurse- and allied health personnel-led clinics.
- Conclusion** Delivery of primary health care by nurse and allied health personnel-led teams is a well-established model, internationally. Evidence from the literature provides benchmarks for standards of good practice. Knowledge of factors influencing quality of care can assist the planning, implementation, evaluation, and further expansion of such programmes, locally.

Key words

Allied health-personnel; Health services needs and demand; Nurse practitioners; Primary health care; Quality of life

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Introduction

As a result of population ageing and shifts in patient needs in the past two decades, we have seen an increased demand for chronic disease management delivered in the community. Whilst the number of primary care doctors is limited, one solution has been to introduce allied health personnel-led clinical services to assist in care delivery. A number of countries, namely the United Kingdom, Australia, Canada and the United States, have introduced multidisciplinary allied-health clinics, nurse practitioner, and nurse-led clinics into routine practice in primary care. Under certain circumstances, available evidence shows that this model for care delivery has the potential to reduce health costs without compromising quality of care.^{1,2}

In their 2008/2009 Policy Agenda, the Hong Kong SAR Government announced plans to enhance primary care and introduce new initiatives to strengthen support for chronic disease management. One of these was the introduction of six Nurse and Allied Health

由護士和醫療輔助人員作主導的基層醫療服務診所的護理質素

- 目的** 回顧由護士和醫療輔助人員作主導的基層醫療服務診所的護理質素，尤其集中有關防止跌傷、理遺護理、肺康復、精神健康、藥學監護和傷口護理服務的質素指標。
- 資料來源** 搜索1990年至2010年於Ovid Medline、Cochrane Database、RAND Database、ACOVE，以及來自英國、澳洲、加拿大和美國的臨床指引。
- 研究選取** 主要針對成年病人基層醫療的研究，並盡可能利用系統性文獻及薈萃分析綜合研究結果。
- 資料選取** 利用以下詞彙及相關詞進行資料選取：基層醫療、診所、輔助醫護、護士主導、防止跌傷、理遺護理、失禁、慢性阻塞性肺部疾病、肺病、呼吸道復康、精神健康、精神滿意度、抑鬱、憂慮、傷口護理、腿部潰瘍、靜脈性潰瘍、敷藥診所、傷口護理診所、藥品評估、藥劑師主導和藥學服務。
- 資料綜合** 共選取21份國際指引和33項研究作為資料綜合。雖然研究資料欠缺一致性，而有關組織性結構和臨床護理過程的某些範疇也不屬護理素質的必然指標，不過，基於可影響護理結果的關係，它們仍有一定的重要性。有關護士和醫療輔助人員主導的基層醫療診所服務質素，本文也綜合七項重要決定因素。
- 結論** 以護士和醫療輔助人員作主導的基層醫療服務，在外國已建立其根深蒂固的模式。文獻搜索可提供標準護理質素的基準。認識影響護理質素的因素有助計劃、實施、評估和進一步擴大本地基層醫療的服務。

Clinic programmes, which are currently being piloted in government-funded General Outpatient Clinics of the Hospital Authority. These programmes are designed to enhance chronic disease management in primary care through patient empowerment and use of multidisciplinary teams.

This review was undertaken as part of the Evaluation Study on the Quality of Care of the Hong Kong Hospital Authority's Chronic Disease Management Healthcare Programmes. Its aim was to provide the background for developing an evaluation strategy to assess the quality of care provided by the Nurse and Allied Health Clinic programmes offered by the Hospital Authority. Its specific focus was to identify the factors determining quality of care for nurse-led and allied health personnel-led clinics on six programmes developed by the Hospital Authority. These programmes addressed fall prevention, continence care, pulmonary rehabilitation, mental wellness, medication compliance, and wound care.

Methods

A literature search was conducted using electronic databases Ovid Medline (limited to English, full-

text articles from 1990-2010), Cochrane Database, RAND (Research and Development) Corporation Health Database, the ACOVE (Assessing the Care of Vulnerable Elders) project and clinical guidelines from the United Kingdom, Australia, Canada, and the United States.

Combinations of the following terms (and related terms) were used to search for articles: primary care, clinic, allied-health, nurse-led, fall prevention, continence care, incontinence, chronic obstructive pulmonary disorder (COPD), pulmonary disease, respiratory rehabilitation, mental health, mental wellbeing, depression, anxiety, wound care, leg ulcer, venous ulcer, dressings clinic, wound clinic, medication review, pharmacist-led, pharmaceutical care. Reviews were limited to studies involving adult patients in ambulatory and primary care settings. Studies focused on services provided to patients with specific physical or cognitive impairments (eg paraplegia, Alzheimer's or Parkinson's disease) and those based in residential care facilities or in-patient settings were excluded.

Articles were appraised following the grading system developed by the Scottish Intercollegiate Guidelines Network (SIGN) for the National Health Service in Scotland (Box 1³). Where possible systematic reviews and meta-analyses were reviewed. Where these were unavailable, the next highest level of study was used.

Results

In all, 21 national guidelines and 33 studies were identified to be of sufficient relevance and quality. A summary of these is presented in Table 1.^{1,2,4-31}

Fall prevention clinics

It has been estimated that approximately 30% (26% in Hong Kong³²) of elderly persons over 65 years old living in the community fall each year.⁴ Worldwide, falls are a significant source of morbidity, mortality, and health care utilisation. Based on the 2001 Hong Kong public health care costs and population data, it was estimated that annually, elderly persons over 65 years who sustained falls ('fallers') consumed around US\$71 million (HK\$552 million) more public health care dollars than non-fallers.³²

Much of the data available on the effectiveness of fall prevention services has come from the United Kingdom, where the National Health Service has implemented community-wide fall intervention clinics.^{33,34} The National Institute for Health and Clinical Excellence (NICE)³³ and the American Geriatrics Society, British Geriatrics Society, and the American Academy of Orthopaedic Surgeons panel³⁴ provide level C recommendations in their guidelines

for assessment and prevention of falls in older people.

The ACOVE project has identified a number of quality indicators relevant to the quality of care for falls and mobility problems in the elderly.⁵ These include: a system for detecting falls, inclusion of a multi-factorial risk assessment, basic fall history (including medication review and functional status), orthostatic vital signs, visual acuity testing, gait and balance evaluation, cognitive assessment, home hazard assessment and modification, benzodiazepine discontinuation, assistive device prescription (for poor balance or >2 falls in past year) and inclusion of an exercise programme.

