DEMAND MANAGEMENT

Managing the provision of hospital services by manipulating demand: reducing the inflow of patients to hospital so that the demand for specialist services reaches a stable relationship with the available supply of specialist care.

This involves implementing models of care that will shift care along the continuum to the left:

The care continuum

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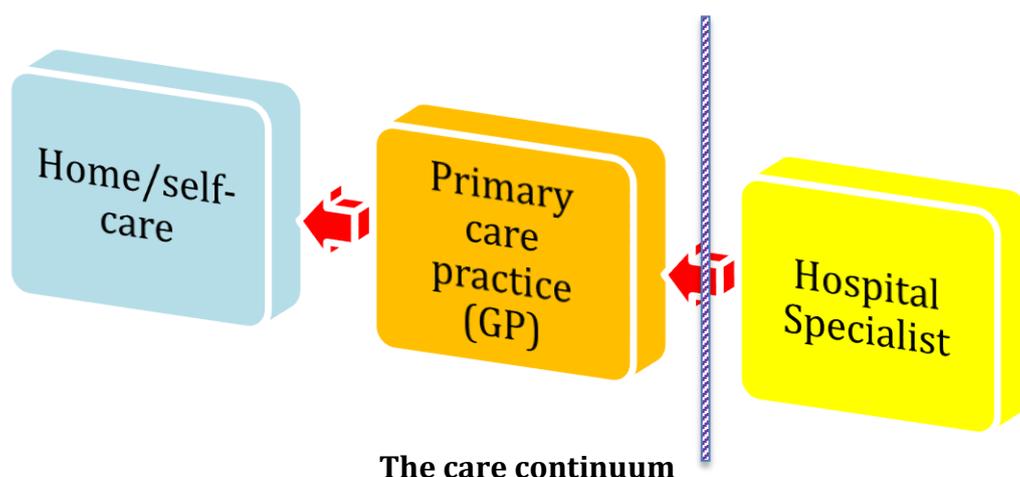
PART ONE:
INNOVATIVE MODELS AT THE SPECIALIST-PRIMARY CARE INTERFACE

Improving GP access to specialist advice

1. Dedicated rostered consultant available to provide direct telephone and email advice to GPs – for management advice aimed at finding alternatives to admission; or for early specialist opinion re diagnostic / treatment plan, which may avert the need for outpatient referral.

*Example: **The Respiratory service at Oxford University Hospitals** NHS Trust (Churchill Hospital) has a 'Consultant of the week' model - where the on-call consultant is available by mobile phone for urgent queries. There is also an email advice service for non-urgent queries – to which the consultant of the week responds. Email advice is often requested for patients known to the service with chronic disease, or if there is uncertainty around the need for referral, or, for example, for queries around interpretation of spirometry.*

> **WDHB context**: Specialist phones e.g. 'endo phone' is a mobile phone carried by specialists on a roster to answer any immediate endocrinology questions from GPs. This is well received by GPs but is only provided by some services and there is no one central point of contact (e.g. through operator is slower than ringing direct if you have the correct number). e-Referrals will become the conduit for email advice from specialist services i.e. they may respond to an e-referral with advice in the first instance.

2. "Hot clinics" for on-the-day or more rapid assessment and advice – these clinics are similar to (and may include) dedicated phone advice, but provide face-to-face assessment – helping to reduce outpatient clinic waiting times and admissions.

Examples:
*(i)**The Respiratory "Hot" clinic at Southmead Hospital**, North Bristol NHS Trust - takes referrals from GPs and Community Matrons for adult patients threatening admission with an acute respiratory problem. The clinic is staffed by a Respiratory Consultant, supported by a Respiratory Nurse Specialist and a Specialist Registrar, who see patients Monday to Friday 11.00 am to 4.00 pm, with the intention of preventing admission. Patients are discharged from the clinic with a management plan drawn up by a Respiratory Consultant.*
Audit has shown that 72% of the Hot clinic referrals were successfully treated in the community following attendance at the clinic and avoided the need for hospitalisation. (Thorax 2008; 63: supplement VII A13).

*(ii) **Older Person's "hot clinic" Assessment Units at King's College and Guy's Hospitals** – provide same day or next-day comprehensive geriatric assessment for older people with complex needs, aimed at avoiding unnecessary ED attendance or inpatient admission. GPs refer patients they think would benefit from rapid specialist assessment, patients attending ED may be diverted to the unit, and elderly hospital inpatients can also access it.*

*(ii) **Paediatric Rapid Access Clinic - Horton General Hospital** (Oxford University Hospitals NHS Trust)– for semi-urgent care. Clinics occur one afternoon a week for patients who cannot wait for the usual clinic appointments, but do not require immediate care.*

> **WDHB context:** Potentially worth exploring for specific areas such as 'frail elderly' where

multidisciplinary roles may be important. Otherwise this role is possibly filled by ADU.

3. Non-contact First Specialist Assessment (NcFSA) – the specialist provides a
written plan of care and any other necessary advice to the GP in response to outpatient referral being made, without the patient having to physically attend. Particularly useful in services where clinical management decisions rest heavily on diagnostic test results. NcFSA have been shown to reduce waiting times. Patient management remains primarily with the GP, but with ready access to specialist back-up – resulting in improved primary/secondary collaboration and GP upskilling. Funding is secured as a 'non-contact FSA' purchase unit.

*Example: **MidCentral DHB Neurology service** – in 2007, waiting time for outpatient assessment was well in excess of MoH limit (of 6 months) – some patients were waiting 24 months to be seen. Now, 20-30% of GP referrals are handled as NcFSA –with extensive letters and care plans being sent to GPs without face-to-face assessment of the patients. No significant clinical risk associated with NcFSA has been revealed by audit. Wait times now meet all required targets. The service has more option to control its processes and waiting times and clinicians are less concerned about patients 'falling through the cracks'.*

> **WDHB context**: It is considered that e-Referrals may be the facilitator for this, although it is recognized that some specialties are not using it this way currently or are struggling a little with its use

4. Virtual "paper rounds" and advice (teleconference) – pre-scheduled, regular
teleconferencing between specialist(s) and primary care practices for case discussion and advice – particularly suited to chronic conditions or lengthy therapies eg, CHF, diabetes, hypertension, mental illness, obesity, rheumatoid arthritis, obstetrics, hepatitis, chronic pain

*Example: **Project ECHO model** (USA) – organized virtual 'learning networks' where a wide variety of specialist teams provide collaborative care, advice and education on cases presented by primary care providers, with the aim of upskilling GPs (particularly in rural areas) to provide specialist level care to patients, without the need to attend the hospital clinic. The network provides an effective means of immediately disseminating new or changed best practice guidelines and their rapid adoption throughout primary care. Project ECHO was developed in response to poor patient access to specialist care in underserved rural communities and prisons in the US.*

> **WDHB context**: There is some interest in this from PHO Clinical Directors – will be investigated with respect to a mixture of CME purposes and virtual case discussions. We will be looking for a range of specialist services that would be interested in participating on a rostered basis.

Upskilling GPs to reduce referrals to specialists

5. Decision support tools and integrated care pathways – evidence based
management guidelines and referral pathways for common conditions aim to improve quality and consistency of general practice care. Collaborative engagement of local GPs in the development of primary/secondary pathways is critical to their successful acceptance and implementation in primary care.

Designing new ways of working (where and how services are provided to patients) to improve the flow of patients through the system may involve **improving direct GP**

access to diagnostics within pathways, to avoid unnecessary use of First Specialist Assessment (FSA) merely to access diagnostics. **Constructive feedback to GPs re inappropriate referrals** - giving reasons for declines and referencing the pathways, is essential to rapidly improve acceptance and uptake of the new system.

Examples:
*(i) **HealthPathways, Canterbury DHB** Gynaecology (Gynae) service – in 2007, in an effort to tackle its problem of long waiting times, the Gynae service developed referral criteria and guidelines in the management of common conditions, for GPs. The guidelines were distributed electronically and on CD however, their adoption by general practice was low. The Gynae department realized that rearranging hospital services would only have a minimal impact on overall service levels unless all parts of the service, inside and outside the hospital, were addressed as a 'whole of system approach. The Canterbury Initiative assisted by bringing together the hospital specialists and GPs to jointly identify and solve the clinical service issues, through a series of clinical workgroups, education and upskilling sessions. This high degree of collaborative engagement was key to both primary and secondary care clinicians' feelings of ownership of the service redesign, leading to high levels of GP acceptance and adoption of the pathways. The redesign involved:*
- *Publishing the clinical guidelines on the HealthPathways website, making them much easier to access and use*
- *Upskilling GPs in management of gynaecological conditions*
- *Funding general practices to perform some gynaecological investigations and procedures*
- *Improving general practice access to pelvic ultrasound*

Outcomes include reductions in FSAs and Follow-ups (FUs), 95% of FSAs going on to have hospital treatment, improved relationships between GPs, SMOs and gynaecology services, and an upskilled primary health sector. The HealthPathway for surgery for menorrhagia has resulted in a dramatic time to treatment reduction from 164 days in 2007, to 64 days in 2010.

(ii) 'Kupe'/Pathway Navigator (currently being developed)– dynamic decision support tool allowing clinicians to manage patients according to evidence-based clinical pathways, within their usual clinical workflow.

> **WDHB context**: The Auckland region is considering obtaining the ~350 pathways that have been developed in Canterbury as a starting point. They will need to be localized and socialized in the region. The intention will probably be to integrate into the Pathway Navigator electronic tool at some stage. We will try to get hold of these to circulate.

6. GPs with Special Interests (GPwSIs) - GPs who are able to deliver a clinical service/advanced procedure outside the normal scope of general practice, can offer increased capacity across the primary/secondary interface, reduce waiting times, and provide a convenient, community-based service to patients. GPwSI services will be of most value in priority areas of health need/demand within a particular community, and where the relationships between the GPwSIs, local GPs and hospital consultants are strong and continually maintained. In order to maintain clinical competencies and sustainable service delivery, GPwSIs need to work a minimum of 50 referrals per year and preferably 100. RNZGP and Health Workforce NZ are currently developing formal training processes for "Fellows in Advanced Competency Modules" which will formalize the GPwSI role. These include endoscopy, plastics, childhood obesity, ORL and infectious diseases. Although GPwSIs primarily deliver direct clinical services to patients, they

may also take on other roles such as trainer, educator and coach of GP colleagues in raising overall standards of care.

