Prioritising person-centred care

Improving information and understanding



Summarising evidence from systematic reviews



Key themes

We compiled information from 85 systematic reviews and found that the top things that managers and clinicians can do to improve patient information and understanding are:

- provide specific and tailored information and education
- make information and support available electronically
- provide telephone helplines, teleconsultations, telehealth and telemonitoring

The table signposts to evidence about what works best to enhance patient experience. Initiatives in bold have the most evidence to support them.

Focus	Improves knowledge	Improves experience	Improves service use and costs	Improves health outcomes
Targets patients	 Personalised information^{1,2} Printed and electronic information^{3, 4,5,6,7,8,9,10} Verbal reinforcement from clinicians^{11,12} Audio-taped consultations¹³ Education programmes¹⁴ 	 Printed and electronic information¹⁵, 16,17,18,19,20,21,22 Telephone helplines, telecounselling, and telemonitoring²³, 24,25,26,27,28,29,30 Digital interactive tv³¹ Social media³² Education programmes, especially active initiatives^{33,34} 	 Pre-operative and pre-discharge information^{35,} 36,37,38,39,40 Personalised information⁴¹ Reminder packaging for medicine^{42,43} Written and telephone reminders for screening and appointments^{44,45} Telemonitoring and teleconsultations^{46,47,} 48,49,50,51,52,53,54,55,56 	 Personalised information, including tailored for minority groups^{57,58} Clear information about medicines⁵⁹ Telehealth interventions 60,61,62,63,64,65,66 E-learning and online initiatives^{67,68,69,70,71,72,73,74,75,76,77,78} Group and individual education⁷⁹
Targets professionals	 Using wider range of community groups⁸⁰ 	 Clinical information systems / decision support^{81,82} 		 Education by non-clinical staff⁸³
Targets systems / organisations	• Improved information style ⁸⁴			• Food labels ⁸⁵

Improving information and understanding

Person-centred care involves placing people at the forefront of their health and care. This ensures people retain control, helps them make informed decisions and supports a partnership between people, families and health and social services.

Some of the core facets of person-centred care involve:

- supporting self-management
- supporting shared decision-making
- enhancing experience
- improving information and understanding
- and promoting prevention

We have a series of booklets for healthcare commissioners and health professionals summarising the best research evidence about what works in each of these areas. This booklet focuses on improving information provision and understanding.

What is health literacy?

Ensuring that people are provided with clear, useful information about health and healthcare is an important component of supporting people to be involved in decisions and to make positive choices. Health literacy has been defined as "the ability to read, understand and act upon health information." This involves much more than simply ensuring that people can read and understand health information. It is also about building competence to make health *decisions*. In other words, health literacy refers to the knowledge, motivation and competencies of accessing, understanding, appraising and applying health-related information within the healthcare, disease prevention and health promotion. Therefore it is relevant to the whole population, not just those with low basic literacy and numeracy skills. Being able to obtain, understand and use information is essential for good health.

Three distinct <u>levels of health literacy</u> have been described:

- *functional*: basic skills in reading and writing for understanding health information
- *interactive*: more advanced skills to enable active participation in health care choices
- *critical*: the ability to critically analyse information about health and health care and make effective use of it

Low health literacy is associated with health inequalities. People with low health literacy tend to have poorer health and a greater risk of hospitalisation. Health literacy interventions have three key objectives: to provide information, to encourage appropriate and effective use of healthcare resources and to tackle health inequalities. Improving the way that information is provided is therefore a key part of supporting personcentred care.

Why is this important?

1. Access to information helps people stay central to their care

People need to be able to understand their health and healthcare in order to:

- understand what is wrong
- gain a realistic idea of prognosis
- make the most of consultations
- understand tests and treatments
- assist in self-care
- find services and sources of help
- find reassurance and help to cope
- help others understand
- learn how to prevent further illness
- find 'the best' health care providers for them

Information needs may change during the course of an illness. When people first receive a diagnosis, for example, they may want practical information to support treatment decisions, as well as reassurance to reduce anxiety. Later, when the focus moves to long-term management and self-care, they may have more specific and in-depth information needs.

People's information needs are very diverse and vary according to their age, sex, socio-economic status, beliefs, preferences and coping strategies. Their information needs also depend on their general literacy, knowledge, skills and abilities and the language they speak at home.

There is a vast amount of information about health, healthcare, diseases and treatments available. But <u>research</u> has found that people want more information than they currently receive and that health professionals tend to overestimate the amount of information they supply. Thus the problem is not one of scarcity. It is about the accessibility, timeliness, quality, readability, reliability and usefulness of the available information.

2. Access to information can impact on people's health

Having good access to information and being able to understand it is crucial because it can have a significant effect on people's health. The American Medical Association concluded that health literacy is a stronger predictor of health status than age, income, employment status, education level, race or ethnic group.

Improving information provision and people's overall health literacy is important in tackling <u>health inequalities</u> because people with low health literacy:

- have poorer health status
- undergo more hospital admissions
- are less likely to adhere to treatment recommendations
- experience more drug and treatment errors, and
- make less use of preventive services.

Failure to give patients full information about their medicines contributes to the low levels of adherence to treatment recommendations reported in many studies.⁸⁷

3. Current health materials may be too complex

A study of <u>health literacy in England</u> compared the 'difficulty levels' of health information materials with assessments of over 7,000 people's literacy and numeracy skills. The health information materials were generally too complex. 42% of people aged between 16 and 65 years were unable to effectively understand and use everyday health information. This figure rose to 61% when the information also required numeracy skills. This suggests that between 15-1 million people across the country are not accessing the information they need to become and stay healthy.

Another study tested functional health literacy in the UK using materials that people might encounter in healthcare settings (for example, instructions for taking medicines). About 11% of adults in the UK had marginal or inadequate health literacy. Those with poor literacy skills were more likely to be:

- older
- male
- lower educational attainment
- lower income
- worse diet
- less exercise
- smokers
- worse self-rated health

4. Policies and regulations require good information provision

In the UK, there are many policy documents and regulations requiring health organisations to provide clear information and address health inequalities. For example, a 'Strategic review of health inequalities in England' was published in 2010 and the Health and Social Care Act 2012 gave NHS commissioners and Public Health England duties to reduce health inequalities. The NHS Commissioning Board is supposed to facilitate new approaches to health information and health literacy. The board's Mandate requires it to promote people's access to their health records and join up these records across organisations. Health and Wellbeing Boards, which assess local needs and coordinate strategies to meet them, are also pursuing the health inequalities agenda.

The <u>Health and Social Care Act</u> requires all health and social care providers to "provide service users with appropriate information and support in relation to their care or treatment; encourage service users, or those acting on their behalf, to understand the care or treatment choices available to the service user, and discuss with an appropriate health care professional, or other appropriate person, the balance of risks and benefits involved in any particular course of care or treatment."

The <u>NHS Constitution</u> for England includes the following commitments that have a bearing on information provision and health literacy:

- the NHS will strive to make decisions in a clear and transparent way, so that patients and the public can understand how services are planned and delivered.
- you have the right to be given information about your proposed treatment in advance, including any significant risks and any alternative treatments which may be available, and the risks involved in doing nothing.
- the NHS will strive to inform you about what healthcare services are available to you, locally and nationally.
- the NHS will strive to offer you easily accessible information to enable you to participate fully in your own healthcare decisions and to support you in making choices. This will include information on the quality of clinical services where there is robust and accurate information available.
- you have the right to be involved in discussions and decisions about your healthcare, and to be given information to enable you to do this.
- the NHS will strive to provide you with the information you need to participate effectively to influence the planning and delivery of NHS services.

The <u>Care Quality Commission</u> (CQC) regulates the quality of health and social care on behalf of patients, service users, their carers and families. It has issued extensive guidance to providers on meeting the statutory requirements to inform service users about their care and treatment, and to ensure that they are enabled to understand the choices available to them.

There is also specific guidance for health professionals. The General Medical Council's (GMC) guidance for doctors on standards for professional practice, *Good Medical Practice* states that they must give patients the information they want or need in a way they can understand. Doctors must make sure, wherever practical, that arrangements are made to meet patients' language and communication needs.

The <u>Nursing and Midwifery Council</u> (NMC) code requires nurses and midwives to make arrangements to meet people's language and communication needs. They must share with people, in a way they can understand, the information they want or need to know about their health.