A variety of outcome measures have been proposed, including the number of falls or fall rate, muscle strength/balance, daily functioning, physical activity scale, health-related quality of life, anxiety/depression scales, fear of falling scale, health care utilisation for fall-related injuries.^{4,6,7} To date, however, evaluations of clinical outcomes attributable to fall prevention services have been limited due to difficulties in obtaining longitudinal patient-reported events.⁷

Although earlier reviews suggested that fall prevention services may be effective, a meta-analysis in 2008 concluded that the reduction in the number of fallers may be quite modest.⁷ A Cochrane analysis concluded that there was some evidence that fall prevention strategies can be cost-saving.⁴ Overall, however, systematic evaluations have not shown dramatic reductions in fall rates or health care utilisation.⁶ Small but significant improvements have been shown for some secondary outcomes, including balance, leg strength, gait speed and falling efficacy, particularly in patients with good long-term adherence to recommended interventions.⁴ Better outcomes have been associated with programmes that could identify vulnerable patients (eg by screening, advertising, and clinician education), and had high uptake rates (by being readily accessible to patients). Services providing care which closely adhered to evidence-based guidelines for fall prevention were also associated with better clinical outcomes.^{4,6,7}

Continence care clinics

Urinary incontinence is a significant health issue which impacts on patient and family quality of life. Worldwide, urinary incontinence is experienced by approximately 15 to 30% of community-dwelling women and 2 to 28% of community-dwelling men.⁸ The degree of psycho-social morbidity associated with continence problems is highly variable and the patient's perceived significance or impact on daily activities may have no direct relationship to the severity of the continence problem.⁹

BOX 1. Scottish Intercollegiate Guidelines Network (SIGN) grading system for levels of evidence and recommendations³

Levels of evidence	
1	(a) Systematic review of randomised controlled trials (RCTs) (b) Individual RCT with narrow confidence interval Prospective cohort study with good follow-up Systematic review(s) of the evidence (c) Absolute better-value or worse-value analyses
2	(a) Systematic review of cohort studies (b) Individual cohort study, including low-quality RCT Retrospective cohort study, or poor follow-up (c) 'Outcomes' research; ecological studies
3	(a) Systematic review of case-control studies (b) Individual case-control study Non-consecutive cohort study, or very limited population
4	Case series and poor-quality cohort and case-control studies
5	Expert opinion without explicit critical appraisal, or based on physiology, bench research or 'first principles'
Grades of recommendations	
A	Consistent level 1 studies
B	Consistent level 2 or 3 studies or extrapolations from level 1 studies
C	Level 4 studies or extrapolations from level 2 or 3 studies
D	Level 5 evidence or non-analytic studies

BOX 2. Scottish Intercollegiate Guidelines Network (SIGN) on the Management of Urinary Incontinence in Primary Care³⁶

1.	Health care practitioners should consider using a validated quality of life and incontinence severity questionnaire to evaluate and audit the impact of urinary symptoms and effectiveness of any management strategy. (Grade B)
2.	Patients with urinary incontinence should be offered information and advice on the treatment options available to them in both primary and secondary care. (Grade C)
3.	Assessment, treatment and referral, as appropriate, should be offered to all patients with urinary continence problems. (Grade B)
4.	Routine clinical history taking for urinary incontinence should include medication review, enquiry as to bowel problems (in particular constipation and faecal incontinence), functional ability to reach the toilet, appropriate fluid intake and sexual dysfunction. (Grade C)
5.	Initial assessment of a male patient with urinary incontinence should include digital rectal examination. (Grade C)
6.	Initial assessment of a female patient with urinary incontinence should include urinalysis and pelvic examination. (Grade C)
7.	Pelvic floor muscle exercises should be the first choice of treatment offered to patients suffering from stress or mixed incontinence. Referral should be to a specialist physiotherapist or trained primary care clinician. (Grade C)
8.	Pelvic floor muscle exercises should be considered as part of a treatment plan for patients with urge urinary incontinence. (Grade C)
9.	Pelvic floor muscle exercise treatment should be considered for patients following radical prostate surgery. (Grade C)
10.	A trial of an anti-muscarinic should be given to patients with significant urgency with or without urge incontinence assuming no contra-indications exist. (Grade A)
11.	Containment issues should be discussed in tandem with the assessment process. (Grade C)
12.	Patients should be referred to secondary care if previous surgical or non-surgical treatments for urinary incontinence have failed or if surgical treatments are being considered. (Grade C)