Examples:
Counties Manukau ORL GPwSI *service – primary care-based ORL clinic established in 2005 with 5 GPwSIs – for diagnosis of basic ORL conditions, exclusion of serious pathology, initiation of non-surgical management of common ORL conditions, care-planning for patients requiring common surgical interventions including direct referral to the waiting list. Evaluation of the service in 2012 found that referrals and treatment by the GPwSIs were appropriate, access was improved for patients, waiting times had reduced, patients found the clinic significantly more convenient than secondary care-based clinics, and the GPs valued the variety and professional interest the role provided them.*

Southern DHB *(Otago) GPwSI surgical services –*
(i) The **Orthopaedic GPwSI** *service now manages most of the ACC orthopaedic patients in Otago. 4 GPs have been trained by orthopaedic surgeons at Dunedin Hospital , to provide orthopaedic FSAs to ACC cases only – the GPs can access all diagnostic facilities available to hospital clinicians. Patients are seen a maximum of 3 times, before being referred to a specialist or returned to their GP. Over 1000 cases/ year have been referred to the service over the past 5 years and less than 50% are referred on to orthopaedic surgeons. The GPwSI service has improved patient access and orthopaedic waiting times in Otago - most referrals to GPwSIs are given an appointment within 2 weeks and a plan of care confirmed within 3-4weeks.*
(ii) **Minor surgery GPwSI** *service - 7 GPs, trained by Southern DHB ENT and plastic surgeons, provide a skin lesion assessment and excision service, contracted by the DHB to provide 350 procedures per year. Referrals come from primary care, mostly for suspected skin cancers. The GPs are able to manage 99% of referrals (the remaining 1% being referred on to specialists). A 2010/2011 audit showed waiting times for minor surgery have decreased to an average 12.3 days from referral, quality of GPwSI surgery was high - with 1% incomplete excision rate, 2.6% complication rate (dehiscence, infection), and malignant pathology in 55% of surgeries. GPwSI clinics in primary care has meant reductions in unnecessary referrals to secondary care and increased patient convenience of timely, quality care provided closer to home at no cost.*

> **WDHB context**: This has been tried before with a few different areas. There have been issues raised such as the reluctance of GPs to refer to a GPwSI at another practice in case they lose those patients entirely to the other practice. It has been considered to date that the environment (including the funding environment) may not be conducive to this. However there may be some specialty areas where these constraints can be worked around. If any specialties are interested in exploring further, it may be worth some investigation with primary care (suggestions from primary care include procedures and uncommon conditions).

Specialist outreach – decentralizing care

7. Specialist clinics in general practice setting – Specialists consulting or participating in case presentations within general practices. Over time, this helps to raise the level of expertise of the primary care team.

Examples:
*(i)***Totara Health Services** *- a 'one stop shop' for health services, comprising Health New Lynn general practice (an amalgamation of four local medical centres: Golf Road Medical Centre, Kinross Family Medical Centre, New Lynn Medical Centre, Titirangi Family Health Care into one practice), after hours walk in clinic open 8am - 8pm Monday to Friday, and 9am to 2pm weekends, on-site radiology facility and pharmacy, audiology, cardiology, a dentist, midwifery, musculoskeletal, ophthalmology, orthodontic, orthopaedic, psychology, physiotherapy, podiatry, and nutritionist services.*

*(ii) **Legacy Medical Village** (Texas, USA) is a group of 11 GPs located in Plano, a suburb of Dallas, population 700,000 - mostly young, middle- and upper-middle class. Physicians in the group had become frustrated with the highly fragmented nature of care in the Dallas area, which caused staff to spend significant time arranging referrals to hospital-affiliated specialists, and long wait times for specialist appointments. To address these issues, the group decided to create a primary care–driven, multispecialty medical complex – providing convenient, 'one-stop shop' same-day and extended hours access to a primary care practice and a full range of 26 specialty services that collaborate closely with one another while still operating as autonomous legal entities. Specialty practices include cardiology, gastroenterology, urology, neurology, podiatry, pain management, general surgery, plastic surgery, orthopedic surgery, women's health, optometry, and hematology/oncology (with one office for each type of specialty). The facility also includes physical therapy, laboratory services, and radiology services. Clinicians within Legacy refer primarily to each other, fostering the development of strong working relationships. Providers across specialties have an "open-door" policy that allows them to regularly collaborate on the care of individual patients, with communications occurring via e-mail, telephone, and personal interaction. Physicians are encouraged to walk into colleagues' offices to discuss a case in person, and to call colleagues during an office visit to ask for a real-time patient consult. Physicians may also invite each other to attend their practice meetings to discuss issues related to cross-specialty care. Other activities to create cohesiveness include the use of centralized administrative services, joint advertising of the Legacy Medical Village "brand", joint community activities – such as twice weekly onsite health classes on topics such as weight loss, diabetes, and bariatric surgery; employer health fairs; "lunch-and-learn" sessions held at corporate locations; and an exercise "boot camp" held in the Legacy Medical Village parking lot. Physicians and staff from all practices meet every 3 or 4 months to discuss strategy, operations, and process improvements, such as how to improve patient handovers and ensure the seamless transfer of patient information between specialists. The program has led to improvements in breast and colon cancer screening rates and to anecdotal reports of expedited patient care and improved physician and patient satisfaction.*

> **WDHB context**: This has also been tried and is currently working in some areas such as diabetes specialist clinics in primary care practices. However the intention for the future is more integration rather than co-location.

8. Telemedicine consults – to remote/rural community clinics, to prisons, nursing homes, schools, to other hospitals. *Examples: **VHA rural telemedicine**, Tele-ICU, Tele-stroke consults between hospitals.*

9. GP access to patient hospital record – does not substitute the need for direct communication, but enhances collaboration between primary-secondary care, to provide seamless integrated care across the continuum.

*Example: "**Dr-Connect**" at the Cleveland Clinic – gives referring primary care physicians 185 days access to the full electronic medical record of patients they have referred, with email notifications of any updates to the EMR during this time.*

> **WDHB context**: the national Shared Care Plan platform is the electronic enabler for sharing care plans and health information around patients with long term conditions. This has been used in some areas and roll-out is planned for Auckland and Waitemata.

PART TWO:
INNOVATIONS TO INCREASE PATIENT ENGAGEMENT & SELF-MANAGEMENT AT HOME

Demand management strategies to shift care away from the hospital and into the home, necessarily involve innovative ways of engaging and empowering patients to effectively self-manage their own health as independently as possible. These models align with the goal of a person centred health system – that is, one that supports people to make informed decisions about, and to successfully manage their own health and care. Services are re-oriented to promote patient choice, control, independence and autonomy - based on a philosophy of collaborative equal partnership between providers and patients in making care decisions.

Patient-centred care thus involves giving patients the information and tools to fully understand their condition and its management. It further involves guiding and supporting patients with strategies to put knowledge into practice – and to engage in managing their own health, at a tailored individual level.

Encouraging patients to learn more about their condition

Knowledge is a key component of patient health. Patients who lack knowledge about their diagnoses or prescribed intervention/medications, are less likely to adhere to their treatment plans, and cannot meaningfully participate in informed decision-making about their own health.

The literature suggests that patients only retain half the information they receive in a face-to-face clinic consultation. Effective patient education materials should be evidence-based, engaging, and delivered in a variety of methods and settings outside of the examination room.

1.General health information websites
The internet is a useful vehicle to increase patients' knowledge about their health conditions and management, as well as increasing people's health literacy in general. Web-based information includes **on-line information from hospital websites** and clinicians, as well as **on-line patient communities.** These are useful to reinforce or supplement information given during a face-to-face consultation - to ensure patients are fully informed about their condition and treatment options, which is a prerequisite for shared decision making and the legal requirement of informed consent.

A US survey found 86% of patients conduct a health-related internet search before making a doctor's appointment, and 90% of adults aged 18-24 say they would trust medical information shared by others in their social networks. 43% of all visits to US hospital websites come from search engines and most patients visit the sites of two or more hospitals during their investigations. 53% of patients said that information they found online led them to ask the doctor new questions; 60% researched their medications online to understand them better – and even to decide whether to fill them.

Examples:

Kaiser Permanente Northern California's (KPNC's) kp.org website *offers disease specific programs for patients to work through at their own pace – aimed at increasing patients' understanding of their medical problems, preparing patients for upcoming procedures and diagnostic tests, and supporting shared decision making. KPNC provides medical care to 3.4 million members through the 8,000 physicians of the Permanente Medical Group and 21 Kaiser Foundation hospitals. In the third quarter of 2013, the kp.org website received more than 34 million visits, one quarter of which were to the mobile version of kp.org. The programs cover a wide range of ailments and include self-care information, coaching videos by physicians targeted to common difficulties, and answers to FAQs about specific conditions/procedures/tests. There are also interactive on-line tools for some conditions, where patients can enter their symptoms and a physician-developed algorithmic program will assess whether the patient should consult a health professional. In that case, the patient is instructed to call the 24hr Appointment and Advice Call Centre to speak directly to a nurse or doctor. In 2012, more than 59,000 patients viewed 108 types of pre-operative or pre-procedure videos; 40,000 patients obtained information about a specific medical condition; and 33,000 obtained updates on their medical conditions through on-line newsletters. In an internal survey conducted in 2013, over 90% of patients reported that the pre-procedural programs improved their understanding. A 2009 internal evaluation found that patients who used these programs required approximately one less visit related to the intervention, compared to patients who had not used them.*

Similar hospital websites containing extensive patient care and health information (also available in mobile app form), include the ***Mayo Clinic website*** *– http://www.mayoclinic.org/patient-care-and-health-information; and the* ***Cleveland Clinic website*** *- http://my.clevelandclinic.org/health/default.aspx*

Patientslikeme.com – *provides membership to a free* ***online patient community*** *of over 250,000 patients, covering more than 2000 conditions. Patients share symptom and treatment experiences, support each other, and learn ways of managing their own health from others living with the same condition. The site enables patients to track their health over time and contribute this data to research.*

The ***SocialCode.io*** *is another online platform that provides peer communities with the added 'safety net' of specialist nurse participation/oversight (to ensure validity of information), as well as behavior change tools and professional support (providers can engage with patients via online chat or video).*

2. Group educational courses

Examples:

The ***NHS Expert Patients Programme (EPP)*** *is a 6 week self-management programme for people who are living with chronic (long-term) conditions. It is run by 2 tutors who both have a chronic condition. Topics cover dealing with pain and tiredness, coping with depression, relaxation techniques and exercises, healthy eating. The aim is to support people by increasing their confidence, improving their quality of life, and helping them manage their condition more effectively. Patients report valuing the social aspect of the weekly group sessions as much as the educational benefit. Disease-specific courses are also offered.*

Essentia Health and Vascular Centre *(Minnesota) runs group support and education sessions for its chronic heart failure patients - designed in response to patient focus group recommendations. Support groups are held 6 times a year and are led by CHF program staff. Topical presentations include medication management (taught by a pharmacist), grief support (led by a grief counsellor), diet management (given by a dietician) and living with the disease (led by a life coach).*

3. Shared medical appointments

The SMA is a novel way of delivering **routine follow-up care** in which groups of patients (8 to 20) attend a 1-2 hour appointment where they are seen by a multi-disciplinary team and undergo individual consultations in each other's presence, as a shared learning experience. The model, which recognises that education for self-management of chronic disease can become repetitive and time consuming, was designed to improve outpatient clinic throughput and provider productivity. In a typical 90 minute SMA, a doctor can see and treat 15 patients or more at once, while a nurse practitioner leads patients in group discussions and education. Patients have the benefit of a longer visit with the physician and access to other members of the health care team as appropriate, such as a nutritionist or health educator.