The <u>Health Professions Council</u> (HPC) standards require allied health professional registrants to communicate properly and effectively with service users.

What works?

85 systematic reviews published between 1998-2013 have summarised the best research evidence about improving information and understanding. This section outlines key findings about what works so commissioners and health professionals know the most useful and cost-effective interventions to invest in.

The appendix describes how we identified and analysed the research evidence.

What has been tested?

Systematic reviews have explored the provision of printed materials, electronic health information and telephone support. The main interventions tested include:

Information for people undergoing treatment:

- leaflets and booklets about diseases and treatments
- printed material that is specially tailored for individual patients
- information about medicines and how to take them
- medication reminders and special packaging to improve treatment adherence
- combined provision of written materials and verbal information
- pre-operative information for patients undergoing surgical procedures
- information for people when they are discharged from hospital
- interventions to mitigate the effects of low literacy

Electronic health information and 'virtual' support:

- computer-generated patient information and education
- health websites
- 'virtual' communities
- audio and videotapes / dvds

Telephone based care:

- tele-consultation using real-time interactive video
- home tele-monitoring
- telephone counselling, tele-health, tele-care and health coaching
- automated telephone reminders

Initiatives to support self-management are described in another booklet in this series.

What are the impacts?

Improving knowledge

Written information

A number of reviews suggest that providing written information can improve people's knowledge. The impact is greater when written information is **personalised** and reinforced by verbal information from clinicians. ^{88,89,90,91} Material may need to be targeted towards particular ethnic and demographic groups. ⁹²

A review identified characteristics that improved the **clarity of information** and comprehension, including presenting essential information by itself or first, presenting information so that the higher number is better, adding icons to numerical information and adding video to verbal narratives.⁹³

Another review found that five interventions have commonly been used to enhance patient engagement in hospitals: entertainment, generic health information, patient-specific information, advanced communication tools and personalised decision support.⁹⁴

However other reviews have highlighted that much information used routinely in health services is too complex.⁹⁵ For example, one review found that standard leaflets in pill packets did not meet patients' needs adequately.^{96,97}

Using technology

There is evidence that both **printed and electronic information** materials and educational programmes can have a beneficial effect on patients' knowledge and understanding of their condition. ^{98,99,100,101,102,103,104,105}

A review examining online health information tutorials found mixed results. There was some evidence of improved knowledge and confidence, but the quality and quantity of evidence was low.¹⁰⁶

A review of internet use by the carers of people with cancer identified two main activities: information searching and support group activity. Carers accessed online information to increase their knowledge and problem solve. They valued e-mail communication with health professionals to ask questions and clarify information and found online support groups useful for gaining information tailored to individual needs and peer support.¹⁰⁷

A number of electronic screening tools are available to identify people with poor health literacy for further intervention. 108

Other information and education

Other approaches have also been tested. For instance, one review found that question prompt sheets and **audiotapes of consultations** improved recall of medical information provided within clinical consultations.¹⁰⁹

Specially targeted interventions can help to increase knowledge and understanding in people with low health literacy or from low socioeconomic groups or rural areas. For instance, a review of functional and interactive **health literacy education programmes** found improved health literacy skills of older adults, though longer-term impacts remained uncertain. 113

In the US, health information interventions have been set up in barbershops to target minority ethnic groups. A review found that barbers were able to provide health education, screening and referrals to health services. In studies where barbers received training, their knowledge of health conditions increased significantly and they were able to increase knowledge and promote positive health behaviours among their customers.¹¹⁴

However, it is difficult to recommend one type of education or information provision over others to support health literacy. Many reviews are not specific about the exact interventions included and others point out issues with the scope of current initiatives. For example, reviews of health literacy screening tools or educational interventions have suggested the need to use more comprehensive assessment approaches that move beyond readability and numeracy to address the full spectrum of health literacy factors. Older people and those from minority ethnic groups may be in need of special attention.

Improving experience

Written information

Providing written and electronic information can increase people's sense of empowerment. It can also improve their ability to cope, increase satisfaction and may help to reduce anxiety in certain cases. 122,123,124,125,126,127,128,129

Using technology

There is some evidence that **telephone helplines**, telecounselling, and telemonitoring can reduce social isolation, increase decision-making confidence and self-efficacy and improve satisfaction. ^{130,131,132,133,134,135,136,137} For example, initiatives that allow patients to share symptom data with providers via the internet or telephone lines have been found to improve experience. ¹³⁸ Interactive digital television has also shown promise. ¹³⁹

Clinical information systems, used to prompt health professionals to offer advice or support for certain conditions, have been found to improve care processes and people's experience of care. 140,141

Social media has also been used for health communication. Reported benefits include increasing interactions with others, more readily available shared and tailored information, increased accessibility and widening access to health information, peer / social / emotional support and public health surveillance. 142

A review found that online pharmacies may improve access to medication, but that the information contained on websites may be poor.¹⁴³

Other information and education

A review found improved mental wellbeing after people took part in an **educational intervention** to improve health literacy.¹⁴⁴

One review found that among people who experience a stroke, information strategies that **actively involve patients** and their caregivers are more effective in reducing anxiety and depression than passive information sources.¹⁴⁵

Improving service use and costs

Written information

Reviews have also examined the impact of various information strategies on service use and costs. For instance, a number of reviews report that **pre-operative and pre-discharge information** may help to reduce consultations, length of stay in hospital and follow-up visits. 146,147,148,149,150,151

A review of **targeted information** and support for parents with low health literacy found that this reduced the number of times they took their children to the emergency department.¹⁵²

Reminders in print, email or telephone form have been found to increase the uptake of preventive screening for cancer.¹⁵³

Reviews suggest that leaflets in pill packets do not help to improve adherence to medicine taking. 154,155

Using technology

Telephone reminders can help to increase attendance rates and improve medication adherence. ¹⁵⁶

Home-based **telemonitoring** and telecare may be cost-effective but studies have produced conflicting results. ^{157,158,159,160}

There is evidence that specifically targeted information and teleconsultations can improve diagnostic accuracy, reduce consultation rates, waiting times and out-of-pocket costs to patients, but studies have found conflicting results. 161,162,163,164,165,166,167

Other information and education

Reminder packaging (such as pills in calendar packs) may improve adherence to self-administered long-term medication. ^{168,169}

Improving health behaviour and outcomes

There is evidence that people with poor health literacy may have worse clinical outcomes or may be less likely to take steps to safeguard their health. A number of initiatives have been tested to address this, and to provide enhanced information more generally.

Written information

There is little evidence of a direct effect on health status or health behaviour from printed information on its own, but more complex **tailored interventions** may improve adherence, health behaviours and treatment outcomes.¹⁷⁴

One review found evidence of a reduction in medical errors when people were given **clear information** about medicines.¹⁷⁵

A review about adding information about healthy and unhealthy nutrients on **food labels** found no effects on whether people purchased foods. Interventions were more likely to be effective when they lasted for a longer time, included other components in addition to labels, and when they focused on the absence of unhealthy nutrients instead of or in addition to the presence of healthy nutrients.¹⁷⁶

Using technology

Some reviews have found evidence of improvements in quality of life and health status as a result of **telehealth** interventions. 177,178,179,180,181,182,183

For example, a review of various interventions to improve medication adherence in older people with cognitive impairment had mixed findings. Reminder systems generally had no benefit but **telephone and televideo reminders** at each dosing interval improved adherence.¹⁸⁴

Patient portals allow people to electronically access health information, including information managed by a healthcare organisation. A review found no impact of accessing and using information in this way on health outcomes, though there was some evidence of better adherence to treatment.¹⁸⁵

There is some evidence of a beneficial impact on health behaviour, uptake of screening, and clinical outcomes resulting from **e-learning programmes**, online initiatives and 'virtual' support. 186,187,188,189,190,191,192,193,194,195,196,197

Other information and education

People with low health literacy have worse health outcomes. There is some evidence that the effects can be mitigated with well-designed interventions. Some reviews suggest that targeted support is needed. One review reported that **group and individual education** interventions of varying intensity in primary care and community settings are useful for supporting sustained change in health literacy and this may have a follow-on effect on behavioural risk factors. Primary care interventions were more effective than those in the community for supporting smoking cessation whereas the reverse was true for diet and physical activity interventions.