TABLE I. Summary of studies reviewed

Study	Appraisal strategy / study design*	Major findings
Laurant et al, 2005 ¹ (Cochrane review)	RCTs, CBA, and ITS evaluating nurse-led primary care services (excluding emergency services) were included. Major outcomes considered were patient outcomes, process of care outcomes, resource utilisation outcomes, and cost outcomes. 25 Articles relating to 16 studies were identified and subject to methodological quality assessment and data synthesis.	Appropriately trained nurse might be able to provide as high quality care as primary care doctors, and achieve as good health outcomes for patients. Higher patient satisfaction and more scheduled return visits were associated with nurse-led care. Whether the physician workload and direct cost of care can be reduced remains unknown.
Thomas et al, 2000 ² (Cochrane review)	RCTs, CBA, and ITS evaluating the introduction of clinical guidelines for nursing, midwifery and other professions allied to medicine. 18 Studies were identified and reviewed on the processes and outcomes of care. Numerical data analysis was not performed in view of the substantial differences on overall study design (eg source and format of interventions, outcomes measured, and participating health professionals).	There was some evidence that guideline-driven care can be effective in changing the process and outcome of care provided by professions allied to medicine. Among studies evaluating the ability of guidelines to facilitate physician-nurse role substitution, no difference in terms of outcome of care has been found. Authors called for caution in generalising findings to other professions and settings as all study methods were inadequately reported.
Falls prevention		
Gillespie et al, 2009 ⁴ (Cochrane review)	RCTs and quasi-randomised trials of interventions to reduce falls in community-dwelling older people, with rate of falls and risk of falling as primary outcomes were included. A total of 111 trials including ongoing and unpublished trials were identified, all subject to risk-of-bias assessment and data synthesis.	Multiple-component group exercise, Tai Chi, and individually prescribed multiple-component home-based exercise were effective in reducing rate of falls and risk of falling. Effects of some other interventions were equivocal and might be context-specific in nature. These include multifactorial intervention, vitamin D supplementation, home safety interventions, gradual withdrawal of psychotropic medication, cardiac pacing, and cataract surgery.
Gates et al, 2008 ⁷ (systematic review)	RCTs, quasi-randomised trials evaluating falls or falls-related injuries preventive intervention that was based in community and emergency care settings were included. Evaluations were based on risk factor assessment and patient treatment and/or management options. 19 Studies were identified and subject to methodological assessment and data synthesis following the Cochrane-recommended procedures.	The review found little evidence to support the effectiveness of multifactorial fall prevention programmes in reducing the number of fallers or fall-related injuries among elders in community and emergency care settings. No comparative differences were found in mortality and hospital service utilisation. Subgroup analysis however suggested that higher intensity interventions might be more effective than knowledge-based management or referral in reducing number of fallers.
Chang and Ganz, 2007 ⁵ (review)	A total of 182 articles (including but not limited to: meta-analyses of RCTs, individual RCTs, meta-analyses of observational studies, individual cohort studies, clinical practice guidelines) evaluating risk factors of falls and mobility problems in elders were identified from web search, reference mining, and previous literature searches in the ACOVE project. Potential quality indicators were reviewed and judged by an expert panel.	12 Quality indicators were judged sufficiently valid. These include Detection of Falls, Multifactorial Falls-Risk Assessment, Basic Fall History, Orthostatic Vital Signs, Visual Acuity Testing, Gait and Balance Evaluation for Falls and Mobility Disorders, Cognitive Assessment, Home Hazard Assessment and Modification, Benzodiazepine Discontinuation, Assistive Device, and Exercise Programs.
Hendriks et al, 2008 ⁶ (single RCT)	Recruited and consented were 333 elders who attended emergency or primary care services because of a fall (response rate, 14.1%). Intervention group received detailed medical and occupational-therapy assessment, followed by recommendations and referral if indicated; control group received usual care. Fall rates and daily functioning were recorded at baseline, and after 4 and 12 months.	Three-quarters of participants reported adherence to referrals and recommendations. In both 4-month and 12-month follow-up periods, the fall rate, daily functioning, and time-to-first-fall between the two groups were comparable. Other measures including perceived health status, activity of daily living, mental health, and quality of life were also not different between groups.
Continenence care		
Milne, 2004 ⁸ (review)	Over 100 articles (including but not limited to: systematic review, single RCT, cohort study, case-control study) related to behavioural therapies on UI were reviewed to identify the methodological evidence of commonly recommended behavioural therapies on UI.	Evidence for pelvic floor muscle training was strong in women with UI and modest in men for a short time after radical prostatectomy. Less was known about bladder training, prompted voiding, habit retraining, and timed voiding. There might be comparative efficacy of behavioural interventions in specific populations but more research is needed to understand the phenomenon.
Pang et al, 2005 ⁹ (cross-sectional survey)	A territory-wide telephone survey was conducted in Hong Kong for 12 months. Targets were Hong Kong women aged 10-90 years with access to fixed residential telephone lines. A representative sample of 749 valid responses were obtained (response rate, 24.2%).	Urinary symptoms were reported by 52% of women (95% confidence interval, 48.9-56.0%), of whom 12% indicated impaired quality of life, particularly on emotional well-being (5.6%) and social activity (5.1%). Those with urge incontinence were more likely to report impaired quality of life.

* ACOVE denotes Assessing Care of Vulnerable Elders, CBA controlled before and after studies, COPD chronic obstructive pulmonary disease, FI faecal incontinence, GP general practitioner, ITS interrupted time series analyses, MHW mental health worker, PCP primary care provider, RCT randomised controlled trial, and UI urinary incontinence

TABLE I. (Cont'd)

Study	Appraisal strategy / study design*	Major findings
Fung et al, 2007 ¹⁰ (review article)	A total of 348 articles related to quality indicators in evaluating and treating elders with UI were identified through web search, reference mining, the ACOVE literature searches, and peer recommendation. Potential indicators were reviewed and judged by an expert panel.	14 Quality indicators were judged sufficiently valid. These include: Initial Evaluation and Annual Assessment of UI, Targeted Basic History, Targeted Physical Examination and Laboratory Testing, Postvoid Residual, Classification Before Treatment, Discussion of Treatment Options, Response to Treatment, Behavioral and Lifestyle Treatments, Preoperative Urodynamic Testing, Surgery for Stress UI, and Catheter Use.
Wagg et al, 2009 ¹¹ (cross-sectional study)	The relationship between organisational structure (ie personnel, skills, resources and knowledge available to care for people) and clinical process of continence care for older people was retrospectively examined using data from the 2006 National Audit of Continence Care for Older People. A total of 3385 community-dwelling elders' data were retrieved and scored using expert-derived scoring systems.	Primary care sector scored higher than hospitals or care homes in regard to service organisation. Yet the three sectors were scored similarly in terms of clinical process for bladder incontinence and faecal incontinence. The relationship between organisational strength and quality of bladder/bowel care was found to be moderate in the primary care sector, and weak in hospitals and care homes. Quality of care for UI and FI was highly inter-correlated within sectors.
Chronic obstructive pulmonary disorder		
Lacasse et al, 2007 ¹² (systematic review) (Note: This article is a short version of the full meta-analysis published in the Cochrane Library in 2006)	RCTs evaluating effectiveness of any respiratory rehabilitation programme to conventional community care were included. The programme must be at least 4 weeks long, and must include an exercise component. Outcomes considered were health-related quality of life and/or exercise capacity. 31 Studies were identified and subject to methodological quality assessment and data synthesis.	Rehabilitation relieved dyspnoea and fatigue, improved emotional function and enhanced patients' control over their condition. Improvements were moderately large and clinically significant. On the contrary, effect on exercise capacity was small and clinically not significant.
Smith et al, 2000 ³⁰ (Cochrane review)	RCTs investigating the effects of supervised and home-based intervention in patients with COPD were included. Controls received routine care; outcomes of interest included lung function, exercise tolerance, health-related quality of life of patient and carer, mortality, and hospital service utilisation. Four studies on outreach nursing programmes were identified and subject to risk-of-bias assessment and data synthesis.	Meta-analysis revealed no significant reduction of mortality by intervention in general. However, subgroup analysis suggested that outreach nursing programme might reduce mortality and improve health-related quality of life among patients with moderate COPD. Reported in one study in severe cases only, no benefit was observed on hospital admission rate. No changes were found in lung function and exercise performance in general.
Taylor et al, 2005 ³¹ (systematic review)	RCTs evaluating in-patient, out-patient, and community-based interventions for COPD management that were led, coordinated, or delivered by nurses were included. Nine studies were identified and subject to methodological quality assessment and data synthesis.	Interventions of less than 1-month duration were less studied and not found with any benefits. For year-long interventions, meta-analysis failed to detect any influence on mortality, patients' health-related quality of life, psychological wellbeing, disability, or pulmonary function. Whether hospital readmission can be reduced remained unknown. More quality research is needed for investigating other possible benefits.
Mental health		
Bower and Rowland, 2006 ¹⁴ (Cochrane review)	RCTs comparing counselling in primary care with other treatments for patients with psychological or psychosocial problems were included. Outcomes of interest included mental health symptoms, social and occupational functioning, patient satisfaction, and cost data. Identified from multiple electronic databases were eight trials that were further subject to methodological quality assessment and data synthesis.	All trials involved face-to-face individual contact between patient and experienced/accredited counsellor. Compared with GP care, patients receiving counselling had significantly lower psychological symptom scores in the short-term (within 6 months), but not the long-term (7 months or more). Yet all effects diminished when only chronic patients were considered. Patient satisfaction was higher in the counselling group in general. Costs of counselling and usual care were somehow similar.
Harkness and Bower, 2009 ¹⁵ (Cochrane review)	RCTs, CBA, and ITS assessing the effects of on-site MHWs on the clinical behaviours of PCPs such as consultation rates, prescribing, and referral were included. Interventions/therapies provided by MHWs may vary from psychotherapy and counselling to broader psychosocial interventions. 42 Studies were identified and subject to methodological quality assessment and data synthesis.	Among the identified studies, MHWs included counsellors, psychologists, psychiatrists, community psychiatric nurses, nurse therapists, practice nurses, and social workers. Meta-analysis demonstrated significant reductions in PCP consultations, psychotropic prescribing, prescribing costs, and rates of mental health referral when treatments were provided by MHWs. Authors, however, concluded that changes were modest in magnitude, inconsistent, and did not generalise to the wider patient population.
Slade, 2002 ¹³ (systematic review)	Published and pre-published studies related to outcome or process assessment for mental health services were included. The review goal was to identify principles and outcome domains that have been proposed for implementing routine outcome assessment, and to further synthesise outcome domains into distinct categories. Altogether 6400 publications were identified mainly from electronic databases and research registers.	Identified were seven basic principles for choosing patient-level outcomes and 16 outcome domain proposals, from which seven distinct categories emerged: wellbeing, cognition/emotion, behaviour, physical health, interpersonal, society, and services.