The focus of the SMA model is on patient education and disease management - providing an opportunity for patients to share both their successes and struggles with others experiencing similar challenges. As such, group visits are especially beneficial for patients living with chronic conditions, patients seeking more information on their specific health issues, and patients who require "mind and body" care – those patients who typically require additional time with their doctor. SMAs are not intended to replace individual visits, but rather to enhance care for these patient groups.

Studies comparing SMAs to conventional care have demonstrated improved accessibility and patient satisfaction[1], as well as enhanced general and disease-specific clinical outcomes. SMAs have been shown to reduce cardiovascular risk in diabetic patients – achieving significantly greater reductions in HbA1c and systolic BP compared to usual outpatient care.[2] SMAs have also been shown to provide superior CHF education than standard visits – achieving greater improvements in patient Heart Failure Knowledge Test scores after 8 weeks than patients receiving standard visits.[3] Families of children with haemophilia or von Willebrand's disease valued the social support, and reported improved levels of satisfaction with care,[4] especially for less experienced patients. In a study evaluating patient satisfaction with SMA follow-up to bariatric surgery,[5] 91% of patients scheduled a subsequent SMA, and 96% indicated that they would recommend SMAs to others. Patients graded their overall experience with SMAs as 4.5 out of 5 (1 being poor and 5, excellent). Implementation of SMAs dramatically reduced the average waiting period for an appointment from 57.7 days to 25 days for new patients, and from 50 days to 20.3 days for former patients. SMAs for mid-life women's health at Cleveland Clinic were found to increase physician productivity by as much as 20% per month.[6]

Example:
__The Cleveland Clinic__ has been offering SMAs for the past 10 years. Typically groups of 10 to 15 patients are seen together in a setting that encourages asking questions, and sharing concerns and experiences. Visits are with a physician or a nurse practitioner. An additional staff member with expertise on the topic (eg, an RN, psychologist, physician assistant) serves as a facilitator. Each patient signs a waiver and confidentiality agreement to assure a secure and private environment in which to share medical information. During the shared visits, patients can also be seen in a private exam room for individualized care, as needed. Each patient signs a waiver and confidentiality agreement to assure a secure and private environment in which to share medical information.
SMAs are offered in the following specialty areas: Opiate addiction, back pain in pregnancy, asthma, coeliac disease, CHF, chronic kidney disease, depression and anxiety in women, diabetes type 1 for adolescents, diabetes type 2, diabetic foot ulcers, juvenile arthritis, medical weight

management, menopause, minority men's wellness, multiple sclerosis, osteoporosis, polycystic ovary syndrome, paediatric rheumatology, preventive cardiac care, preventive medicine, stroke, transplant dermatology for skin cancer, women's health. See:
http://my.clevelandclinic.org/patients-visitors/prepare-appointment/shared-medical-appointments.aspx

4. Personalised care coordination for patients with complex needs

Care coordination is "the deliberate organisation of patient care activities between two or more participants involved in a patient's care to facilitate the appropriate delivery of health care services".

Care coordination programmes target patients who are at high risk of hospital readmission - who have difficulty managing their health due to complex longterm needs or treatment regimes, and/or require multiple services, providers and resources. For example, older adults with several chronic conditions, children with developmental disabilities, recovery from stroke or serious accidents, mental health patients, and cancer care. The aim is to bridge the gaps in the fragmented healthcare delivered to these patients – ensuring effective referrals and transitions occur, reducing waste and accidental duplication, and keeping patients informed - through all providers sharing important clinical information, and having clear, shared expectations of their roles.

Common characteristics present in successful care management programmes include[7]:
- Appropriate identification of high-risk patients
- Multidisciplinary teams (expertise across medical, behavioural health and social services)
- Team skills match patient needs
- Patient involvement in goal setting and care planning
- Home and community based care
- Specialty trained care managers
- Smaller case loads
- Health coaching

The care coordinator/care manager becomes the primary point of contact for patients and their families, and works with the patient and family to (1) Assess and identify the patient's biopsychosocial needs; (2) Develop a plan of care and discuss goals and outcomes; (3) Implement the plan – with the care coordinator acting as an information and education resource for patients, organising referrals, coordinating and streamlining the patient's care as they transfer between various healthcare providers and social services; (4) Periodic evaluations – to continually reassess the plan of care and address new needs.

A major focus of care coordination is patient education, aimed at helping patients to better manage their own conditions, thereby maximising quality of life and reducing admissions. Care coordinators provide expert management and advice on symptom control - often involving monitoring of conditions eg, patient takes daily BP, weight, blood glucose, pain levels, with the care coordinator providing immediate educational feedback regarding triggers if recordings are abnormal, and advising appropriate intervention.

In New Zealand, the care coordinator role is established in cancer care as part of the government's Faster Cancer Treatment programme. The Ministry of Health funds 40 dedicated cancer nurse coordinators who provide a direct and single point of contact for patients and their families along the cancer care pathway. Impact and process evaluations of the cancer nurse coordinator role are currently underway (study period Jan 2013 to June 2016).

Care coordination services are provided at Canterbury, Capital & Coast, and Hutt Valley DHBs by Nurse Maude - http://www.careco.org.nz/

Health Workforce NZ is exploring a national training programme in case management and care coordination for clinical and allied health professionals wanting to pursue this as a viable career pathway. So far, two short introductory courses to case management/care coordination have been presented in Christchurch and Counties Manukau, to 38 participants from nursing and allied health backgrounds. The courses and follow-up mentoring sessions are currently being formally evaluated and will inform recommendations for a formal training pathway.

Examples:

West Coast PHO 'Health Navigator' service *- care coordination for patients with longterm conditions and major social issues that impact their accessibility to health and social support services. Target diseases are CVD, diabetes, COPD, cancer.*
http://assets.healthnavigator.org.nz/2011/04/West-Coast-Bridging-the-gap-between-health-social-care-the-role-of-health-navigators-within-a-rural-PHO.pdf

See Kings Fund study of five effective care coordination programmes in the UK at:
 http://www.kingsfund.org.uk/projects/co-ordinated-care-people-complex-chronic-conditions

- ***Midhurst Macmillan specialist palliative care service*** *– a community-based, consultant-led service providing direct care and support to patients in the last 12 months of life to prevent unnecessary hospital admissions and enable them to live at home and die in the place of their choice.*
- ***Oxleas Advanced Dementia Service*** *provides care co-ordination and specialist palliative care and support to patients with advanced dementia living at home. Comprises of a psychogeriatrician, several specialist nurses and a dementia social worker.*
- ***Pembrokeshire community resource teams –*** *integrated teams of health and social care professionals, known as community resource teams (CRTs) who work to coordinate care for people living at home in the largely rural county of Pembrokeshire. The model is one aspect of a wider strategic programme of integrated care called 'Care Closer to Home'.*
- ***Sandwell Esteem Team****- part of the Sandwell Integrated Primary Care Mental Health and Wellbeing Service (the Sandwell Wellbeing Hub) in the West Midlands. The hub is a holistic primary and community care-based approach to improving social, mental and physical health and wellbeing in the borough of Sandwell.*
- ***South Devon and Torbay*** *– this group uses proactive case management and community virtual wards to identify people at risk of an unnecessary hospital admission in the next 12 months. Each month, the multidisciplinary team identifies and addresses patients' needs to put in place a case management plan to prevent crises from occurring.*

VHA care coordination and home telehealth (CCHT) *– see case study*

Intermountain Healthcare Care Management Plus program – *primary care based care coordination by a care manager, combined with electronic tracking and reminder systems to deliver comprehensive medical care to elderly patients with multiple chronic illnesses. The care manager helps patients to manage medical and quality of life issues, while the informatics tools*

document the care plan and provide reminders on best practices. A seven-clinic 1-year long pilot study showed care-managed patients with diabetes had 3-fold greater reductions in HbA1c levels compared with a control group, as well as 15-25% fewer long-term complications, 20% lower mortality, and 24% fewer hospitalisations. Physician productivity was 8-12% higher in the 50 physicians who used the program. This roughly covered the cost of the care manager and training. The program resulted in reduced medical costs of approx USD$200,000 per clinic due to the avoidance of unnecessary services at the primary care level.

5. Pharmacist home visits

"House calls" by pharmacists are an innovative way of empowering elderly people to stay at home independently for as long as possible, and may help to reduce preventable medication-related admissions. North American studies[8] estimate the incidence of drug-related presentations to ED to be as high 28%, of which up to 70% are preventable – these being caused by patient non-compliance or inappropriate prescribing or monitoring. Older people (over the age of 60 years) using multiple medications are at a greater risk – with 10 and 30% of all hospital admissions in older people thought to be caused by medication-related problems.[9] Estimates of non-adherence among the elderly vary from 21 to 55% with ~11% of admissions attributable to non-adherence.

Pharmacists can play an important role in the prevention, identification and reporting of medication errors; and in the care of people with long-term conditions by promoting healthy lifestyles, supporting self-care, carrying out medication reviews and managing disease systematically within multi-professional teams.

Home visits give pharmacists the clearest picture of a patient's health, lifestyle and daily medication regimen – enabling them to see what medications (prescribed, OTC and 'home brewed' remedies) are actually being taken, where they are stored, strategies – or lack thereof – for taking medications on time, and other problems with adherence eg, difficulty opening vials due to arthritis, stopping meds because they can't remember their purpose, inaffordability of filling the prescription. Patient's beliefs and views about medicines are a key influence on when, how and whether they take their medication. Only around 50% of long term medicines are actually taken as directed.[10] Home assessments allow issues to be identified, medication review and education provided, and practical solutions tailored to meet individual needs.