Another review found that interventions of a **moderate to high intensity** were most effective for improving health literacy and subsequent lifestyle change. **Non-medical** healthcare staff were more effective in improving health literacy than clinical staff.²⁰¹

Another review found that structured interventions, **tailored to ethnic minority groups** by integrating elements of culture, language, religion and health literacy skills, had a positive impact on a range of patient outcomes.²⁰²

Intensive **individual educational interventions** for patients with acute and sub-acute lower back pain have been found to be effective on short and longer term outcomes including pain intensity, functionality and return-to-work.²⁰³ Similarly, a review found that intensive disease management interventions providing information reduced disease severity.²⁰⁴

On the other hand, a review found no improvement in medication adherence following an educational initiative to improve health literacy. Another review found no link between improved health literacy and better self-management. ²⁰⁶

What should we invest in?

Taking all of the evidence together, commissioners and providers wanting to enhance experience should consider investing in the initiatives listed below.

Improvement initiatives	Expected return on investment
Personalised patient information (paper and electronic) reinforced by professional or lay support	 Improvements in patients' knowledge and understanding of their condition Increased sense of empowerment Greater ability to cope with the effects of illness Improved patient satisfaction May lead to improvements in health behaviour and better health outcomes
Telephone reminders Telephone counselling and helplines, tele-care, tele- health, tele-monitoring	 Improved attendance rates Less social isolation Improved self-efficacy and satisfaction May improve diagnostic accuracy May lead to fewer consultations and shorter waiting times May lead to improved health status and better quality of life
E-learning and online resources Pre-operative and pre-	 Improved knowledge Improved access to information Improved self-management May impact on clinical outcomes May lead to shorter length of stay
discharge information materials	and fewer follow-up visits

The top three things to explore further are:

1. Clear and simple information

There is good evidence that well-designed printed and electronic information can help to improve patients' knowledge and understanding of their condition. Written health information materials must be well-targeted and available at the time and place when needed. Information materials have greater impact when the information is personalised and reinforced by verbal information from clinicians.

2. Telephone support

Telephone counselling, helplines and reminders can be beneficial to patients, helping to boost their confidence to look after themselves.

3. Electronic initiatives

Novel approaches such as e-learning modules, patient portals, websites and social media may all have a role to play in disseminating health information.

Learn more

You can access the abstracts of all the systematic reviews of evidence by clicking on the hyperlinks in the references section of this document.

There are a number of other resources available:

- Information should be readily accessible, clearly written and reliable. A number of tools and checklists have been developed to assist in the production of good quality information including <u>DISCERN</u> quality criteria for consumer health information; <u>IPDAS</u> (International Patient Decision Aids Standards Collaboration) and <u>Health on the Net Foundation</u> code of conduct (HON Code).
- The Department of Health supports an <u>information accreditation</u> scheme to 'kite mark' health information producers. The scheme supports information producers to improve the quality of their information. It is open to all organisations producing health information public, voluntary, and commercial.
- NHS Choices is the NHS's online service for the public. It first went live in June 2007 and now contains a wealth of information on all aspects of health and healthcare.
- <u>Healthtalkonline</u> reports people's real-life experiences of health and illness. Covering 50 health conditions, it aims to inform and educate people about patients' and carers' experience of illness and treatment. There is an additional <u>young people's website</u>.
- The <u>Patient Information Forum</u> is an independent association for professionals that work in the field of consumer health information. It promotes high-quality information for patients, carer and their families.

- Surveys carried out as part of the <u>Care Quality Commission</u>'s national NHS patient survey programme include a number of questions about information provision that could be used to monitor trends. Examples include the <u>Community Mental Health Service User Survey</u> and the <u>Inpatient Survey</u>. The <u>GP Patient Survey</u> also includes relevant questions.
- <u>Information prescriptions</u> may be offered to people with a longterm condition or social care need. They aim to guide people to relevant and reliable sources of information to allow them to feel more in control and better able to manage their condition and maintain their independence.
- <u>Skilled for Health (SfH)</u> is a set of teaching resources which evolved from the national adult basic skills programme, Skills for Life, and a series of pilot studies.
- The <u>Marmot review website</u> from the Institute of Health Equity showcases the 2010 strategic review of health inequalities and data and reports published since then.
- The <u>Health Literacy Group</u> brings together academics and practitioners with an interest in health literacy.

Appendix: identifying evidence

Commissioners and professionals need accessible and accurate information upon which to make decisions. High quality research is one of the things that might be used to help guide decisions. This appendix describes how we compiled the highest quality research to support decision-making.

What type of evidence is included?

To find out what works best to prioritise person-centred care, we drew on systematic reviews. 'Systematic reviews' have traditionally been regarded as the best standard of evidence because they bring together the results of all relevant studies that meet specific quality criteria. A systematic review starts with a specific question or set of clearly defined questions and then identifies, appraises, selects and synthesises all high quality research evidence relevant to that question. Tried and tested methods are used to perform a thorough search of the literature and critical appraisal of individual studies to identify valid and applicable evidence.

Some groups, such as the Cochrane Collaboration have agreed a set of <u>standards</u> for gathering, analysing and reporting evidence, though not all reviews conform to these standards.

By drawing together the findings of systematic reviews, we compiled the highest quality evidence to support healthcare planners and practitioners. We focused on the extent to which interventions impacted on people's knowledge, people's experience, service use and costs and health outcomes and behaviours.

Identifying research

Two reviewers independently searched bibliographic databases to identify relevant systematic reviews and other high level narrative reviews. The databases were Medline / Pubmed, Embase, CINAHL, the Cochrane Library and Google Scholar. Specialist websites and the reference lists of identified articles were also searched. The databases were searched for systematic reviews published in English language journals between January 1998 and December 2013.

Reviews were eligible for inclusion if they focused on interventions designed to enhance the active role of patients and lay people. Reviews where patients were solely the 'objects' of an intervention that targeted professionals were excluded. Two reviewers independently assessed the relevance and quality of each review, first based on the abstracts and titles of identified studies and then based on full-text. Any review which focused on a relevant topic and outcome was included.

More than 40,000 studies were screened and a total of 779 systematic reviews were identified for inclusion, broken down into the following categories:

- supporting self-management (228 reviews)
- supporting shared decision-making (48 reviews)
- enhancing experience (110 reviews)
- improving information and understanding (85 reviews)
- and promoting prevention (308 reviews)

Things to remember when interpreting the findings

The evidence base is substantial and significant, but it is not perfect. It will not help to answer all questions about how best to prioritise personcentred care. Some interventions, such as education for self-management, have been very well studied. Others initiatives have been less well investigated, and few studies have examined the longer-term effects of interventions.

Much of the research is from North America, so commissioners and health professionals need to think about whether the findings translate easily to the local context.

Although there is good evidence that some things make a difference to how people feel and what people do, analysis of cost-effectiveness is sometimes lacking.

Acknowledgements

The material was prepared by The Evidence Centre for National Voices. Some of the work was based on a project originally funded by the Department of Health via the Picker Institute Europe.

Exploring the evidence

You can click on the hyperlinks to explore the evidence further.

- Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication</u> adherence. *Cochrane Database Syst Rev* 2008:(2):CD000011.
- Johnson A, Sandford J, Tyndall J. <u>Written and verbal information versus verbal information only for patients being discharged from acute hospital settings to home.</u> Cochrane Database Syst Rev 2003;(4):CD003716.
- 3 Crocco AG, Villasis-Keever M, Jadad AR. <u>Analysis of cases of harm associated with use of health information on the internet</u>. *JAMA* 2002;287(21):2869-2871.
- Fox MP. A systematic review of the literature reporting on studies that examined the impact of interactive, computer-based patient education programs. Patient Educ Couns 2009;77(1):6-13.
- Revere D, Dunbar PJ. <u>Review of computer-generated outpatient health behavior</u> interventions: clinical encounters "in absentia". J Am Med Inform Assoc 2001;8(1):62-79.
- 6 Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a systematic review</u>. *Patient Educ Couns* 2005;58(3):235-243.
- 5 Smith J, Forster A, House A, Knapp P, Wright J, Young J. <u>Information provision for stroke patients and their caregivers</u>. *Cochrane Database Syst Rev* 2008;(2):CD001919.
- 8 Treweek SP, Glenton C, Oxman AD, Penrose A. <u>Computer-generated patient education materials: do they affect professional practice? A systematic review.</u> *J Am Med Inform Assoc* 2002;9(4):346-358.
- 9 Wantland DJ, Portillo CJ, Holzemer WL, Slaughter R, McGhee EM. <u>The effectiveness of Webbased vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes.</u> *J Med Internet Res* 2004;6(4):e40.
- Wofford JL, Smith ED, Miller DP. <u>The multimedia computer for office-based patient education: a systematic review. Patient Educ Couns</u> 2005;59(2):148-157.
- 11 Skinner CS, Campbell MK, Rimer BK, Curry S, Prochaska JO. <u>How effective is tailored print</u> communication? *Ann Behav Med* 1999;21(4):290-298.
- 12 Treweek SP, Glenton C, Oxman AD, Penrose A. <u>Computer-generated patient education</u> <u>materials: do they affect professional practice? A systematic review.</u> *J Am Med Inform Assoc* 2002;9(4):346-358.
- van der Meulen N, Jansen J, van Dulmen S, Bensing J, van Weert J. <u>Interventions to improve</u> recall of medical information in cancer patients: a systematic review of the literature. *Psychooncology* 2008;17(9):857-868.
- 14 Manafo E, Wong S. <u>Health literacy programs for older adults: a systematic literature review.</u> Health Educ Res 2012;27(6):947-960.
- 15 Bessell TL, McDonald S, Silagy CA, Anderson JN, Hiller JE, Sansom LN. <u>Do Internet interventions for consumers cause more harm than good? A systematic review.</u> *Health Expect* 2002;5(1):28-37.

- Eysenbach G. <u>The impact of the Internet on cancer outcomes</u>. CA Cancer J Clin 2003;53(6):356-371.
- 17 Eysenbach G, Powell J, Englesakis M, Rizo C, Stern A. <u>Health related virtual communities and electronic support groups: systematic review of the effects of online peer to peer interactions</u>. *BMJ* 2004;328(7449):1166.
- Fox MP. A systematic review of the literature reporting on studies that examined the impact of interactive, computer-based patient education programs. Patient Educ Couns 2009;77(1):6-13.
- 19 Nguyen HQ, Carrieri-Kohlman V, Rankin SH, Slaughter R, Stulbarg MS. <u>Internet-based patient education and support interventions: a review of evaluation studies and directions for future research.</u> Comput Biol Med 2004;34(2):95-112.
- 20 Revere D, Dunbar PJ. <u>Review of computer-generated outpatient health behavior interventions: clinical encounters "in absentia"</u>, J Am Med Inform Assoc 2001;8(1):62-79.
- 21 Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a systematic review</u>. *Patient Educ Couns* 2005;58(3):235-243.
- 22 Wofford JL, Smith ED, Miller DP. <u>The multimedia computer for office-based patient</u> education: a systematic review. *Patient Educ Couns* 2005;59(2):148-157.
- 23 Currell R, Urquhart C, Wainwright P, Lewis R. <u>Telemedicine versus face to face patient care: effects on professional practice and health care outcomes.</u> Cochrane Database Syst Rev 2000;(2):CD002098.
- 24 Deshpande A, Khoja S, Lorca J, McKibbon A, Rizo C, Jadad AR. <u>Asynchronous telehealth:</u> <u>systematic review of analytic studies and environmental scan of relevant initiatives.</u> Ottawa: Canadian Agency for Drugs and Technologies in Health, 2008.
- 25 Glueckauf R, Ketterson T. <u>Telehealth interventions for individuals with chronic illness:</u> research review and implications for practice. *Professional Psychology: Research and Practice* 2004;35(6):615-627.
- 26 Hersh WR, Hickam DH, Severance SM, Dana TL, Krages KP, Helfand M. <u>Telemedicine for the Medicare Population: Update.</u> Rockville, MD: Agency for Healthcare Research and Quality, 2006.
- 27 Jones JF, Brennan PF. <u>Telehealth interventions to improve clinical nursing of elders</u>. Annu Rev Nurs Res 2002;20:293-322.
- 28 Mair F, Whitten P. <u>Systematic review of studies of patient satisfaction with telemedicine</u>. *BMJ* 2000;320(7248):1517-1520.
- 29 Miller EA. <u>Telemedicine and doctor-patient communication</u>: an analytical survey of the literature. *J Telemed Telecare* 2001;7(1):1-17.
- Smith J, Forster A, House A, Knapp P, Wright JJ, Young J. <u>Information provision for stroke patients and their caregivers.</u> Cochrane Database Syst Rev 2008;(2):CD001919.

- Blackburn S, Brownsell S, Hawley MS. <u>A systematic review of digital interactive television systems and their applications in the health and social care fields.</u> *J Telemed Telecare* 2011;17(4):168-176.
- 32 Moorhead SA, Hazlett DE, Harrison L, Carroll JK, Irwin A, Hoving C. <u>A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication</u>. *J Med Internet Res* 2013;15(4):e85.
- Loke YK, Hinz I, Wang X, Rowlands G, Scott D, Salter C. <u>Impact of health literacy in patients</u> with chronic musculoskeletal disease--systematic review. *PLoS One* 2012;7(7):e40210.
- 34 Smith J, Forster A, House A, Knapp P, Wright J, Young J. <u>Information provision for stroke</u> patients and their caregivers. *Cochrane Database Syst Rev* 2008;(2):CD001919.
- 35 Horey D, Weaver J, Russell H. <u>Information for pregnant women about caesarean birth.</u> Cochrane Database Syst Rev 2004;(1):CD003858.
- Johansson K, Salantera S, Heikkinen K, Kuusisto A, Virtanen H, Leino-Kilpi H. <u>Surgical patient education: assessing the interventions and exploring the outcomes from experimental and quasi-experimental studies from 1990 to 2003.</u> Clinical Effectiveness in Nursing 2004;8(2):81-92.
- Johansson K, Nuutila L, Virtanen H, Katajisto J, Salanterae S. <u>Preoperative education for orthopaedic patients: Systematic review.</u> J Adv Nurs 2005;50(2):212-223.
- 38 McDonald S, Hetrick S, Green S. <u>Pre-operative education for hip or knee replacement.</u>

 Cochrane Database Syst Rev 2004;(1):CD003526.
- 39 McDonnell A. <u>A systematic review to determine the effectiveness of preparatory information in improving the outcomes of adult patients undergoing invasive procedures.</u> Clin Effect Nurs 1999;3(2):4-13.
- 40 Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a systematic review.</u> *Patient Educ Couns* 2005;58(3):235-243.
- 41 Morrison AK, Myrvik MP, Brousseau DC, Hoffmann RG, Stanley RM. <u>The relationship between parent health literacy and pediatric emergency department utilization: a systematic review.</u>

 Acad Pediatr 2013;13(5):421-429.
- 42 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication adherence</u>. *Cochrane Database Syst Rev* 2008;(2):CD000011.
- 43 Heneghan CJ, Glasziou P, Perera R. <u>Reminder packaging for improving adherence to self-administered long-term medications</u>, Cochrane Database Syst Rev 2006;(1):CD005025.
- 44 Naylor K, Ward J, Polite BN. <u>Interventions to improve care related to colorectal cancer among</u> racial and ethnic minorities: a systematic review, *J Gen Intern Med* 2012;27(8):1033-1046.
- 45 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication</u> adherence. *Cochrane Database Syst Rev* 2008;(2):CD000011.
- 46 Clark RA, Inglis SC, McAlister FA, Cleland JGF, Stewart S. <u>Telemonitoring or structured</u> telephone support programs for patients with chronic heart failure: systematic review and <u>meta-analysis</u>, *BMJ* 2007;334(7600):942.
- 47 Farmer A, Gibson OJ, Tarassenko L, Neil A. <u>A systematic review of telemedicine interventions</u> to support blood glucose self-monitoring in diabetes, *Diabet Med* 2005;22(10):1372-1378.
- 48 Glueckauf RL, Ketterson TU. <u>Telehealth interventions for individuals with chronic illness:</u>
 research review and implications for practice. *Professional Psychology: Research and Practice*2004:35(6):615-627.