TABLE I. (Cont'd)

Study	Appraisal strategy / study design*	Major findings
Medication review and pharmaceutical care		
Knight and Avorn, 2001 ¹⁶ (review)	A total of 5171 titles were used to identify relevant abstracts and articles for this review. On the basis of literature review and author's expertise, 16 potential indicators were reviewed and judged by an expert panel.	12 Quality indicators were judged sufficiently valid. These include: Drug indication, Patient education, Medication list, Response to Therapy, Periodic drug regimen review, Monitoring warfarin therapy, Monitoring diuretic therapy, Avoid use of chlorpropamide as a hypoglycaemic, Avoid drugs with strong anticholinergic properties whenever possible, avoid barbiturates, Avoid meperidine as an opioid analgesic, Monitoring renal function and potassium in patients prescribed ACE inhibitors.
Holland et al, 2006 ¹⁷ (review) (Note: This is an editorial)	Findings of 8 large studies conducted in the UK, European countries, the US, and Canada on medication review in broad older populations were summarised in brief.	There appeared some benefits for pharmacist-led review on medication-related outcomes, such as medication appropriateness and adherence, but in general no changes in quality of life or hospital admission. Interventions that were delivered by small number of pharmacists working in close liaison with primary care doctors were found to be most successful.
Holland et al, 2005 ¹⁸ (single RCT)	Patients aged over 80 years who were admitted as emergency and prescribed two or more drugs on discharge were recruited. 872 Patients gave consent (response rate, 62%) and were randomised to receive home-based pharmacist care or usual GP care. Pharmacist visited and educated patients twice within 2-8 weeks of discharge on drug use, drug storage and self-monitoring of drug reaction. Outcome measures included 6-month emergency readmission, mortality, and quality of life.	6-Month hospital readmission rate was 1.3 times higher in the intervention group. Death rates as determined using survival analysis were not different statistically between groups within the measured period. Quality of life scores decreased in both groups in comparable magnitude.
RESPECT Trial Team, 2010a ¹⁹ (single ITS) (Note: RESPECT is the acronym for Randomized Evaluation of Shared Prescribing for Elderly people in the Community over Time)	760 Patients aged 75 years or above were recruited from 24 general practices. Each participant received monthly medication review conducted by pharmacist for 12 months, started from 1 of 5 randomised time points within the first study year. Outcome measures including medication appropriateness (assessed by independent pharmacists who were blinded to the design), quality of life, health utility, and cost of health care were collected at 5 points in time during the study.	Multiple time-series analysis failed to demonstrate any relationship between medication appropriateness and intervention or time. Quality of life scores declined over time, yet the rate of decline was unaffected by pharmaceutical care. Neither was there evidence for changes in hospital admission rate or other serious adverse event.
RESPECT Trial Team, 2010b ²⁰ (single ITS)	Same as in RESPECT Trial Team, 2010a	Cost effectiveness was determined in terms of incremental cost per additional QALY. The RESPECT model of pharmaceutical care costs £10 000 for every QALY it gains, which was considered cost-effective if compared with the general threshold of between £20 000 and £30 000 per QALY suggested by NICE.
Zermansky et al, 2001 ²² (single RCT)	Patients aged 65 years or above receiving at least one drug on repeat prescription were invited from general practices. 1188 Patients gave consent (response rate, 49.4%) and were randomised to receive pharmacist care or usual GP care in the clinic face-to-face. Immobile patients received home visits. Outcome measures included prescription pattern, drug cost, and service utilisation.	Much higher review rate was observed in the intervention group: 97% vs 44% in the control group. Pharmacist care resulted in more drug changes and lower prescribing costs. Health care service utilisation in terms of GP consultation and hospital admission rate was highly similar between groups.
Mackie et al, 1999 ²¹ (single RCT)	Primary care patients aged 20 years or above receiving 4 or more medicines on repeat prescription were invited to attend medication review in a pharmacist-directed clinic. 1677 Patients gave consent (response rate, 55%) and were randomised to receiving active intervention or passive observation should a change of medication regimen was considered appropriate by the pharmacist after structured review. Referral was only made in the intervention group.	83% Of the reviewed participants were identified with drug-related pharmaceutical care issues. Among the active referrals, consensus between pharmacist and GP was high: 84% were agreed by GP, 11% partially agreed, 3% were rejected. The top 5 clinical issues were: unnecessary therapy (24%), ineffective therapy (12%), no routine monitoring (11%), inappropriate choice of therapy/dose schedule (11%), and admitted non-compliance (11%).