There is now good evidence that medication review improves process outcomes of prescribing such as reduced polypharmacy, more appropriate choice of medicine, improved drug monitoring, and prevention of potential adverse effects.[11] Pharmacist interventions (including home visits) have failed to demonstrate improvement in harder outcomes – such as reductions in unplanned hospital admissions, or mortality.[12] However, reducing hospital admissions is not usually the main focus of the pharmacist's role, and realistically, medication problems are seldom the sole causative factor in the breakdown in the care for complex older patients in the community. Rather, pharmacist-led interventions focus on ensuring the safe, effective and rational use of medicines, improving patient care, and reducing health inequalities.

Examples:
Canterbury Medication Management Service, CDHB - *in New Zealand, a mobile pharmacist service has been available in Canterbury since 2011, to conduct home assessments for eligible patients. The Medication Management Service (MMS) is a review of a patient's medicine taking behaviour undertaken by an accredited pharmacist. The service improves a patient's medication-*

related health outcomes by identifying all issues affecting adherence, setting goals with the patient and increasing their understanding of their medications. MMS involves interaction between the patient and their pharmacist to optimise the outcomes from their medication. The service is provided free to eligible patients (criteria involve at risk patients, living independently in the community, taking at least 3 different medications). MMS does not involve a clinical medication review but focuses on medication adherence and medicine knowledge. Referrals are accepted from GPs, CREST, families, hospital teams, community pharmacists/technicians, and medication oversight patients. See: *http://mms.ccpg.org.nz/providing-the-service/mms-consultation-process/*

Providence Healthcare Geriatric Outreach service *(Canada) – provides home visits by a certified geriatric pharmacist with the goal of empowering seniors to spend more of their final years living where they want, the way they want. The pharmacist review is sent to the patient's GP.*

The University of Rhode Island's College of Pharmacy *- is pairing home visits from pharmacists with a portable electronic personal health record called the ER-card, in an effort to reduce hospital readmissions. During the home visit, the pharmacist performs a medication review and also inputs the patient's medical history and medications into a laptop or, if the patient wishes, into the patient's computer to complete the ER-Card. The ER-Card lists current medications (prescribed, over-the-counter, herbal supplements), blood type, allergies, medical conditions, past major surgeries, emergency contacts, usual GP, treating specialists, advanced directives, and any other relevant information. A USB drive with the patient's ER-Card profile is given to the patient, or if a patient doesn't have computer access, a hard copy will be printed. The intention is for patients to bring their ER-Card to medical appointments and hospitals, where it can be viewed easily and used to inform medical care providers.* (*See: http://www.uri.edu/news/releases/?id=5913*)

6. Primary care based lifestyle behaviour health coaching

Poor diet, smoking, and physical inactivity remain leading causes of morbidity and mortality, but busy primary care practices rarely have time to offer interventional support for healthier lifestyles. Addressing this problem, a 'Health Navigator' model has been established in over 33 Genesys PHO practices (serving over 59,000 primary care patients) in the US since 1997. Health navigators are members of the primary care team, who help patients adopt healthier lifestyle behaviours and better habits to self-manage their health. Complex medical and social issues are barriers to healthy lifestyles and the health navigator supports patients in overcoming these. Patients identified as requiring lifestyle change – commonly, for weight loss, quitting smoking, or poorly managed chronic conditions such as diabetes, pain or depression, are referred by practice staff. Close, supportive relationships with patients are established through in-person visits and phone calls; helping patients to set health goals and making a plan to achieve these; providing relevant educational material; and facilitating access to medical and community-based resources eg, recreational facilities, nutrition programs, smoking cessation programs, housing assistance, legal services, mental health services. This is done in a collaboration with the primary care team to ensure a coordinated care plan. The health navigator checks on progress, usually by telephone, and conducts a formal reassessment every 3 to 6 months - documenting progress and supporting behaviour change.

Beneficial outcomes: pre and post-health implementation data from patients receiving the Genesys intervention between 2003 and 2009, showed that after 6 months of health navigation, 53% of patients increased their levels of physical activity and fruit and vegetable intake, and 17% of smokers had quit. Among 797 diabetics who had not previously performed self-care, 82 % began checking their blood sugars regularly, 90%

began checking their feet regularly, 52% who had not previously had an eye exam got one, and 45% attended a formal diabetes self-management education session. 42% of depressed patients and 37% of chronic pain patients reported improvement in symptoms after working with health navigators, and patients experienced a 50% decline in both ED visits and inpatient admissions.

Health navigators can be health educators, social workers, nurses, dieticians, or other health care professionals, who are trained in motivational interviewing, and in developing stakeholder relationships to facilitate effective referrals to medical and community services. The typical Genesys health navigator works with a target population of 6,000 to 6,500 patients, engaging around 600 patients per year.

7. Giving patients access to their personal health information - Patient portals

Patient portals allow patients access to their personal health records ie, problem list, medication list, allergy list and test results, reminders for preventative health checks, and usually allow patients to order prescription refills, book doctors' appointments, and communicate with health providers via email. These user-friendly and convenient features are aimed at engaging patients in their own health care and informed decision-making. By providing patients with their personal health records, they can become valuable members of their own care team – providing an extra 'layer of protection' against mistakes, for example in chasing up missing results or follow-up, and picking up inaccuracies on the medical record.

The consumer demand for these services is significant and not limited to the young – an Accenture consumer research study of over 9000 people in 9 countries found that 77% of seniors (aged >65years) say that online access to their health records is important. Of importance to American consumers was the ability to book appointments online (77%), requesting prescription refills electronically (76%), and receiving reminders via email and text (74%). Communicating with providers via email was important to slightly fewer (69%).

Research suggests that portal access increases patient satisfaction; self-scheduling appointments reduces DNA rate by 40%; and use of secure messaging to get patients to confirm or supplement aspects of their medical record prior to a scheduled appointment (eg, current medication list, or self-monitored chronic disease measurements such as BP or blood glucose) results in both patient and doctor feeling more prepared for the visit.

However, there is currently no clear evidence that portal use can lead to improved clinical outcomes or that it will decrease the demand on healthcare services. Earlier studies showed conflicting results. Some suggested that online access, with the ability to communicate with clinicians online, may substitute for in-person services – for example, portal use at Kaiser Permanente Hawaii[13] was associated with a 26.2% reduction in number of annual office visits, however, this decrease was more than offset by an increase in telephone encounters and secure messages so that the total number of patient contacts increased by 8.3%. A more recent, large retrospective study at Kaiser Permanente Colorado[14], found that in the year following activation of their portals, patients with online access to their records and secure messaging increased their numbers of office visits by 16%, and increased the number of telephone calls they made to the clinic by 8%, as compared to the year prior to portal activation. They also had

statistically significant higher numbers of afterhours clinic visits (increase of 19 visits per 1000 members per year), ED visits (11 extra visits per 1000 members per year) and hospitalisations (20 extra admissions per 1000 members per year), compared with a matched cohort of KP members without online access. This trend was consistent across varying clinical services and held true across all ages and genders. Possible explanations for these surprising results are that they are a reflection of a genuine increase in patient engagement in healthcare in the first year of portal sign-up – with patients identifying additional health concerns and queries from their online access. Whether this will have a beneficial effect on healthcare utilisation down the track is yet to be seen. There may also be an element of 'frequent user' self-selection among patients who choose to sign up for portal use – with those who are more anxious or already more likely to use services using the online technology to gain even more frequent access, rather than viewing it as a substitute for contact with the health system. Another possibility is that clinicians may not yet feel comfortable dealing with medical issues remotely and find it easier to bring the patient in to the office when an email query is made – it may be that current medical training inadequately prepares doctors for patient care in virtual environments.

Some research has shown that patient-physician secure messaging to monitor and manage chronic conditions between regular checkups, can lead to improved glycaemic, hypertensive, and LDL control in the primary care setting.[15] However beyond this, there has been no other evidence that portals lead to improved health outcomes. Further research is required to elucidate which features of portals best improve patient engagement and can lead to improved health status.

Examples:
Kaiser Permanente's MyHealthMangaer *– a patient online access system available at no additional cost to the patient, to view personal health information and lab results, choose a physician, schedule appointments, send and receive secure messages to and from clinicians, and order medication refills for home delivery or pharmacy pick-up through the kp.org site. As of September 2013, 73% of KPNC patients had registered on the site allowing them to manage their health care in this way. By December 2013, more than 42,000 patients had logged onto KP Preventive Care – a mobile app that allows patients to view the status of preventive health care screenings, communicate with their physician, and schedule screening tests such as mammograms.*

*The free **Mayo Clinic Patient app** offers secure access to personal health records and lab results, health news and information, allows online appointment booking, prescription refills, and bill paying, in a convenient mobile form.*

*Similarly, **Cleveland Clinic's interactive "MyChart"** website allows patients to view portions of their medical record – health summary, current medications, and test results; review past and upcoming appointments, and request and cancel appointments; receive health reminders; request prescription renewals; and manage healthcare for children and dependants with "MyChart for Caregivers".*

Giving patients tools to self-manage their condition

8. Self-directed internet therapies

Several online treatment programs have been developed and found to be effective, particularly for delivering mental health therapies. Internet and mobile technologies are especially appealing to people who are infrequent users of healthcare or who are

relatively resistant to usual outreach methods, and are well suited to self-managing lifestyle modifications to prevent or halt progression of mildly severe illness.

Examples:
The University of Sydney Counselling and Psychological Services *provides links to selected free, interactive e-therapy programs on its website:*
http://sydney.edu.au/current_students/counselling/get-help/e-therapy.shtml
These include interactive online programs for mood problems, chronic pain, cognitive behavioural therapy, coping with grief, divorce, reducing alcohol, mindfulness and meditation. There are also self-help workbooks for patients to download and complete at their own pace, covering a wide range of topics from eating disorders and depression to anger management and substance abuse.

Omada Health (USA) 'Prevent' Diabetes prevention program *– a 16 week weight loss program designed to help people at risk of type 2 diabetes or those with prediabetes, develop healthier lifestyle behaviours through structured learning, online small peer group support, personal health coaching, and data tracking (of weight and activity using wireless scales and digital pedometers). The Prevent curriculum is based on the 2002 National Diabetes Prevention Program study, which found that a comprehensive weight loss program cut the risk of type 2 diabetes by 58% in over 3200 patients with prediabetes. A pilot study of the Prevent program in 230 prediabetic people resulted in an average weight loss of 6.25kg after 16 weeks.*
https://omadahealth.com/programs/prevent/

SPARX *(Smart, Positive, Active, Realistic, X-factor thoughts) – targeted at 12-19year olds, this is a free online self-help computer program, incorporating cognitive behavioural therapy, to help young people learn skills to deal with mild to moderate depression. Developed at the University of Auckland. https://research.sparx.org.nz/*

9. Mobile apps for self-monitoring and management of longterm conditions

Smartphone applications (or apps) are becoming increasingly popular and there are now approximately 200 external sensors on the market connecting to smartphone apps, which can track a range of health metrics, such as blood pressure, heart rate, glucose level, weight, peak flow, medication compliance and more. The market for these sensors is growing and has been estimated to reach $5.6 billion by 2017.[16] As such, mobile apps hold significant potential as a basis for powerful patient-operated self-management health tools, including for chronic conditions such as diabetes, hypertension, warfarin anticoagulation, asthma, and chronic pain. However, the lack of regulation or guidance for health-related apps means that the validity and reliability of their content is largely unknown. For example, a study reviewing available apps on the subject of pain, found that 86% of the 111 included apps reported no medical professional involvement.[17] Another study showed that of 61 apps relating to dermatology, authorship information was absent in 36%, and only 33% stated a named dermatologist, other physician or valid collaborative group involved in the creation of the app.[18]

While there is currently no large scale implementation of mobile apps being prescribed as validated therapeutic patient self-management tools, this is undoubtedly a growth area that will be incorporated into models of care in the future.