- 49 Louis AA, Turner T, Gretton M, Baksh A, Cleland JG. <u>A systematic review of telemonitoring for the management of heart failure</u>. *Eur J Heart Fail* 2003;5(5):583-590.
- 50 Bunn F, Byrne G, Kendall S. <u>Telephone consultation and triage: effects on health care use and patient satisfaction</u>. *Cochrane Database Syst Rev* 2004;(4):CD004180.
- 51 Currell R, Urquhart C, Wainwright P, Lewis R. <u>Telemedicine versus face to face patient care:</u>
 effects on professional practice and health care outcomes. Cochrane Database Syst Rev
 2000;(2):CD002098.
- 52 Deshpande A, Khoja S, Lorca J, McKibbon A, Rizo C, Jadad AR. <u>Asynchronous telehealth:</u> <u>systematic review of analytic studies and environmental scan of relevant initiatives.</u> Ottawa: Canadian Agency for Drugs and Technologies in Health, 2008.
- Hailey D, Ohinmaa A, Roine R. *Recent studies on assessment of telemedicine: systematic review of study quality and evidence of benefit.* Alberta, Canada: Institute of Health Economics, 2003.
- 54 Hersh WR, Hickam DH, Severance SM, Dana TL, Krages KP, Helfand M. <u>Telemedicine for the Medicare Population: Update.</u> Rockville, MD: Agency for Healthcare Research and Quality, 2006.
- Jennett PA, Affleck HL, Hailey D, Ohinmaa A, Anderson C, Thomas R, Young B, Lorenzetti D, Scott RE. <u>The socio-economic impact of telehealth: a systematic review.</u> *J Telemed Telecare* 2003;9(6):311-320.
- Jones JF, Brennan PF. <u>Telehealth interventions to improve clinical nursing of elders</u>. Annu Rev Nurs Res 2002;20:293-322.
- 57 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication</u> adherence. *Cochrane Database Syst Rev* 2008;(2):CD000011.
- Zeh P, Sandhu HK, Cannaby AM, Sturt JA. <u>The impact of culturally competent diabetes care interventions for improving diabetes-related outcomes in ethnic minority groups: a systematic review. Diabet Med 2012;29(10):1237-1252.</u>
- 59 Ioannidis JP, Lau J. <u>Evidence on interventions to reduce medical errors: an overview and</u> recommendations for future research. *J Gen Intern Med* 2001;16(5):325-334.
- 60 Clark RA, Inglis SC, Mcalister FA, Cleland JGF, Stewart S. <u>Telemonitoring or structured</u> telephone support programs for patients with chronic heart failure: systematic review and meta-analysis. *BMJ* 2007:334(7600):942.
- 61 Currell R, Urquhart C, Wainwright P, Lewis R. <u>Telemedicine versus face to face patient care:</u>
 effects on professional practice and health care outcomes. Cochrane Database Syst Rev
 2000;(2):CD002098.
- 62 Glueckauf RL, Ketterson TU. <u>Telehealth interventions for individuals with chronic illness:</u>
 research review and implications for practice. *Professional Psychology: Research and Practice*2004;35(6):615-627.
- Hailey D, Ohinmaa A, Roine R. <u>Recent studies on assessment of telemedicine: systematic review of study quality and evidence of benefit</u>. Alberta, Canada: Institute of Health Economics, 2003.
- Jennett PA, Affleck HL, Hailey D, Ohinmaa A, Anderson C, Thomas R, Young B, Lorenzetti D, Scott RE. <u>The socio-economic impact of telehealth: a systematic review.</u> J Telemed Telecare 2003;9(6):311-320.
- 65 Louis AA, Turner T, Gretton M, Baksh A, Cleland JG. <u>A systematic review of telemonitoring for the management of heart failure</u>. *Eur J Heart Fail* 2003;5(5):583-590.

- 66 Mistiaen P, Poot E. <u>Telephone follow-up</u>, initiated by a hospital-based health professional, for postdischarge problems in patients discharged from hospital to home. Cochrane Database Syst Rev 2006;(4):CD004510.
- 67 Bessell TL, McDonald S, Silagy CA, Anderson JN, Hiller JE, Sansom LN. <u>Do Internet interventions for consumers cause more harm than good? A systematic review. Health Expect</u> 2002;5(1):28-37.
- 68 Glueckauf RL, Ketterson TU. <u>Telehealth interventions for individuals with chronic illness:</u>
 research review and implications for practice. *Professional Psychology: Research and Practice*2004:35(6):615-627.
- Revere D, Dunbar PJ. Review of computer-generated outpatient health behavior interventions: clinical encounters "in absentia", J Am Med Inform Assoc 2001;8(1):62-79.
- 70 Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a</u> systematic review. *Patient Educ Couns* 2005;58(3):235-243.
- 71 Treweek SP, Glenton C, Oxman AD, Penrose A. <u>Computer-generated patient education</u>
 <u>materials: do they affect professional practice? A systematic review.</u> *J Am Med Inform Assoc*2002;9(4):346-358.
- 72 Wantland DJ, Portillo CJ, Holzemer WL, Slaughter R, McGhee EM. <u>The effectiveness of Webbased vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes.</u> *J Med Internet Res* 2004;6(4):e40.
- 73 Wofford JL, Smith ED, Miller DP. <u>The multimedia computer for office-based patient education: a systematic review</u>, <u>Patient Educ Couns</u> 2005;59(2):148-157.
- 74 Beatty L, Lambert S. <u>A systematic review of internet-based self-help therapeutic interventions to improve distress and disease-control among adults with chronic health conditions.</u> *Clin Psychol Rev* 2013;33(4):609-622.
- 75 Tao D, Or CK. Effects of self-management health information technology on glycaemic control for patients with diabetes: a meta-analysis of randomized controlled trials. *J Telemed Telecare* (published online April 2013).
- 76 Montague E, Perchonok J. <u>Health and wellness technology use by historically underserved</u> health consumers: systematic review. *J Med Internet Res* 2012;14(3):e78.
- 77 Yu CH, Bahniwal R, Laupacis A, Leung E, Orr MS, Straus SE. <u>Systematic review and evaluation of web-accessible tools for management of diabetes and related cardiovascular risk factors by patients and healthcare providers.</u> *J Am Med Inform Assoc* 2012;19(4):514-522.
- 78 Gibbons MC, Wilson RF, Samal L, Lehmann CU, Dickersin K, Lehmann HP, Aboumatar H, Finkelstein J, Shelton E, Sharma R, Bass EB. Consumer health informatics: results of a systematic evidence review and evidence based recommendations. Transl Behav Med 2011;1(1):72-82.
- 79 Taggart J, Williams A, Dennis S, Newall A, Shortus T, Zwar N, Denney-Wilson E, Harris MF. <u>A systematic review of interventions in primary care to improve health literacy for chronic disease behavioral risk factors.</u> *BMC Fam Pract* 2012;13:49.
- 80 Luque JS, Ross L, Gwede CK. <u>Qualitative systematic review of barber-administered health education, promotion, screening and outreach programs in African-American communities.</u> *J Community Health* (published online August 2013).
- Pasricha A, Deinstadt RT, Moher D, Killoran A, Rourke SB, Kendall CE. <u>Chronic care model decision support and clinical information systems interventions for people living with HIV: a systematic review.</u> *J Gen Intern Med* 2013;28(1):127-135.

- 82 Haynes RB, Wilczynski NL. <u>Effects of computerized clinical decision support systems on practitioner performance and patient outcomes: methods of a decision-maker-researcher partnership systematic review. *Implement Sci* 2010:5:12.</u>
- Dennis S, Williams A, Taggart J, Newall A, Denney-Wilson E, Zwar N, Shortus T, Harris MF.