* ACE denotes angiotensin-converting enzyme, CI confidence interval, CPS clinical pharmacy services, GP general practitioner, ITS interrupted time series analyses, NHS National Health Service (England), NICE National Institute for Health and Clinical Excellence, QALY quality-adjusted life years, and RCT randomised controlled trial

TABLE I. (Cont'd)

Study	Appraisal strategy / study design*	Major findings
Nkansah et al, 2010 ²³ (Cochrane review)	RCTs evaluating any out-patient pharmacists' service other than drug compounding and dispensing were included. Outcomes of interest included health care process measures or patient outcomes. 43 Studies were identified from a prior version of this review and the Cochrane register, and all were subject to methodological quality assessment. Numerical data analysis was not performed due to the variety of outcome measures.	Results were sparse in general. In 1 study comparing pharmacist-directed to physician-directed medication management, patient's systolic blood pressure was higher in the pharmacist group. When compared with no service, 3 studies showed a decrease in total number of medication prescribed, 1 study showed improvement in eliminating therapeutic duplication, and 29 studies showed some benefits in quality of life when pharmacist services targeted at health professionals, and 2 of which demonstrated an improvement in physician's prescribing patterns. Authors called for a need to develop standardised approach to better measure and report outcomes.
Perez et al, 2009 ²⁴ (systematic review)	Published studies evaluating the economic impact of CPS were included. Outcomes of interest were any assessment measuring cost to provide services or economic outcomes. A total of 93 studies were identified and subject to quality assessment. Cost data and measurable benefits were pooled to determine benefit-to-cost ratios.	Most commonly evaluated CPS were general pharmacotherapeutic monitoring services (32 studies), target drug programmes (27 studies), and disease state management services (21 studies). Positive economic benefit associated with CPS was noted in 31 of these studies. Benefit-to-cost ratio was 4.81:1, meaning for every \$1 invested in CPS, \$4.81 was achieved in reduced costs or other economic benefits.
Wound care		
Palfreyman et al, 2006 ²⁶ (Cochrane review)	RCTs evaluating dressings in the treatment of venous leg ulcer with healing time or healing rates reported were included. 42 Studies were identified and subject to methodological quality assessment and data synthesis. Dressing types evaluated in the reviewed studies include hydrocolloids, foams, hydrogels, alginates, and miscellaneous dressings.	Hydrocolloids were no more effective than simple low adherent dressings used beneath compression. For other comparisons there was no evidence of relative effectiveness of wound dressings but most studies are too small for drawing solid conclusion.
Palfreyman et al, 2007 ²⁵ (systematic review)	Same as in Palfreyman et al, 2006. ²⁶ (Note: This study focused on evaluating the relative effectiveness of various wound-dressing types)	This study expanded the findings in Palfreyman et al, 2006 ²⁶ by increasing the number of comparisons from 7 pairs to 14 pairs. Similar to Palfreyman 2006, no single type of wound dressing is more effective in terms of leg ulcer healing. Cost-effectiveness cannot be determined due to insufficient or poor-quality cost data.
Harrison et al, 2005 ²⁷ (single quasi-experiment using pre/post design)	All patients referred for home-care management of leg ulcers were recruited. Participants recruited in the first study year received former community care (n=78), while in the second study year, all participants including newly recruited patients received nurse-led guideline-driven care (n=180). Patient's ulcer healing progress was monitored at 3-month intervals within each 1-year study period.	Under the guideline-driven new model, the median number of weekly visits to each patient declined from 3 to 2.1, the use of compression therapy nearly doubled, median supply cost per case decreased to about one-fourth, yet the 3-month healing rate increased significantly from 23 to 56%. Health-related quality of life measured at the 3rd month of either study period was not different statistically.
Morrell et al, 1998 ²⁸ (single RCT)	223 Patients with venous leg ulcers were recruited and randomly assigned to receive 4-layer compression bandaging or usual home care, all provided by the district nursing service. Healing process, patient's satisfaction with care, service used, and personal costs were monitored for 1 year.	The initial healing time for leg ulcers was significantly shorter in the clinic group: 20 weeks vs 43 weeks for the control group. At 12 weeks, 34% in the clinic group were healed compared to 24% in the control. The crude initial healing rate of ulcers in intervention compared with control patients was 1.45 (95% CI, 1.04-2.03). Health status, pain experience, satisfaction, and mean total NHS costs were comparable between groups.
Harrison et al, 2008 ²⁹ (single RCT)	126 Mobile patients referred for home care were recruited and randomised to receive nurse-led guideline-driven leg ulcer care based in home or clinic. Patient's ulcer healing process was monitored at 3-month intervals within the 1-year study period.	The 3-month healing rate was high and comparable for both groups: 58.3% for clinic and 56.7% for home care group. No significant differences were found between the groups in pain experience, health-related quality of life, satisfaction with care, and resource utilisation including number of visits, nursing cost, and supply cost.

A number of national guidelines provide level A to C recommendations for urinary continence care including: NICE guidelines for urinary incontinence in women,³⁵ the SIGN guidelines for urinary incontinence in primary care (Box 2³⁶), and NICE guidelines for lower urinary tract symptoms in men.³⁷ NICE has produced guidelines for the implementation of continence care clinics to help improve standards of continence care in the UK (Box 3³⁸).