PART THREE:
IMPROVING SUPPLY - INNOVATIONS TO INCREASE PRODUCTIVITY & DELIVER CARE MORE EFFICIENTLY

The flipside to manipulating demand for hospital services is to increase the supply of services - by working smarter to extract greater productivity from available resources.

Virtual Alternatives to face-to-face visits (faster, cheaper, convenient)

In some situations, virtual alternatives to office visits (telephone, secure messaging, videochat) can provide patients with an appropriate level of care, accessible without the inconveniences of traffic, parking, lost days at work or school, and at lower cost than in-person visits. They may be particularly useful for reaching patients who are infrequent or reluctant users of healthcare services who are vulnerable to chronic conditions.

Some studies estimate that 25% to 70% of all doctors' visits do not require face-to-face appointments, particularly in primary care consultations for common, low acuity conditions, or follow-up consultations. This has led to the redesign of primary care in several US health organisations. For example, Greenfield Health primary care practice in Portland, Oregon, has set up a system that relies heavily on email and telephone communication for the majority of patient contacts, based on the belief that more than one-half of primary care office visits are unnecessary (see *examples* below).
In the specialist hospital setting, mobile and video consults can overcome the time inefficiencies of specialists travelling to rural clinics, or between different campuses, when clinicians practice out of more than one location.

It is important that additional time for "desktop medicine" is factored into workflow schedules when incorporating virtual visits into care – that is, time spent reviewing test results, planning and conducting outreach for screening and preventive care, responding to patient emails, making telephone follow-up calls to patients, and renewing prescriptions. For example, the average Kaiser Permanente GP receives 15 to 20 secure email messages from patients per day – asking questions, seeking clarification, reporting adverse effects, inquiring about test results and communicating a variety of other information/concerns. This has required a system-wide revision of GP schedules to allow time to respond. Staff cover is also required to respond to emails when doctors are out of the office for more than a day.

1.Telephone visits
Telephone consultations have become increasingly convenient and appealing to patients with the widespread use of mobile phones – which allow the privacy and flexibility of calling the doctor from anywhere and at any time.

A UK study[19] comparing the content of face-to-face and telephone consultations by experienced GPs, found that telephone consultations were significantly briefer, presented fewer problems and included less data gathering, counselling and rapport building than traditional face-to-face consultations. Patient and doctor satisfaction levels were just as high for telephone visits as for face-to-face consultations (97% of patients and 85% GPs reporting they were satisfied or very satisfied with telephone

consults). The study found that doctors consulting by telephone were less likely to have gathered sufficient information to exclude important serious illnesses – suggesting that telephone consultations may be more safely suited to follow-up appointments. However, although clinical complexity was not formally assessed, the reviewing doctors felt that telephone problems were of a relatively less complex nature than face-to-face presentations – therefore requiring less time and information gathering.

Examples:

Kaiser Permanente North California *has offered 10-15 minute telephone visits with a GP as an alternative to office visits for over ten years. Use of this service has increased from around 640,000 telephone visits in 2008 to more than 2.3 million in 2013.*

Teladoc.com – *one of the largest telehealth providers on the US – offers patients with minor illnesses 24hr access convenient care to physicians via telephone or internet video consults. Patients must first create an online Teladoc account and enter information about their medical history. They can then request a consult via the telephone or the internet. A Teladoc physician receives the patient's request and contacts the patient, usually within 20 to 25 minutes – to diagnose, discuss treatment options, and send a prescription to the patient's preferred pharmacy, if indicated. Many US health plans and employers have contracted with Teladoc primarily to improve access and reduce costs (less time away from work and cheaper consults than ED or GP office). Teladoc uses 3 kinds of physicians; those semi-retired or taking time off from active practice; ED physicians who provide services when not working at the hospital; and practising GPs who treat Teladoc patients in between their office appointments. The company sees the service as a "pressure release valve" for primary care – supplementing, rather than replacing the regular general practice. To discourage patients from viewing the service as a substitute for the family GP, the company does not allow patients to request a specific Teladoc physician. In 2013, Teladoc provided more than 120,000 consults to its 6million members. A study examining 3,700 Teladoc telephone visits in California[20] found the most common diagnoses, which accounted for 52% of Teladoc business, were acute respiratory conditions, urinary tract infections, and skin problems. Compared to patients attending GP offices for similar conditions, Teladoc patients were younger, had fewer chronic conditions, and less likely to have used health care in the previous year. The timing of Teladoc visits closely resembled the timing of ED visits, with 34% of visits occurring on weekends and holidays. Reassuringly, Teladoc patients had fewer follow-ups to any setting for a similar condition, compared to patients who attended ED or a primary care office. If follow-up visits are considered a rough proxy for clinical resolution, this suggests telephone consults can provide as high quality care as in other care settings.*

Afterhours GP services in Denmark *– In 1992, out of hours GP services in Denmark were reformed in an effort to transfer costs and working hours from afterhours periods to daytime. Access to afterhours care is now through a single phone number – which connects the patient directly to a triage GP. This GP decides whether the patient needs a home visit, a consultation in an after-hours clinic or ED, or just telephone advice. Electronic health records are in use in all primary care practices in Denmark - all doctors use the same computer system with a central server - which enables the afterhours doctors access to the patient's medical record, and supplies automatic feedback to the patient's own GP about afterhours contacts. In the interests of cost-efficiency, the triage doctor is encouraged to use telephone advice instead of offering face-to-face consultation (the service is run by GPs in a county of 50,000-60,000 inhabitants; all health services in Denmark are free of charge to patients; and the doctors are responsible for costs).*

A study[21] five years after the reform, showed that telephone consultations had largely replaced home visits - the percentage of telephone consultations had doubled to 48% and home visits much reduced, from 57% to 18%. The out of hours workload for GPs had decreased considerably – with the percentage of GPs working >5 hours/week afterhours, falling from 70% to 50%. For example,

only 6 or 7 GPs were needed to run the afterhours service in the county of Aarhus, which has a population of 60,000. Overall patient satisfaction was 72%.

2. Asynchronous e-mail consultations

Consultations via e-mail can provide patients with rapid diagnosis and treatment simply by emailing their symptomatology and digital photos, without having to miss work or school for an office visit. E-mailing written instructions and advice can overcome problems of patients misremembering verbal instructions, and avoids the annoyance and time wastage of "telephone tag". The ability to attach photos enhances the doctor's clinical assessment and has enabled store and forward non-emergency e-visits in dermatology, ophthalmology, and primary care, including school based clinics and convenient care for minor acute conditions.

E-visits with regular providers via patient portals: In typical e-visits, patients log on to their secure personal health record internet portal and answer a series of questions about their condition. The information is sent to the patients' regular GPs, who make a diagnosis, order appropriate care, document this on the EHR, and reply to the patient via secure portal messaging within several hours. The advantage of this service is that it provides convenient care by the patient's usual doctor(s), rather than an urgent care or ED physician. This allows patients to use e-visits to ask their doctors non-urgent questions or to supply additional information eg, digital photos, as follow-up to an office visit. In the US, e-visits are offered by numerous health systems and are commonly reimbursed by health plans.

Studies of the quality of care provided at e-visits are generally reassuring. A 2013 comparison[22] of e-visits and office visits for sinusitis and urinary tract infection (UTI) found that antibiotics prescribed at e-visits were equally likely to follow recommended guidelines as those prescribed at office visits; during e-visits, doctors were less likely to order UTI-relevant laboratory tests (8% vs 51% testing at office visits); there was no difference in how many patients had follow-up visits for any reason; and e-visit patients appeared generally satisfied, with 50% choosing e-visits for subsequent illness in the next year. However, antibiotic prescribing rates were higher, particularly for UTIs, at e-visits, and physicians were less likely to order preventive care.

Examples:

Kaiser Permanente *Northern California patients can send secure e-mail messages directly to their GP or specialist(s) for non-urgent questions, or to supply additional information, including attached images. In 2013, some 8.2 million secure email messages were received by KPNC physicians. In many cases, the doctor is able to resolve a patient's problem without scheduling an office visit. Or, if necessary, a GP can refer the patient directly to a specialist via email. For example, KPNC dermatologists are able to make a definitive diagnosis and prescribe appropriate treatment in 80% of cases that involve only digital communication. In 98% of cases KPNC doctors have been able to answer non-urgent emails within two business days, with 83% providing same-day responses. From 2014, KPNC physicians are now expected to answer emails within 24 hours. In a 2013 internal survey of KPNC members, 87% of respondents reported that their secure email encounters with physicians did a very good or excellent job of meeting their needs.*

Greenfield Health, ***Portland,*** *Oregon – has redesigned the primary care patient-provider relationship from one of episodic care to continuous, ongoing care, by relying heavily on e-mail and telephone communication as a replacement for face-to-face office visits, wherever practical. Established in 2001, Greenfield Health is a medical group practice, operating from 2 clinic sites*

with 9 physicians, with an integrated research and development laboratory component for primary care service delivery innovations. With a stated mission to actively explore the use of IT and system design to improve care, approximately 80% of care is now done by secure email or telephone. Key components of the model include: (i) Patients can contact their providers at any time by email, phone, or an online system, and lab results and educational material are emailed to patients. (ii) The office time freed up by virtual contact enables the clinic to provide walk-in and same-day appointments for those that truly need it. (iii) Each patient is matched with a health coordinator (medical assistant) who serves as the patient's advocate and point of contact for referrals, ordering tests, interacting with consulting doctors, hospitals, labs, and other ancillary services. There is one medical assistant for every 500 patients (iv) All members of the team, including the patient, have access to the electronic health record with integrated, automated clinical guidelines, customised encounter forms, secure messaging, practice decision support, and patient decision support. (v) In depth and ongoing education, aimed at engaging patients in self-care and decision-making, is provided through group visits for patients with the same diagnosis or risk factor (eg weight management); the Greenfield Health website which contains educational videos and information; monthly electronic newsletters emailed to all patients, which contain large amounts of preventive and chronic disease management information. Anecdotal reports indicate the program has helped patients become more engaged in their care and that the practice's ability to provide evidence based care has been enhanced – eg, 95% of adult patients have had a cardiac risk assessment, consistent with national recommendations. According to one insurer, Greenfield Health is 20% more cost efficient than normal in terms of total cost of care – thought to be due in part to email and phone calls replacing many of the office visits occurring in a typical practice. At Greenfield, the average patient experiences nearly five e-mail contacts and five phone contacts, but fewer than 2 in-person visits per year.