 Which providers can bridge the health literacy gap in lifestyle risk factor modification
 education: a systematic review and narrative synthesis. BMC Fam Pract 2012;13:44.
- Sheridan SL, Halpern DJ, Viera AJ, Berkman ND, Donahue KE, Crotty K. <u>Interventions for individuals with low health literacy: a systematic review.</u> J Health Commun 2011;16 Suppl 3:30-54
- 85 van 't Riet J. <u>Sales effects of product health information at points of purchase: a systematic review.</u> *Public Health Nutr* 2013;16(3):418-429.
- 86 Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, Brand H. Health literacy and public health: a systematic review and integration of definitions and models. BMC Public Health 2012;12:80.
- 87 Cox K, Stevenson FA, Britten N, and Dundar Y. <u>A systematic review of communication between patients and healthcare professionals about medicines: the consequences for concordance. Health Expect 2004;7(3):235-245.</u>
- 88 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication adherence</u>. Cochrane Database Syst Rev 2008;(2):CD000011.
- 89 Johnson A, Sandford J, Tyndall J. <u>Written and verbal information versus verbal information only for patients being discharged from acute hospital settings to home.</u> Cochrane Database Syst Rev 2003;(4):CD003716.
- 90 Skinner CS, Campbell MK, Rimer BK, Curry S, Prochaska JO. <u>How effective is tailored print</u> communication? *Ann Behav Med* 1999;21(4):290-298.
- 91 Treweek SP, Glenton C, Oxman AD, Penrose A. <u>Computer-generated patient education</u> <u>materials: do they affect professional practice? A systematic review.</u> *J Am Med Inform Assoc* 2002;9(4):346-358.
- 92 Weekes CV. <u>African Americans and health literacy: a systematic review.</u> ABNF J 2012;23(4):76-80.
- 93 Sheridan SL, Halpern DJ, Viera AJ, Berkman ND, Donahue KE, Crotty K. <u>Interventions for individuals with low health literacy: a systematic review.</u> *J Health Commun* 2011;16 Suppl 3:30-54.
- 94 Prey JE, Woollen J, Wilcox L, Sackeim AD, Hripcsak G, Bakken S, Restaino S, Feiner S, Vawdrey DK. Patient engagement in the inpatient setting: a systematic review. J Am Med Inform Assoc (published online November 2013).
- 95 Herndon JB, Chaney M, Carden D. <u>Health literacy and emergency department outcomes: a systematic review.</u> *Ann Emerg Med* 2011;57(4):334-345.
- 96 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication adherence</u>. Cochrane Database Syst Rev 2008;(2):CD000011.
- 97 Raynor DK, Blenkinsopp A, Knapp P, Grime J, Nicolson DJ, Pollock K, Dorer G, Gilbody S, Dickinson D, Maule AJ, Spoor P. <u>A systematic review of quantitative and qualitative research on the role and effectiveness of written information available to patients about individual medicines. Health Technology Assessment 2007;11(5).</u>
- 98 Crocco AG, Villasis-Keever M, Jadad AR. <u>Analysis of cases of harm associated with use of health information on the internet</u>. *JAMA* 2002;287(21):2869-2871.

- 99 Fox MP. A systematic review of the literature reporting on studies that examined the impact of interactive, computer-based patient education programs. Patient Educ Couns 2009;77(1):6-13.
- 100 Revere D, Dunbar PJ. <u>Review of computer-generated outpatient health behavior</u> interventions: clinical encounters "in absentia". *J Am Med Inform Assoc* 2001;8(1):62-79.
- 101 Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a systematic review</u>. *Patient Educ Couns* 2005;58(3):235-243.
- Smith J, Forster A, House A, Knapp P, Wright J, Young J. <u>Information provision for stroke</u> patients and their caregivers. *Cochrane Database Syst Rev* 2008;(2):CD001919.
- Treweek SP, Glenton C, Oxman AD, Penrose A. <u>Computer-generated patient education</u> <u>materials: do they affect professional practice? A systematic review.</u> J Am Med Inform Assoc 2002;9(4):346-358.
- 104 Wantland DJ, Portillo CJ, Holzemer WL, Slaughter R, McGhee EM. <u>The effectiveness of Webbased vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes.</u> *J Med Internet Res* 2004;6(4):e40.
- 105 Wofford JL, Smith ED, Miller DP. The multimedia computer for office-based patient education: a systematic review. Patient Educ Couns 2005;59(2):148-157.
- 106 Car J, Lang B, Colledge A, Ung C, Majeed A. <u>Interventions for enhancing consumers' online health literacy</u>. *Cochrane Database Syst Rev* 2011;(6):CD007092.
- 107 Kinnane NA, Milne DJ. <u>The role of the Internet in supporting and informing carers of people</u> with cancer; a literature review. *Support Care Cancer* 2010;18(9):1123-1136.
- 108 Collins SA, Currie LM, Bakken S, Vawdrey DK, Stone PW. <u>Health literacy screening instruments</u> for eHealth applications: a systematic review. *J Biomed Inform* 2012;45(3):598-607.
- 109 van der Meulen N, Jansen J, van Dulmen S, Bensing J, van Weert J. <u>Interventions to improve recall of medical information in cancer patients: a systematic review of the literature.</u> Psychooncology 2008;17(9):857-868.
- 110 RTI International. <u>Literacy and health outcomes.</u> Rockville MD: Agency for Healthcare Research and Quality, 2004.
- Barry MM, D'Eath M, Sixsmith J. <u>Interventions for improving population health literacy:</u> insights from a rapid review of the evidence. *J Health Commun* 2013;18(12):1507-1522.
- Brundisini F, Giacomini M, DeJean D, Vanstone M, Winsor S, Smith A. <u>Chronic disease</u> patients' experiences with accessing health care in rural and remote areas: a systematic review and qualitative meta-synthesis. *Ont Health Technol Assess Ser* 2013;13(15):1-33.
- 113 Manafo E, Wong S. <u>Health literacy programs for older adults: a systematic literature review.</u> Health Educ Res 2012;27(6):947-960.
- 114 Luque JS, Ross L, Gwede CK. Qualitative systematic review of barber-administered health education, promotion, screening and outreach programs in African-American communities. J Community Health (published online August 2013).
- Allen K, Zoellner J, Motley M, Estabrooks PA. <u>Understanding the internal and external validity of health literacy interventions: a systematic literature review using the RE-AIM framework.</u> *J Health Commun* 2011;16 Suppl 3:55-72.
- 116 Carbone ET, Zoellner JM. <u>Nutrition and health literacy: a systematic review to inform nutrition</u> research and practice. *J Acad Nutr Diet* 2012;112(2):254-265.
- Al Sayah F, Williams B, Johnson JA. <u>Measuring health literacy in individuals with diabetes: a systematic review and evaluation of available measures.</u> *Health Educ Behav* 2013;40(1):42-55.

- 118 Zeni MB. <u>Systematic review of health literacy in Cochrane database studies on paediatric asthma educational interventions: searching beyond rigorous design.</u> *Int J Evid Based Healthc* 2012:10(1):3-8.
- 119 Mårtensson L, Hensing G. <u>Health literacy a heterogeneous phenomenon: a literature review.</u>

 Scand J Caring Sci 2012;26(1):151-160.
- 120 Anker AE, Reinhart AM, Feeley TH. <u>Health information seeking: a review of measures and methods</u>. *Patient Educ Couns* 2011;82(3):346-354.
- 121 Zamora H, Clingerman EM. <u>Health literacy among older adults: a systematic literature review.</u> *J Gerontol Nurs* 2011;37(10):41-51.
- 122 Bessell TL, McDonald S, Silagy CA, Anderson JN, Hiller JE, Sansom LN. <u>Do Internet interventions for consumers cause more harm than good? A systematic review.</u> *Health Expect* 2002;5(1):28-37.
- 123 Eysenbach G. <u>The impact of the Internet on cancer outcomes.</u> CA Cancer J Clin 2003;53(6):356-371.
- 124 Eysenbach G, Powell J, Englesakis M, Rizo C, Stern A. <u>Health related virtual communities and electronic support groups: systematic review of the effects of online peer to peer interactions</u>. *BMJ* 2004;328(7449):1166.
- 125 Fox MP. A systematic review of the literature reporting on studies that examined the impact of interactive, computer-based patient education programs. Patient Educ Couns 2009;77(1):6-13.
- 126 Nguyen HQ, Carrieri-Kohlman V, Rankin SH, Slaughter R, Stulbarg MS. <u>Internet-based patient education and support interventions: a review of evaluation studies and directions for future research</u>. *Comput Biol Med* 2004;34(2):95-112.
- 127 Revere D, Dunbar PJ. <u>Review of computer-generated outpatient health behavior interventions: clinical encounters "in absentia"</u>. *J Am Med Inform Assoc* 2001;8(1):62-79.
- 128 Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a systematic review</u>. *Patient Educ Couns* 2005;58(3):235-243.
- 129 Wofford JL, Smith ED, Miller DP. <u>The multimedia computer for office-based patient education: a systematic review. Patient Educ Couns</u> 2005;59(2):148-157.
- Currell R, Urquhart C, Wainwright P, Lewis R. <u>Telemedicine versus face to face patient care:</u> effects on professional practice and health care outcomes. Cochrane Database Syst Rev 2000;(2):CD002098.
- Deshpande A, Khoja S, Lorca J, McKibbon A, Rizo C, Jadad AR. <u>Asynchronous telehealth:</u> <u>systematic review of analytic studies and environmental scan of relevant initiatives.</u> Ottawa: Canadian Agency for Drugs and Technologies in Health, 2008.
- Glueckauf R, Ketterson T. <u>Telehealth interventions for individuals with chronic illness:</u>
 research review and implications for practice. *Professional Psychology: Research and Practice*2004;35(6):615-627.
- Hersh WR, Hickam DH, Severance SM, Dana TL, Krages KP, Helfand M. <u>Telemedicine for the Medicare Population: Update.</u> Rockville, MD: Agency for Healthcare Research and Quality, 2006.
- 134 Jones JF, Brennan PF. <u>Telehealth interventions to improve clinical nursing of elders</u>. Annu Rev Nurs Res 2002;20:293-322.
- 135 Mair F, Whitten P. <u>Systematic review of studies of patient satisfaction with telemedicine</u>. *BMJ* 2000;320(7248):1517-1520.