The National Audit of Continence Care for Older People carried out by the Royal College of Physicians as part of the National Clinical Audit demonstrated that although there was significant variability in continence care and service delivery across the UK, the 2-year project (the clinical audit and subsequent dissemination of findings and changes) resulted in substantial improvements in continence care standards across the country.³⁹

The ACOVE project has published a set of quality indicators for the management of urinary incontinence in the elderly that included criteria for screening/detection, evaluation (history, examination, and diagnostic tests), treatment, behavioural therapy, urodynamic testing, surgery, and catheter use.¹⁰

Thomas et al⁴⁰ conducted a comprehensive review on continence outcome measures ('The Continence Outcomes Measurements Suite' project) and proposed measures for evaluating the outcomes of continence care. These included urinary incontinence symptom measures (eg Incontinence Severity Index), pad tests (eg 24-hour pad test), frequency volume charts and bladder diaries (eg International Continence Society/World Health Organization templates for 3 days), health-related

quality-of-life measures (eg SF-36 Health Survey, Version 2), and functional measures (eg Barthel).⁴⁰

Systematic reviews show that community-based services offering conservative continence care can be effective in achieving improvements in urinary symptoms, continence-related knowledge, and quality of life.^{8,10,11} It appears that a close relationship exists between organisational strength (such as protocols, performance audits, and feedback) and quality of primary care continence care; better quality of care was provided by well-organised, integrated services using multidisciplinary and appropriately trained staff.¹¹ Other factors determining quality of care for continence clinics included adequate identification of patients (through screening and promotion), enhancing uptake rates for the service, and accessibility (location within the community and proper signage).^{10,11} Adherence to evidence-based guidelines, and facilitated referral to or integration with secondary care facilities were also important.^{10,11}

Pulmonary rehabilitation

Chronic obstructive pulmonary disease is a leading cause of morbidity and mortality worldwide, and its prevalence is projected to continue increasing due to ongoing exposure to risk factors (tobacco smoke, occupational dust, and pollution) as well as population ageing.⁴¹ Moreover, COPD places significant burdens on the health care system and impacts quality of life. In Hong Kong, COPD has accounted for among the largest number of hospital bed days occupied in the past decade,⁴² and the prevalence of moderate-to-severe COPD among individuals 30 years and older was estimated to be approximately 3.5%.⁴¹

The American Thoracic Society and European Respiratory Society (ATS/ERS) defines pulmonary rehabilitation as "an evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory disease who are symptomatic and often have decreased daily life activities."⁴³ These programmes typically include: education, exercise training, nutritional intervention, psychosocial support, and smoking cessation. Moreover, GOLD (the Global Initiative for Chronic Obstructive Lung Disease),⁴¹ NICE,⁴⁴ and ATS/ERS⁴³ have each developed similar evidence-based guidelines for pulmonary rehabilitation. In general, the recommendations include advice on patient identification, recruitment, service accessibility, programme content, duration, and staffing.

The Thoracic Society of Australia and New Zealand have developed guidelines for measuring outcomes of pulmonary rehabilitation and recommend that assessments be made at the beginning and completion of a pulmonary rehabilitation programme.⁴⁵ These assessments

BOX 3. National Institute for Health and Clinical Excellence Commissioning guide for urinary continence service for the conservative management of urinary incontinence in women³⁸

1. Identification and appropriate referral of women with urinary incontinence
2. Initial assessment and conservative management of urinary incontinence by trained and competent staff with all health professionals involved in the conservative management of urinary incontinence have the required skills and access to relevant training and education
3. Development of a high-quality integrated continence service that enables treatment, based on assessment, to be delivered in the most appropriate setting, which is usually primary care in the first instance; and allows easy access to specialist care when it is needed
4. Service location ensuring services are accessible to all residents in the area served
5. Established care and referral pathways
6. Information and audit requirements, including IT support and infrastructure
7. Planned service improvement, including redesign and quality
8. Equitable access, and referral-to-treatment times according to the 18-week patient pathway or equitable waiting times locally for those services currently outside 18 weeks
9. Service monitoring criteria

include measurement of exercise capacity (eg Six-Minute Walking Test), dyspnoea scores, and oxygen saturation. They also recommend measurement of health-related quality of life and patient satisfaction.

Systematic reviews and meta-analyses have demonstrated that respiratory rehabilitation can improve dyspnoea, exercise tolerance, health-related quality of life, the sense of control patients have over their condition, and reduce health service utilisation. These improvements are moderately large and clinically significant. There is a general consensus worldwide that rehabilitation should be an important component of COPD management.¹² Though strongly endorsed, regrettably, access to these services remains a problem. In Canada for example, only 1% of all patients with clinically significant COPD had access to pulmonary rehabilitation.⁴⁶ Programmes should contain between 6 and 12 weeks of exercise, whereas prolonged out-patient programmes showed only modest effects.⁴³ Although the effects can persist beyond the initial period, the benefits of pulmonary rehabilitation appear to wane with time and there is limited evidence of benefits from attending further rehabilitation programmes.⁴³ For patients who continue to exercise, evidence indicates that they do not return to baseline levels.⁴³

Community mental health services

Mental health disorders are among the most common health problems in the community, for which primary care is recognised to play an essential role in the detection of patients and provision of care. It has been estimated that approximately one-quarter of Hong Kong's general population aged 15 years or more experience symptoms of anxiety, and that approximately one-third experience symptoms of moderate-to-severe depression.⁴⁷

In recent years, a number of models have been proposed to address the need for better service delivery of mental health care in the community. These include: integrated mental health care services, collaborative service models, stepped care, and shared care. Overall, the models are very heterogeneous in what they offer and there has been no systematic review to evaluate evidence for one model over another. Some models have been designed for more psychiatric-spectrum disorders (schizophrenia, bipolar disorder) where in-patient or specialist treatment is integrated with primary care service provision.⁴⁸ Others focus on specific psychosocial problems such as substance abuse. Some models advocate on-site delivery of mental health care, others promote better access to psychological interventions. NICE recommends a stepped care approach for the management of mild-to-moderate depression and anxiety, and advocates

a period of psychological therapy (counselling) with or without medications (depending on the severity of the illness).⁴⁹

Shield et al⁵⁰ published a set of quality indicators for primary care mental health services that were developed to address standards set by the National Service Framework for Mental Health in England. They included: the need for accessibility (including out-of-hours point of contact), clear practice policies and procedures, information for patients and carers, up-to-date and confidential medical record keeping, patient-centred care, confidentiality, and consent. They also entailed comprehensive assessments, patient involvement in treatment plans, psychotropic prescriptions according to local management protocols and based on up-to-date evidence. The latter treatments were provided by adequately trained counsellors, psychotherapists, and other practitioners of talking therapies working within the practice.