Convenient care e-visits: as alternatives to visiting the GP, retail clinics, urgent/after hours care, or ED, patients now have the option of obtaining online medical advice and treatment for simple medical conditions on various US websites such as *Virtuwell.com* (patients complete an automated algorithm-based interview, driven by artificial intelligence, and receive a protocol-based treatment plan from a nurse practitioner), *Consultadr.com* (telephone, email or video consult with a physician) or *Onlineusadoctors.com*. At *Healthmagic.com*, the "Ask a Doctor" service reports it has more than 100 doctors online from 50+ specialties any time of the day to answer queries, and provide specialist second opinions.

School e-clinics: the e-visit model has been implemented in targeted settings such as schools alnd aged care facilities to improve accessibility and reduce inequality in these populations.

Examples of virtual school clinics include:

*The **Health e-Access** program, Rochester, New York – has provided >11,000 telemedicine visits for inner city and suburban children in childcare centres and primary schools since 2001. During a telemedicine 'visit', a trained telehealth assistant at the school or childcare centre uses an electronic stethoscope, and high resolution camera-linked viewing scope for eyes, ears nose and throat, to capture an audiovisual physical examination, which is stored in a central server and then uploaded to the off-site doctor to review. The doctor can also talk with and assess the child via videoconference to complete diagnosis and treatment decisionmaking. Studies of the program found it was associated with a 63% decrease in illness-related absences in childcare, and a 22% decrease in the number of emergency room visits for children, compared to children without access to the technology.[23] The program was also able to replace 85% of illness visits to primary care doctors with the telemedicine encounters[24], and there were no differences in diagnosis made through telemedicine and in-person evaluation.[25] 91% of telemedicine visits allowed parents to stay at work and 94% of problems managed by telemedicine would otherwise have led to a*

physician's office or emergency department visit.[26] Parents welcomed the convenience of the service, liked not having to miss work, and the ability to have medications delivered directly to the childcare or school.[27]

*The **vMOKO** school telemedicine trial in the Far North, aimed at reducing the high prevalence of preventable infections such as impetigo, in primary school children. Remoteness and poverty make it difficult for families to access distant healthcare, and periodic visiting doctors and nurses waste many non-productive hours travelling.*
Currently being trialled in 2 Northland schools, the vMOKO model utilises the school principal and teachers, assisted by technology and clinical support, to perform health checks on children and initiate treatment early, before simple medical problems progress to serious infections. This is based on the belief that common, easily treated conditions do not need to be seen in person by a doctor in order to be diagnosed and treated appropriately. Instead, vMOKO's philosophy is to involve communities in their own health; involving a shift of medical knowledge and empowerment to the community. School staff are trained how to take observations, fill in the e-visit template and attach photos/video (using tablet/iPad). The information is emailed to a GP for diagnosis, and antibiotics are delivered to the school, if required, on the rural post. Follow-up to check resolution of the infection is similarly provided by e-visit – avoiding the lengthy travel time and transport problems for parents and clinicians.

(See: http://www.3news.co.nz/VMOKO-brings-health-care-to-remote-Far-North/tabid/817/articleID/344380/Default.aspx#ixzz32OfW1DQp Te Kura Kaupapa Maori O Rangiawhia on the Karikari Peninsula, where the children get an education centred on Maori culture, and the principal and teachers double as doctors).

3. Realtime teleconsultation – videochat

The ability to visualise and converse with patients in realtime, allows virtual visits for higher acuity conditions and specialty medicine – particularly as image quality and user-friendliness continues to improve with digital cameras, and Google Glass now being piloted as a telemedicine camera.

Examples include:

*1.**Inpatient post-surgical "Telerounding"** at Henry Ford Hospital (Detroit) using iPad's Facetime – surgeons who work at more than one hospital are now using iPads to facetime their patients at the Henry Ford Hospital when they are not on-site. Previously, the surgeons would telephone their patients, however, video consultation has enabled more personal and informative conversations, and gives surgeons a better sense of the post-surgical condition as they can physically see their patients. The hospital provides an iPad to the patients, as well as assistance from a medical resident or another member of the patient's healthcare team during the video chat.*

Face-to-face video calls on tablet PCs are inexpensive, private, reliable and easy for both surgeon and patient to use. Their size makes the tablet PCs easy to transport for surgeons and easy to hold for patients. Videochat gives patients the positive feeling of personalized care even when the doctor is miles away from the hospital. "Using the iPad to communicate really appeals to the type of patients that are seeking state-of-the-art, minimally invasive robotic surgery at Henry Ford," states Dr. Craig Rogers, MD, director of Renal Surgery and director of Urologic Oncology at Henry Ford.

See http://www.prweb.com/releases/2012/3/prweb9335873.htm

***2. Tele-ICU** – critical care nurses and intensivists at tertiary hospitals can continuously monitor critical care patients at multiple smaller hospitals remotely – through two-way cameras and computers that continuously transmit physiological status data, treatment and medical records, in realtime to a 'command centre' at the tertiary hospital. Monitoring clinicians can quickly intervene as needed, in coordination with physicians and nurses at the distant site.*

Tele-ICU programs have been implemented in numerous hospital systems in the US – eg, Avera Health System, which operates hospitals in 5 largely rural states, has run tele-ICU since 2004, from an operations centre at Avera McKennan Hospital (a large tertiary hospital). A two and a half year study of the program (from 2005 to 2007, involving telemonitored 5146 patients in 14 remote facilities) showed that it led to reductions in mortality, length of stay, number of patients requiring transfer to a tertiary facility (reduced by 37.5%) and costs. Clinicians at both the remote sites and the operating centre report high levels of satisfaction with the program.

These beneficial outcomes have been replicated in more recent studies – which additionally demonstrate that Tele-ICU programs are associated with significantly higher adherence to critical care best practices and lower complication rates.[28]

3. Tele-neurology – *In 2007, Mayo Clinic launched its stroke telemedicine program allowing stroke specialists at Mayo's hospital in Phoenix to evaluate and treat patients in several rural Arizona hospitals, via audiovisual robots and other technology. Neurology is a specialty well suited to audiovisual teleconsultation because much of clinical neurology is conducted by taking history-taking and a largely visual examination, all of which can be performed from a distance with technology brought to the patient's bedside. Nurses in the remote hospitals are trained to be the hands of the neurologist on the other end of the camera, performing the neurologic examination. CT scans can be uploaded and immediately viewed by the stroke specialist, and therapeutic options discussed with the treatment team at the remote hospital. Initially the telemedicine network focused on stroke because of the importance of timely evaluation and treatment in limiting the extent of brain injury. The success of the tele-stroke program was phenomenal – demonstrating that a virtual stroke team could approximate a real bedside team in terms of reliability, safety, and clinical and cost-effectiveness. The numbers of stroke patients at remote hospitals requiring transfer to a specialist neurologic centre reduced from a rate of 90% to less than 30%. A 2010 study found that digital camera telemedicine resulted in correct emergency stroke treatment decisions 96% of the time, but only in 83% of cases that used telephone consultation. The program has since been extended to other Mayo campuses, and expanded to include other time-sensitive neurologic emergencies such as status epilepticus, coma, meningitis, encephalitis, spinal cord compression, brain tumour, Guillain-Barre syndrome and traumatic brain injury. The goal over time is to extend Mayo stroke telemedicine to hospitals outside the Mayo Clinic Health System as well, so that a virtual stroke team can become the standard of care in every acute care environment lacking emergency stroke services.*

4. **Antenatal and dermatology outpatient video visits** *at KPNC –*

(i)KPNC's Early Start Program supports pregnant women identified as at risk for drug and alcohol abuse. Women are referred to a substance abuse counselor for psychosocial assessment and development of a care plan, which may involve follow-up visits. A 2008 study showed significant benefit for women participating in the full program (0.5% rate of fetal demise, compared to 7.1% fetal demise in the control group; and the rate of preterm birth in the control group was 2.1 times greater than in the Early Start Program group of women). Video appointments were introduced in January 2013 for 289 women who were unable to participate fully in the program due to travel and job constraints. This is estimated to have prevented multiple fetal deaths and reduced the number of preterm births in these mothers by half. Nine local medical-centre based Early Start programs are now using video to conduct follow-up visits with women enrolled on the program.

(ii)Monthly follow-up evaluations of patients taking Accutane for acne – to assess clinical response and monitoring for psychological complications such as depression and suicidal ideation. Between to college students taking Accutane – for whom in person visits were either not possible or disruptive to their study timetable.