- 136 Miller EA. <u>Telemedicine and doctor-patient communication</u>: an analytical survey of the literature. *J Telemed Telecare* 2001;7(1):1-17.
- 137 Smith J, Forster A, House A, Knapp P, Wright JJ, Young J. <u>Information provision for stroke</u> patients and their caregivers. *Cochrane Database Syst Rev* 2008;(2):CD001919.
- Johansen MA, Henriksen E, Horsch A, Schuster T, Berntsen GK. <u>Electronic symptom reporting between patient and provider for improved health care service quality: a systematic review of randomized controlled trials. Part 1: state of the art. J Med Internet Res 2012;14(5):e118.</u>
- Blackburn S, Brownsell S, Hawley MS. <u>A systematic review of digital interactive television systems and their applications in the health and social care fields.</u> *J Telemed Telecare* 2011:17(4):168-176.
- 140 Pasricha A, Deinstadt RT, Moher D, Killoran A, Rourke SB, Kendall CE. <u>Chronic care model decision support and clinical information systems interventions for people living with HIV: a systematic review.</u> J Gen Intern Med 2013;28(1):127-135.
- 141 Haynes RB, Wilczynski NL. <u>Effects of computerized clinical decision support systems on practitioner performance and patient outcomes: methods of a decision-maker-researcher partnership systematic review. Implement Sci 2010;5:12.</u>
- Moorhead SA, Hazlett DE, Harrison L, Carroll JK, Irwin A, Hoving C. <u>A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication</u>. *J Med Internet Res* 2013;15(4):e85.
- Orizio G, Merla A, Schulz PJ, Gelatti U. <u>Quality of online pharmacies and websites selling</u> prescription drugs: a systematic review. *J Med Internet Res* 2011;13(3):e74.
- Loke YK, Hinz I, Wang X, Rowlands G, Scott D, Salter C. <u>Impact of health literacy in patients</u> with chronic musculoskeletal disease--systematic review. *PLoS One* 2012;7(7):e40210.
- 145 Smith J, Forster A, House A, Knapp P, Wright J, Young J. <u>Information provision for stroke patients and their caregivers</u>. *Cochrane Database Syst Rev* 2008;(2):CD001919.
- 146 Horey D, Weaver J, Russell H. <u>Information for pregnant women about caesarean birth.</u> Cochrane Database Syst Rev 2004;(1):CD003858.
- Johansson K, Salantera S, Heikkinen K, Kuusisto A, Virtanen H, Leino-Kilpi H. <u>Surgical patient</u> education: assessing the interventions and exploring the outcomes from experimental and <u>quasi-experimental studies from 1990 to 2003.</u> Clinical Effectiveness in Nursing 2004;8(2):81-92.
- Johansson K, Nuutila L, Virtanen H, Katajisto J, Salanterae S. <u>Preoperative education for orthopaedic patients: Systematic review. J Adv Nurs</u> 2005;50(2):212-223.
- 149 McDonald S, Hetrick S, Green S. <u>Pre-operative education for hip or knee replacement.</u>

 Cochrane Database Syst Rev 2004;(1):CD003526.
- 150 McDonnell A. <u>A systematic review to determine the effectiveness of preparatory information in improving the outcomes of adult patients undergoing invasive procedures.</u> Clin Effect Nurs 1999;3(2):4-13.
- 151 Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a systematic review.</u> Patient Educ Couns 2005;58(3):235-243.
- Morrison AK, Myrvik MP, Brousseau DC, Hoffmann RG, Stanley RM. The relationship between parent health literacy and pediatric emergency department utilization: a systematic review.

 Acad Pediatr 2013;13(5):421-429.
- Naylor K, Ward J, Polite BN. <u>Interventions to improve care related to colorectal cancer among racial and ethnic minorities: a systematic review.</u> *J Gen Intern Med* 2012;27(8):1033-1046.

- 154 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication adherence</u>. *Cochrane Database Syst Rev* 2008;(2):CD000011.
- 155 Raynor DK, Blenkinsopp A, Knapp P, Grime J, Nicolson DJ, Pollock K, Dorer G, Gilbody S, Dickinson D, Maule AJ, Spoor P. <u>A systematic review of quantitative and qualitative research on the role and effectiveness of written information available to patients about individual medicines.</u> *Health Technology Assessment* 2007;11(5).
- 156 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication adherence</u>. *Cochrane Database Syst Rev* 2008;(2):CD000011.
- 157 Clark RA, Inglis SC, McAlister FA, Cleland JGF, Stewart S. <u>Telemonitoring or structured</u> telephone support programs for patients with chronic heart failure: systematic review and meta-analysis. *BMJ* 2007;334(7600):942.
- Farmer A, Gibson OJ, Tarassenko L, Neil A. <u>A systematic review of telemedicine interventions</u> to support blood glucose self-monitoring in diabetes. *Diabet Med* 2005;22(10):1372-1378.
- 159 Glueckauf RL, Ketterson TU. <u>Telehealth interventions for individuals with chronic illness:</u>
 research review and implications for practice. *Professional Psychology: Research and Practice*2004;35(6):615-627.
- 160 Louis AA, Turner T, Gretton M, Baksh A, Cleland JG. <u>A systematic review of telemonitoring for the management of heart failure</u>. Eur J Heart Fail 2003;5(5):583-590.
- Bunn F, Byrne G, Kendall S. <u>Telephone consultation and triage: effects on health care use and patient satisfaction.</u> *Cochrane Database Syst Rev* 2004;(4):CD004180.
- 162 Currell R, Urquhart C, Wainwright P, Lewis R. <u>Telemedicine versus face to face patient care: effects on professional practice and health care outcomes.</u> Cochrane Database Syst Rev 2000;(2):CD002098.
- Deshpande A, Khoja S, Lorca J, McKibbon A, Rizo C, Jadad AR. <u>Asynchronous telehealth:</u> <u>systematic review of analytic studies and environmental scan of relevant initiatives.</u> Ottawa: Canadian Agency for Drugs and Technologies in Health, 2008.
- Hailey D, Ohinmaa A, Roine R. <u>Recent studies on assessment of telemedicine: systematic review of study quality and evidence of benefit.</u> Alberta, Canada: Institute of Health Economics, 2003.
- Hersh WR, Hickam DH, Severance SM, Dana TL, Krages KP, Helfand M. <u>Telemedicine for the Medicare Population: Update.</u> Rockville, MD: Agency for Healthcare Research and Quality, 2006.
- Jennett PA, Affleck HL, Hailey D, Ohinmaa A, Anderson C, Thomas R, Young B, Lorenzetti D, Scott RE. <u>The socio-economic impact of telehealth: a systematic review.</u> J Telemed Telecare 2003;9(6):311-320.
- Jones JF, Brennan PF. <u>Telehealth interventions to improve clinical nursing of elders</u>. Annu Rev Nurs Res 2002;20:293-322.
- 168 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication</u> adherence. *Cochrane Database Syst Rev* 2008;(2):CD000011.
- Heneghan CJ, Glasziou P, Perera R. <u>Reminder packaging for improving adherence to self-administered long-term medications</u>. Cochrane Database Syst Rev 2006;(1):CD005025.
- 170 Fraser SD, Roderick PJ, Casey M, Taal MW, Yuen HM, Nutbeam D. <u>Prevalence and associations of limited health literacy in chronic kidney disease: a systematic review. Nephrol Dial Transplant 2013;28(1):129-137.</u>
- 171 Al Sayah F, Majumdar SR, Williams B, Robertson S, Johnson JA. <u>Health literacy and health</u> outcomes in diabetes: a systematic review. *J Gen Intern Med* 2013;28(3):444-452.