Although it is generally agreed that mental health outcomes need to be measured, there is less consensus regarding what measures to use. A systematic review by Slade¹³ on outcome measures for routine mental health services identified that outcome measures need to be appropriately selected depending on their goal. If the goal is to collect data to inform the planning, development and evaluation of a specific service, then the focus needs to be more on case mix and treatment leavers. If the evaluation is directed at the treatment, it is important to collect data longitudinally and to consider patient preferences.¹³ Slade¹³ identified seven main outcome domains for use in mental health services. They were: wellbeing, cognition/emotion, behaviour, physical health, interpersonal functioning, social burden, and service satisfaction. Australia is currently a recognised world leader in outcome assessment approaches for public mental health services. It implemented a national system for routine outcome measurements known as the 'National Outcomes and Case mix Collection', which has been operational since 1992.^{13,51}

A Cochrane review on the effectiveness and cost-effectiveness of counselling in primary care concluded that counselling for psychological problems was better than usual general practitioner care. The review found that patients receiving counselling from a trained mental health professional had better short-term outcomes in terms of reduction in mental health symptoms (depression and anxiety), improvements in social and occupational functioning, and greater patient satisfaction than those who received usual care from their regular doctor. In the long-term however, outcomes were not significantly different. Although some types of health care utilisation were reduced, there was no evidence that counselling reduced overall health care costs.¹⁴

Another Cochrane reviews¹⁵ evaluated evidence on the effectiveness of on-site mental health workers for the delivery of psychological therapy to primary care patients and concluded that where such services were available, the number of doctor consultations was reduced. It also concluded that the number of referrals to external mental health services and the amounts of medication prescribed to recipients of such care were also reduced, though such reductions were small and inconsistent. The review found that there was no change in referral patterns or drug prescriptions from patients with mental health problems not in receipt of treatment from on-site mental health care workers.¹⁵

Medication review and pharmaceutical care

With ageing of the populations, issues arising from polypharmacy and medication adverse effects have become significant problems for primary care. In the UK, three-quarters of prescriptions for older people were repeats, with only a few being regularly reviewed by doctors.⁵² In recent years, better recognition of the clinical skills possessed by trained pharmacists has led to expansion of their role beyond that of medication dispensing. Nowadays it also entails medication review, monitoring drug utilisation, engaging in health promotion activities, and informing health professionals and the public about new and established medications.⁵³ This expanded role is referred to as 'pharmaceutical care' in the literature.

Reviewing the medications of elderly patients was instituted as a requirement of the National

Service Framework for Older People in the United Kingdom,⁵⁴ and was implemented in Australia in 2001 as the Domiciliary Medication Management Review Scheme (now known as the Home Medicines Review Program).⁵⁵ More recently, Canada has successfully piloted a pharmacist-integrated programme into family practices in Ontario.⁵⁶ Its rationale was to help ensure that patients gain maximum benefit from their drugs, while simultaneously reducing the potential for harm.

The ACOVE project developed a list of quality indicators for appropriate medication use in the elderly in the US.¹⁶ These include: documentation of a drug's indication, patient education for new prescriptions, an up-to-date medication list in the patient's medical record. The project also entailed documentation of response to therapy, documented periodic drug regimen review, documented monitoring for treatments (eg warfarin, diuretics), avoidance of high-risk medications (eg chlorpropamide, anticholinergic, barbiturates, and narcotics) and the monitoring of renal function and electrolytes for patients on angiotensin-converting enzyme inhibitors. The American Society of Health-System Pharmacists (ASHP) identified a comprehensive list of quality indicators for pharmaceutical care, which was divided into 'patient care indicators' and 'process indicators'.⁵⁷ These are outlined in Tables 2 and 3.⁵⁸

Over the last decade, a large number of randomised controlled trials relating to pharmacist-led medication review and pharmaceutical care have been published. The trials have varied in terms of target populations (elderly or patients with a specific

TABLE 2. The American Society of Health-System Pharmacists Pharmaceutical Care Quality of Care Patient Indicators⁵⁸

Patient care indicators	Example
Adverse drug reaction The patient has a medical problem that is a result of an adverse drug reaction.	Patients receiving vancomycin infusion over a period of less than 45 min who experience red-neck syndrome.
Drug use without indication The patient receives a drug for no medically valid reason.	Patients who receive doses of drugs for which there was no order.
Drug interactions The patient has a medical problem that is a result of a drug-drug, drug-food, and drug-laboratory test interaction.	Patients who experience bleeding due to interaction of warfarin and other drug.
Failure to receive a drug The patient has a medical problem that is the result of not receiving a drug.	Patients who fail to receive antiemetics prior to receive emetogenic antineoplastic agent.
Untreated indication The patient has a medical problem that requires drug therapy but does not receive a drug for that indication.	Patients with major depression for whom antidepressant drug therapy is not prescribed.
Improper drug selection The patient has a drug indication but receives the wrong drug.	Patients with known drug allergies who receive the same drug or chemically related drug.
Over dosage The patient has a medical problem that is treated with too much of the correct drug.	Patients receiving insulin or oral antidiabetic agents who experience episodes of hypoglycaemia.
Sub-therapeutic dosage The patient has a medical problem that is treated too little of the correct drug.	Patients with uncontrolled atrial fibrillation who receive digoxin in a steady state serum drug concentration of less than 0.9 ng/mL.

TABLE 3. The American Society of Health-System Pharmacists Pharmaceutical Care Quality Process Indicators⁵⁸

Patient care indicators	Example
Formulary System	Frequency of admission of new drugs to the formulary without specific guidelines for their use.
Purchasing	Frequency of failure to place orders despite cues that reordering was needed.
Inventory	Frequency of the presence of expired or recalled drugs in drug inventories.
Drug Preparation	Frequency of preparations that are incorrectly compounded, or reconstituted.
Drug Distribution	Frequency of unordered drugs delivered to patient care areas.
Billing and Reimbursement	Percentage of patients' bills for which the organisation does not obtain 100% payment.
Drug Information	Frequency of information requests rated as urgent and not given within specified time limit.
Data Management	Frequency of detection of drug interactions and therapeutic duplications.
Quality and Risk Management	Frequency of drug-related incident reports that do not adequately document the problem.
Continuity of Pharmaceutical Care	Frequency of patient treated in emergency room and failing to return for scheduled clinic visits before depletion of dispensed drugs.
Technology Assessment	Frequency of newly acquired technologies affecting the drug-use system for which there is no documentation of pharmacy input.
Patient Education	Percentage of asthmatic patients discharged on metered-dose inhalers who receive documented instruction in the use of the devices.
Research	Percentage of investigational drug study protocols on file in the pharmacy department.
Documentation	Frequency of failure to document age, weight, allergies, adverse drug reaction, and drug indications in patient's records, per organisational procedures.
Hazardous Waste Disposal	Frequency of bulk cytotoxic waste disposal via methods other than environmental protection agency-approved methods.
Resource Utilisation	Number of units of items prepared and packaged by the pharmacy department that are discarded.
Automated Systems	Frequency of transportation of information by couriers or mechanical means, when an electronic transfer system is available.
Emergency Medication System	Frequency of emergency medical events involving the administration of drugs in which there is no pharmacy department involvement.
Facilities and Equipments	Frequency of temperature, light, moisture, airborne particles, or unsanitary conditions that threaten the health and safety of persons or the integrity of drug products and supplies.
Therapeutic Drug Monitoring	Frequency of phlebotomy timed inappropriately with respect to the time of drug administration.
Drugs stored outside the department of pharmacy	Frequency of the dispensing of institutional drugs stored outside the pharmacy department for outpatient use without appropriate labelling.
Investigational Drugs	Frequency of drug investigations initiated within the organisation for which drug supplies are stored outside the pharmacy.