5. **HIV telemedicine clinics** *(Barcelona) - the Hospital Clinic of Barcelona has developed a new internet-based home care model covering the entire management of chronic HIV-infected patients called Virtual Hospital. The model responds to the change in the natural history of HIV infection in developed countries, where it has become a chronic disease, as a result of antiretroviral therapy.*

For many HIV-infected patients who are medically stable, frequent visits to the hospital are a major investment of time and money for the patients, while trying to maintain normal social and work lives. The virtual hospital approach aims to simplify follow-up appointments – by offering patients medical, nursing, psychological, pharmaceutical and social care teleconference consultations. The multidisciplinary video consultation sessions are set up through email, and medications are delivered to patients' homes. This allows a patient to go to a medical center only for a physical examination and reduces the number of visits to the doctor from six or eight in the usual system to three or four. A five year study of the "Hospital VIHrtual" telemedicine program involving the remote treatment of 200 HIV-infected patients, showed that it produced as good results as those obtained in the usual in-person hospital program. The level of technical satisfaction with the virtual system was high: 85% of patients considered that Virtual Hospital improved their access to clinical data and they felt comfortable with the videoconference system. Neither clinical parameters [level of CD4+ T lymphocytes, proportion of patients with an undetectable level of viral load (p = 0.21) and compliance levels >90% (p = 0.58)] nor the evaluation of quality of life or psychological questionnaires changed significantly between usual and virtual care. Provider productivity was increased with the duration of a consultation reduced from 20 to 10 minutes. See: http://blog.hospitalclinic.org/en/2011/03/assistencia-virtual-eina-control-vih/ ; http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0014515

6. School-based Tele-mental health clinics for children and adolescents *– in 2006, the University of Texas Medical Branch commenced remote mental health assessment and treatment services via videoconferencing technology and onsite case management to low income, minority students in 7 school-based primary care clinics in the Galveston Independent School District. Services include treatment for depression, eating disorders, anxiety disorders, ADHD, conduct disorders and substance abuse. Treatment options include psychiatric consultation, family therapy, and individual counseling. Students may self-refer (walk-in) or be referred by school staff, primary care providers, social services, the court system, or family members. School-based case workers complete initial paperwork, prioritise referrals, assign cases to clinicians, and provide ongoing case management and care coordination for the family. Students with acute issues may need immediate referral to the hospital. In less serious cases, students make a video-conference appointment with a child and adolescent psychiatrist or psychologist, or are referred to counselling services as needed.   The program experienced large annual increases in numbers of students being served, suggesting it has improved access to needed mental health services in a population that has little means of accessing such services (due to poverty, transportation difficulties, social stigma). Preliminary evaluation results indicate significant improvement in mental health symptoms between the initial visit and the 3rd month visit; 72% of parents feel that the child is getting along better with family members, and 68% agree the child is doing better at school.*

7. **After-hours urgent care** *- for patients with urgent, but non-emergent, medical problems, who may prefer the convenience of a videochat consult rather than travelling to an ED or afterhours clinic to be seen eg, Teladoc.com*

Kaiser Permanente doctors working at the Appointment and Advice Call Centre made more than 350 after-hours video visits between January and November 2013. Many could be immediately and conveniently resolved. Those patients requiring immediate in-person care were directed to ED, with the doctor placing the video visit information on the EHR, facilitating treatment when the patient arrived in ED.

HealthSpot Stations *- are 8-foot by 5-foot, freestanding, fully enclosed walk-in telemedicine kiosks, staffed by an attendant. They are equipped with a high definition videoconferencing system, touch screen, and interactive digital medical devices including stethoscope, otoscope, thermometer, BP cuff, pulse oximeter, and scales – that transmit information securely to the remotely-stationed consulting doctor. As newcomers to the convenient care market, the HealthSpot kiosk model is aimed at disrupting the retail clinic space, by being smaller in footprint, cheaper,*

user-friendly, with planned convenient locations such as retail stores, workplaces, and universities. People can walk up without an appointment, and be securely connected to a doctor for diagnosis and treatment (short-term prescriptions for non-controlled substances) of minor conditions. In 2013, HealthSpot partnered with Teladoc – providing patients with the choice of interacting with a Teladoc physician via physical kiosk, in addition to Teladoc's telephone or secure video options. A joint venture between the Cleveland Clinic and HealthSpot has also just been announced - following a 2013 pilot project of kiosks in three regional Cleveland Clinic locations, which reportedly demonstrated a 93% patient satisfaction rate with the stations.[29]

Making the clinical encounter more productive (maximising efficiency and patient-centredness)

Innovative models that aim to "get the most out of" the clinician's time spent with patients – whether it be the office visit, at the bedside, or by videoconference - are focused on

- ensuring preparedness (of both patient and doctor) for the visit – so that both parties enter the consulting room already informed about the patient's health history, reason for the visit, the patient's main concerns;
- ensuring time is not wasted going over preliminary information that could have been confirmed prior to the visit;
- ensuring providers work at the top of their scope – so that the doctor's expertise and time is not wasted on lower level tasks (eg, chasing up results, preventive health screening).

4. Preparing the patient for the visit

A prerequisite for maximal productivity of the doctor's visit, are patients who are health literate, well-informed, and engaged in their own health – enabling the clinical encounter to proceed in a more focused and efficient manner. Innovative strategies and tools to **improve patient knowledge, engagement, and self-management** in the ambulatory setting, have been described in the previous section.

Particularly for patients who will be meeting the doctor for the first time, an innovative idea is for the doctor to **provide a virtual introduction via social media** – which could simply be a one minute video taken with a smartphone, put on You-tube, and then placed on the doctor's/hospital's webpage. Patients can be advised of what to expect during the visit – including common questions they are likely to be asked, and anything they should bring along. The doctor can also direct patients to recommended on-line resources. This familiarisation should save some time when it comes to the face-to-face consultation. Given that the majority of patients perform an online search prior to any consultation and are likely to 'google' the doctor anyway, meeting patients online, via social media, with a virtual introduction seems an appropriate mode of communication.

For example, Wendy Sue Swanson, a pediatrician and the executive director of digital health at Seattle Children's Hospital, has been discussing health concerns with patients through her blog, Seattle Mama Doc, and on Twitter since 2009. Instead of using clinic time to give the same explanation for common conditions, she directs patients to her own curated list of online resources. That way, she can spend more time discussing the patient's individual needs at the clinic visit. (For tips on how to become "an empowered digital physician" see
http://fliptheclinic.org/flips/how-can-i-communicate-with-my-patients-better-without-having-to-spend-more-time-with-them/)

5. Preparing the provider for the visit

Pre-visit questionnaires

These may be emailed or sent to patients (in the US, these are often done via a patient portal) once an appointment is booked, or may be completed in the waiting room prior to seeing the doctor. The aim is to streamline the visit by collecting as much relevant information as possible before the face-to-face encounter. Pre-visit questionnaires have been used to:

- confirm relevant aspects of the medical history eg, current medications, allergies, surgeries;
- explore the patient's current issues – so that the doctor is aware of the problems/reason for the visit from the patient's perspective;
- screen for risk factors for disease – that could be addressed at the upcoming visit
- screen for stresses/pressures in life that may be underlying poor health
- foster patient engagement by involving the patient in the consultation process

Examples:

Pre-visit questionnaire at Kaiser Permanente – *involves patient reporting of meds, and screening questions relevant to that specialty.*

MyHealthScreen (eCHAT) Risk Screening Tool *(funded by Health Workforce NZ) – an electronic health risk assessment tool in the form of a questionnaire on a touch screen tablet, that is presented to patients in GP waiting rooms prior to an appointment. Patients' self-reported information reduces clinic staff time spent collecting and entering routine information into the Practice Management System; and assists providers in identifying risk factors (eg, smoking, anxiety, physical inactivity) for which early intervention for lifestyle or mental health issues may be indicated. The tablet questionnaire presents a non-challenging, private way to query personal information. A 'help question' feature allows patients to indicate whether they need help with an issue during the visit, promoting an efficient and patient-centred consultation, where the doctor is quickly made aware of all concerns/reasons for the patient's visit. An alert will appear in the Practice Management System if the patient indicates possible self-harm. GPs are able to choose whether to populate the eCHAT information within the patient's EHR. A linked clinical decision-support function facilitates evidence-based interventions and efficient use of locally available resources.*
MyHealthScreen was initially tested in 2 Auckland practices in 2012, and then rolled out to an additional 30 urban general practices throughout NZ. A full evaluation of the project is awaited.

"The New Vital Signs" *– to help to give the clinician and patient a more complete picture of the elements contributing to their health. At the start of each visit, patients are asked to rate their relationship to sleep, money, work, spouse/partner, and neighbourhood, on a 0-5 point scale (0 = poor; 5 =great). Scores in the 0-2 range are followed up with discussion, which may reveal a root cause to one or several interconnecting health issues eg, financial problems causing insomnia and exacerbating hypertension. Patients are assisted to draw connections between their answers and their health. Pointing out this relationship can help a patient make life choices to improve both. The provider may also be able to make suggestions or facilitate referral(s) to others who can help with the underlying problem. The "new vital signs" screen has been used in a San Francisco medical practice for the past 15 years, with anecdotal positive reports, as a patient-centred approach that "humanizes" the doctor-patient relationship. It can be administered by the doctor, a nurse, health assistant or other staff member. (See: http://fliptheclinic.org/flips/how-do-you-get-to-the-root-cause-of-a-health-problem/)*

6. Incorporating preventive care by non-physician providers into every office visit

– so as to maximise the utility of the visit - ie, using the visit as an opportunity to address as many of the patient's health issues as possible within the available time. To function efficiently, this requires pre-visit preparation to identify gaps in the patient's preventive care and to obtain the patient's consent to attend to these at the visit, by a non-physician provider.

Examples:

Electronic standing orders allow non-physicians to address preventive care gaps *leading to significantly increased provision of needed preventive services in eight US primary care practices. Standing orders authorise nurses and other non-physician clinical staff to provide services according to a pre-approved protocol without a doctor's examination. They have been shown to improve provision of vaccinations and other health screenings but many practices do not routinely use them. In the model, developed by Practice Partners Research Network, a nurse or medical assistant brings the patient to the exam room at the beginning of every visit, and retrieves the "health maintenance" template on the patient's EMR, that highlights the gaps in care related to 15 preventive care services. The staff member discusses the gaps with the patient and, under standing orders, administers the preventive service or provides referrals for offsite services (eg, mammography) before the physician enters the room. Any uncertainties or queries the patient may have can then be discussed further with the doctor.*

Similarly, in Kaiser Permanente's ***Proactive Office Encounter program****, nurses and/or medical assistants follow standardised workflows prior to, during, and after all primary care and specialist consultations, supported by electronic algorithmic tools to systematically identify and address any gaps in preventive, screening or chronic care during the visit. For gaps that cannot be immediately addressed, the nurse assists the patient to obtain needed tests, referrals and follow-up appointments. The program improved the provision of recommended care (lipid, blood glucose, retinal screening for diabetics; flu immunisations for the elderly; breast, colorectal and cervical cancer screening; and smoking cessation counselling). BP control in diabetics and hypertensives also improved. Using non-physician staff to administer the preventive care program maximises opportunities for care at every patient encounter – while relieving the time-poor GP of the screening burden (specialists typically do not consider this to be part of their job).*

The Shared Medical Appointment model *(described earlier) is also aimed at increasing clinician productivity and efficiency – in providing follow-up care for patients with the same condition.*

Decentralising Specialist Care – Inpatient care on an Outpatient basis

Providing care in an outpatient setting wherever possible is less costly than inpatient care and generally preferred by patients. Innovative models include specialty care ambulatory units and integrating specialist care into primary care settings.