- Loke YK, Hinz I, Wang X, Rowlands G, Scott D, Salter C. <u>Impact of health literacy in patients</u> with chronic musculoskeletal disease--systematic review. *PLoS One* 2012;7(7):e40210.
- 173 Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. <u>Low health literacy and health</u> outcomes: an updated systematic review. *Ann Intern Med* 2011;155(2):97-107.
- 174 Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. <u>Interventions for enhancing medication</u> adherence. *Cochrane Database Syst Rev* 2008;(2):CD000011.
- 175 Ioannidis JP, Lau J. <u>Evidence on interventions to reduce medical errors: an overview and recommendations for future research</u>, *J Gen Intern Med* 2001;16(5):325-334.
- van 't Riet J. <u>Sales effects of product health information at points of purchase: a systematic review.</u> *Public Health Nutr* 2013;16(3):418-429.
- 177 Clark RA, Inglis SC, Mcalister FA, Cleland JGF, Stewart S. <u>Telemonitoring or structured</u> telephone support programs for patients with chronic heart failure: systematic review and meta-analysis. *BMJ* 2007;334(7600):942.
- 178 Currell R, Urquhart C, Wainwright P, Lewis R. <u>Telemedicine versus face to face patient care:</u>
 effects on professional practice and health care outcomes. Cochrane Database Syst Rev
 2000;(2):CD002098.
- 179 Glueckauf RL, Ketterson TU. <u>Telehealth interventions for individuals with chronic illness:</u>
 research review and implications for practice. *Professional Psychology: Research and Practice*2004;35(6):615-627.
- Hailey D, Ohinmaa A, Roine R. <u>Recent studies on assessment of telemedicine: systematic review of study quality and evidence of benefit</u>. Alberta, Canada: Institute of Health Economics, 2003.
- Jennett PA, Affleck HL, Hailey D, Ohinmaa A, Anderson C, Thomas R, Young B, Lorenzetti D, Scott RE. <u>The socio-economic impact of telehealth: a systematic review.</u> J Telemed Telecare 2003;9(6):311-320.
- 182 Louis AA, Turner T, Gretton M, Baksh A, Cleland JG. <u>A systematic review of telemonitoring for</u> the management of heart failure. *Eur J Heart Fail* 2003;5(5):583-590.
- 183 Mistiaen P, Poot E. <u>Telephone follow-up</u>, initiated by a hospital-based health professional, for postdischarge problems in patients discharged from hospital to home. Cochrane Database Syst Rev 2006;(4):CD004510.
- 184 Campbell NL, Boustani MA, Skopelja EN, Gao S, Unverzagt FW, Murray MD. <u>Medication</u> adherence in older adults with cognitive impairment: a systematic evidence-based review. *Am J Geriatr Pharmacother* 2012;10(3):165-177.
- 185 Ammenwerth E, Schnell-Inderst P, Hoerbst A. <u>The impact of electronic patient portals on patient care: a systematic review of controlled trials.</u> *J Med Internet Res* 2012;14(6):e162.
- 186 Bessell TL, McDonald S, Silagy CA, Anderson JN, Hiller JE, Sansom LN. <u>Do Internet interventions for consumers cause more harm than good? A systematic review. Health Expect</u> 2002;5(1):28-37.
- 187 Glueckauf RL, Ketterson TU. <u>Telehealth interventions for individuals with chronic illness:</u>
 research review and implications for practice. *Prof Psych* 2004;35(6):615-627.
- 188 Revere D, Dunbar PJ. Review of computer-generated outpatient health behavior interventions: clinical encounters "in absentia". J Am Med Inform Assoc 2001;8(1):62-79.
- Santo A, Laizner AM, Shohet L. <u>Exploring the value of audiotapes for health literacy: a systematic review.</u> *Patient Educ Couns* 2005;58(3):235-243.

- Treweek SP, Glenton C, Oxman AD, Penrose A. <u>Computer-generated patient education materials: do they affect professional practice? A systematic review.</u> J Am Med Inform Assoc 2002:9(4):346-358.
- 191 Wantland DJ, Portillo CJ, Holzemer WL, Slaughter R, McGhee EM. <u>The effectiveness of Webbased vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes.</u> J Med Internet Res 2004;6(4):e40.
- 192 Wofford JL, Smith ED, Miller DP. <u>The multimedia computer for office-based patient education: a systematic review.</u> *Patient Educ Couns* 2005;59(2):148-157.
- 193 Beatty L, Lambert S. A systematic review of internet-based self-help therapeutic interventions to improve distress and disease-control among adults with chronic health conditions. Clin Psychol Rev 2013;33(4):609-622.
- 194 Tao D, Or CK. Effects of self-management health information technology on glycaemic control for patients with diabetes: a meta-analysis of randomized controlled trials. J Telemed Telecare (published online April 2013).
- 195 Montague E, Perchonok J. <u>Health and wellness technology use by historically underserved</u> health consumers: systematic review. *J Med Internet Res* 2012;14(3):e78.
- Yu CH, Bahniwal R, Laupacis A, Leung E, Orr MS, Straus SE. <u>Systematic review and evaluation of web-accessible tools for management of diabetes and related cardiovascular risk factors by patients and healthcare providers. J Am Med Inform Assoc 2012;19(4):514-522.</u>
- 197 Gibbons MC, Wilson RF, Samal L, Lehmann CU, Dickersin K, Lehmann HP, Aboumatar H, Finkelstein J, Shelton E, Sharma R, Bass EB. Consumer health informatics: results of a systematic evidence review and evidence based recommendations. Transl Behav Med 2011;1(1):72-82.
- 198 RTI International. *Literacy and health outcomes*. Rockville MD: Agency for Healthcare Research and Quality, 2004.
- 199 Oldach BR, Katz ML. <u>Health literacy and cancer screening: A systematic review.</u> *Patient Educ Couns* (published online October 2013).
- 200 Taggart J, Williams A, Dennis S, Newall A, Shortus T, Zwar N, Denney-Wilson E, Harris MF. A systematic review of interventions in primary care to improve health literacy for chronic disease behavioral risk factors. BMC Fam Pract 2012;13:49.
- 201 Dennis S, Williams A, Taggart J, Newall A, Denney-Wilson E, Zwar N, Shortus T, Harris MF.
 Which providers can bridge the health literacy gap in lifestyle risk factor modification
 education: a systematic review and narrative synthesis. BMC Fam Pract 2012;13:44.
- 202 Zeh P, Sandhu HK, Cannaby AM, Sturt JA. <u>The impact of culturally competent diabetes care interventions for improving diabetes-related outcomes in ethnic minority groups: a systematic review.</u> *Diabet Med* 2012;29(10):1237-1252.
- Engers AJ, Jellema P, Wensing M, van der Windt DAWM, Grol R, van Tulder MW. <u>Individual patient education for low back pain.</u> *Cochrane Database Syst Rev* 2008;(1):CD004057.
- 204 Sheridan SL, Halpern DJ, Viera AJ, Berkman ND, Donahue KE, Crotty K. <u>Interventions for individuals with low health literacy: a systematic review.</u> *J Health Commun* 2011;16 Suppl 3:30-54.
- 205 Loke YK, Hinz I, Wang X, Salter C. <u>Systematic review of consistency between adherence to cardiovascular or diabetes medication and health literacy in older adults.</u> Ann Pharmacother 2012;46(6):863-872.

Fransen MP, von Wagner C, Essink-Bot ML. <u>Diabetes self-management in patients with low health literacy: ordering findings from literature in a health literacy framework.</u> Patient Educ Couns 2012;88(1):44-53.