disease), location (home visit, community pharmacy setting, clinic-based setting), and intervention (drug review, public health promotion, health and lifestyle counselling).¹⁷ Most studies have generally shown positive benefits in terms of medication-related outcomes (identifying medication-related problems, enhanced understanding about medications, reduction in number of prescriptions), however this did not seem to translate into better patient health outcomes in terms of quality of life, morbidity, mortality, hospitalisation, or reduction in health care utilisation, or costs.¹⁸⁻²⁰ Of these, the most successful services seem to be delivered by small numbers of pharmacists working closely with primary care physicians.^{21,22}

A recent Cochrane update reviewed the effect of out-patient pharmacists' non-dispensing roles on patient outcomes and prescribing patterns.²³ This 2010 review found evidence to support such a role in patient counselling, therapeutic management,

and providing professional health education with the goal of improving the process of care and clinical outcomes. The data also showed that educational visits by the pharmacist could impact physician prescribing patterns.

The American College of Clinical Pharmacy performed a cost-effectiveness review on pharmacy services published between 2001 and 2005. It concluded that pharmacy services provide a valuable return on investment, although the methods used to evaluate the economic impact needed improvement.²⁴

Wound care clinics

Chronic leg ulcers are a major health problem affecting quality of life. According to a systematic review by Graham et al⁵⁹ of adult population-based studies, the prevalence rates of open ulcers ranged from 0.12% to 1.1% of the population and an increasing prevalence

with age. Moreover, 60 to 80% of lower limb ulcers are associated with venous insufficiency, and 10 to 30% with arterial insufficiency. Other contributing factors include diabetes and rheumatoid arthritis. Over 80% of chronic leg ulcers are managed in the community.⁶⁰ Posnett and Franks^{61,62} estimated that the current cost to the National Health Service of caring for patients with chronic wounds is in the range of £2.3 to 3.1 billion (at 2005/6 prices), and that much of this burden could be avoided with better wound care delivery.

In the UK, national guidelines and frameworks for wound and ulcer care have been produced by the Department of Health (National Service Frameworks [NSFs]), NICE, the Clinical Resource Efficiency Support Team, and SIGN. In Australia, guidelines have been produced by the state Nursing Boards in conjunction with the Health Department.

A number of quality of care indicators and outcome measures have already been identified for evaluating wound care services.^{60,63} These include: compliance with guidelines/protocols, referral rates to secondary care, time to healing or healing rates, ulcer recurrence rates, pain scores, quality of life, cost-effectiveness, and patient satisfaction.

A number of health authorities (especially in the UK and Australia) have already implemented district-wide community leg ulcer clinics in an attempt to deliver and standardise the quality of wound care more efficiently. The objective of these services was to combine nurse-led specialist practice and evidence-based protocol management in a community-based setting. Management guidelines for nurse-delivered wound and ulcer care have not changed significantly over the past 10 years, and evidence is building that adherence to these recommendations results in significantly improved patient outcomes.

Studies show that healing rates can be improved and recurrence rates reduced by the provision of specialised evidence-based wound care delivered by well-trained and well-equipped nursing staff.²⁵⁻²⁷ Other evidence shows that the delivery of wound care in a well-structured community wound clinic setting results in better outcomes and is more cost-efficient than traditional home-based care.^{28,29}

Discussion

In theory, quality of care is ideally assessed by measuring outcomes. However, it is apparent from the literature that for most primary care nurse-led and allied health personnel-led services, availability of clinical outcomes data is very limited. Many studies lack longitudinal follow-up, and overall, there is significant heterogeneity in the measures used. In the absence of consistent outcomes data, it appears that there are a number of key aspects of

organisational structure (personnel, skills/training, resources, and facilities) and clinical processes of care (what is being done for the patients) that can be used as surrogate indicators for quality of care.¹¹ For example, the organisational climate (such as quality of the organisational policies, practices and procedures, and the extent to which the staff adhere to these, or whether audits and service reviews are performed) seems to be a particularly important determinant of quality of care for nurse and allied health clinics. In the UK, NICE has developed guidelines on how to establish and audit a number of these services, with a view to standardise care delivery and optimise quality,^{38,64} and thus improve patient outcomes.¹¹ Future evaluations of nurse-led and allied health personnel-led services need to be more focused on outcome indicators of care effectiveness.

With the recent introduction of nurse-led and allied health personnel-led primary care clinics in Hong Kong, findings from these studies can help establish benchmarks for standards of care and guide the development of good practice. From the literature, a number of key factors that appear to influence the quality of care delivered by such services in primary care clinics have been identified. These include:

1. Adequate identification and recruitment of eligible/vulnerable patients (via screening, service promotion, and uptake)^{33,46,65}
2. Accessibility of services to patients (location within the community, adequate opening hours, and proper signage)^{4,46,65}
3. Location of services with proximity to primary care providers, allowing the doctors and allied health professionals to work together^{15,23}
4. Delivery of care by a small number of nursing or allied health staff, working in close liaison with the primary care doctors^{21,22}
5. Staff with appropriate training and skills to deliver the care—often requiring specialist nurses or a multidisciplinary team of allied health providers coordinating with each other^{21,46,66}
6. Facilitated referral to or integration with secondary care—particularly for patients requiring urgent surgical intervention (eg wound or continence care)^{10,14,66}
7. Close adherence to evidence-based guidelines or clinical protocols (where these exist), to help reduce practice variation and raise standards^{27,46,65}

Conclusion

The use of nurse-led and allied health personnel-led teams to deliver chronic disease management

in primary care settings has already been adopted internationally, and guidelines for setting standards and quality of care are published. Evidence from the literature can help guide the establishment of local benchmarks for good practice. Evaluation of the organisational structure and clinical processes of care of these services can assist health care providers to ensure that quality health care is being delivered.

Hopefully, this can translate into improved patient outcomes.

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