Examples include:

The ***Ambulatory Heart Failure (HF) Unit*** *at the University Hospital of North Staffordshire NHS Trust (serving a catchment population of 500,000), was set up by the multidisciplinary HF team in 2011, to run as a day case clinic providing treatment previously only available on an inpatient basis, for around 260 patients per year. From April to December 2011, there was zero mortality among the 220 patients who chose to receive active ambulatory treatment; and the service reduced inpatient bed demand such that 9 acute hospital beds were able to be removed.*

The ***Emergency Multidisciplinary Unit (EMU)*** *at Abingdon Community Hospital, Oxfordshire – a community-based emergency service for elderly and frail patients, offering acute care as close to*

home as possible, with rapid comprehensive geriatric assessment and treatment, provision for admission of up to 72hrs, and 'hospital at home' nursing for patients sent home to recover. Decentralising geriatric emergency care reduces pressure on the hospital ED and inpatient beds.

*An **integrated care model that places mental health specialists in primary care offices** (developed by Harvard University, US Substance Abuse and Mental Health Services Administration, University of Pennsylvania, Veteran's Administration) – first implemented in 1998 to treat elderly patients >65 years, suffering high rates of depression and substance abuse. The model is used in over 50 clinics in urban, suburban and rural locations. The specialists are either social workers, psychologists, psychiatric nurses, psychiatrists, or master level counsellors – all trained and supervised by consultant psychiatrists to provide guideline based treatment. Co-location in a primary care office reduces stigma (there are no signs about the MH service), increases patient convenience and the likelihood they will keep the appointment. The specialists communicate with the GPs about the assessments, which become a formal part of the primary care record, and take on shared responsibility for the patients. A RCT of >2000 patients at 11 study sites showed the integrated care model achieved higher levels of patient engagement, delivered comparable clinical results (except for symptom control in severely depressed patients), and had lower overall costs, compared to an enhanced specialty care model (considered superior to 'usual' care - providing quicker than usual access to MH care at a separate MH facility, transportation if needed and follow-up calls for missed appointments).*

***Integrated mental health and medical care at school-based health centres** has been implemented in several US states, including Colorado, Maryland, New York, North Carolina, Oregon, Rhode Island and Vermont. In Connecticut, mental health services were integrated in the state's 78 school-based health centres (SBHCs) in 1994, to provide one-on-one, family, group counselling and crisis intervention therapies to primary and secondary school students. A licensed, master's degree level clinician provides the service at each centre. The therapist can refer children to a community-based physician for the management of psychiatric medications. SBHCs provide a wide range of free services including acute primary medical care, routine checkups, immunisations, prescription and dispensing of medications, and dental care. Co-location of mental health services in the combined facility helps reduce the stigma associated with seeking help for behavioural/mental health issues. All children enrolled at the site school may use the SBHC regardless of income or health care coverage. SBHC services are aimed at, but not limited to, students who do not have access to a family doctor, or whose families have little or no health insurance. SBHCs have resulted in less missed class time (96.7% of students seen, return to class the same day), enhanced access to services – between 2006 – 2009, MH services were the most frequently used services in the centres, responsible for around one third of all visits, with high levels of satisfaction, particularly among minority Hispanic and African-American males.*

Standardising care (reduced variation, reduced costs, improved patient flow)

Standardising care involves the application of evidence based medicine in practice to improve quality of care and reduce costs from reduced waste and unwarranted variations in care. There needs to be clear and robust evidence for the good practice before it is standardised, if quality improvement is to be expected. Successful implementation requires well developed clinical leadership and clinicians' commitment to actively manage the care of patients at all stages.

Examples include the use of:

- **Clinical pathways** *eg, Orthopaedic Enhanced Recovery (ERAS) patient-centred pathway for joint surgery at Royal Bournemouth Hospital; and surgical pathways embedding the Proactive care of Older People undergoing surgery (POPS) service at Guy's and St Thomas' – a geriatrician led pre-op, post-op and post-discharge model to improve flow of frail, surgical patients (reduced medical complications and pressure sores, earlier mobilisation, reduced length of stay by 4.5days)[30]*
- **Decision support tools** *eg, Q-guide – an electronic risk assessment app used at Massachusetts General Hospital in pre-operative decision-making for high cost, high use, cardiovascular and orthopaedic surgery such as hip and knee replacements. Incorporated into care discussions to engage patients in shared decision-making*
- **Standardising communication** by defining common language/terminology – so as to reduce ambiguities in care handovers and communication *eg, Regions Birth Centre (Minnesota) standardized communication about fetal heart rate monitoring (definitions of 'high', 'moderate' and 'minimal' variability); adopted evidence-based protocols for induction and ventouse interventions, and formal strategies to improve communication among clinicians.*
- **Standardising the rooming process** in the outpatient clinic *eg, the Proactive Office Encounter program at Kaiser Permanente*

New provider roles

Ensuring that providers practice at the top of their scopes is crucial to maximising productivity and cost-efficiency in healthcare delivery. This has led to the delegation of tasks to alternative, more affordable, personnel and innovative models of care utilising new provider roles.

Examples include:

- Nurse practitioners running minor injury units and walk-in primary care/convenient care clinics
- Pharmacist prescribers managing hypertension in the community and on hospital wards
- Care coordinators
- Healthcare assistant (medical assistant) in general practice
- Registered nurse first surgical assistant (http://www.health.govt.nz/our-work/health-workforce/new-roles-and-initiatives/established-initiatives/registered-nurse-first-surgical-assistant)
- Nurse anaesthetists
- Nurse practitioner procedural clinics eg, endoscopy, cystoscopy, colposcopy
- Physician associate (physician assistant)
- Gerontology nurse specialist
- Nurse practitioner in aged care
- Diabetes nurse prescriber
- GP with Special Interests eg, ORL clinics, minor skin lesion surgery
- Optometrist referral directly to an elective cataract surgery list (bypassing need for ophthalmologist FSA)
- Advanced practice physiotherapists running orthopaedic clinics for patients who are unsuitable for surgery; and managing post-op arthroplasty care.

[1] Bartley, K. B., & Haney, R. (2010). Shared medical appointments: improving access, outcomes, and satisfaction for patients with chronic cardiac diseases. *Journal of Cardiovascular Nursing*, *25*(1), 13-19.

[2] Kirsh, S., Watts, S., Pascuzzi, K., O'Day, M. E., Davidson, D., Strauss, G., & Aron, D. C. (2007). Shared medical appointments based on the chronic care model: a quality improvement project to address the challenges of patients with diabetes with high cardiovascular risk. *Quality and Safety in Health Care*, *16*(5), 349-353.

[3] Yehle K. S., Sands L. P., Rhynders P. A., Newton G. D. (2009). The effect of shared medical visits on knowledge and self-care in patients with heart failure: A pilot study. Heart & Lung, 38(1), 25-33. doi:10.1016/j.hrtlng.2008.04.004

[4] Lock, J., De Bruin, A., Scholten, M., Joosten, M., Seesing, F. M., Beishuizen, A., De Goede-Bolder, A. And Cnossen, M. H. (2012), The group medical appointment (GMA) in haemophilia and von Willebrand's disease: a new development in outpatient paediatric care. Haemophilia, 18: 766–772. doi: 10.1111/j.1365-2516.2012.02783.x

[5] Kaidar-Person, O., Swartz, E. W., Lefkowitz, M., Conigliaro, K., Fritz, N., Birne, J., ... & Rosenthal, R. (2006). Shared medical appointments: new concept for high-volume follow-up for bariatric patients. Surgery for Obesity and Related Diseases, 2(5), 509-512.

[6] Holly L. Thacker, Richard Maxwell, Jennifer Saporito, and David Bronson. Journal of Women's Health. November 2005, 14(9): 867-870. doi:10.1089/jwh.2005.14.867.

[7] Health Home Innovation Fund: Strategies and models for care coordination and complex care management (September 2013). Available at http://www.careinnovations.org/knowledge-center/results/search&keywords=strategies+and+models+for+care+co+ordination/

[8] Zed, P. J. (2005). Drug-related visits to the emergency department. *Journal of pharmacy practice*, *18*(5), 329-335.

[9] Hohl CM, Dankoff J, Colacone A. Polypharmacy, adverse drug-related events, and potential interactions in elderly patients presenting to an emergency department. Ann Emerg Med 2001;38:666-71.

[10] Blenkinsopp, A., Bond, C., & Raynor, D. K. (2012). Medication reviews. British journal of clinical pharmacology, 74(4), 573-580.

[11] Ibid.

[12] Thomas, R., Huntley, A. L., Mann, M., Huws, D., Elwyn, G., Paranjothy, S., & Purdy, S. (2013). Pharmacist-led interventions to reduce unplanned admissions for older people: a systematic review and meta-analysis of randomised controlled trials. Age and ageing, aft169.

[13] Chen, C., Garrido, T., Chock, D., Okawa, G., & Liang, L. (2009). The Kaiser Permanente Electronic Health Record: transforming and streamlining modalities of care. *Health Affairs*, *28*(2), 323-333.

[14] Palen, T. E., Ross, C., Powers, J. D., & Xu, S. (2012). Association of online patient access to clinicians and medical records with use of clinical services. *JAMA*, *308*(19).

[15] Zhou, Y. Y., Kanter, M. H., Wang, J. J., & Garrido, T. (2010). Improved quality at Kaiser Permanente through e-mail between physicians and patients. *Health Affairs*, *29*(7), 1370-1375.

[16] http://research2guidance.com/the-market-for-mobile-health-sensors-will-grow-to-5-6-billion-by-2017/

[17] Rosser, B. A., & Eccleston, C. (2011). Smartphone applications for pain management. *Journal of telemedicine and telecare*, *17*(6), 308-312.

[18] Hamilton AD, Brady RR. Medical professional involvement in smartphone 'apps' in dermatology. Br J Dermatol 2012;167:220–1

[19] McKinstry, B., Hammersley, V., Burton, C., Pinnock, H., Elton, R., Dowell, J., & Sheikh, A. (2010). The quality, safety and content of telephone and face-to-face consultations: a comparative study. *Quality and Safety in Health Care*, *19*(4), 298-303.

[20] Uscher-Pines, L., & Mehrotra, A. (2014). Analysis of Teladoc use seems to indicate expanded access to care for patients without prior connection to a provider. *Health Affairs*, 33(2), 258-264.

[21] Christensen, M. B., & Olesen, F. (1998). Out of hours service in Denmark: evaluation five years after reform. *BMJ*, *316*(7143), 1502.

[22] Mehrotra, A., Paone, S., Martich, G. D., Albert, S. M., & Shevchik, G. J. (2013). A comparison of care at e-visits and physician office visits for sinusitis and urinary tract infection. *JAMA internal medicine*, *173*(1), 72-74.

[23] McConnochie, K. M., Conners, G. P., Brayer, A. F., Goepp, J., Herendeen, N. E., Wood, N. E., & Roghmann, K. J. (2006). Differences in diagnosis and treatment using telemedicine versus in-person evaluation of acute illness. *Ambulatory Pediatrics*, *6*(4), 187-195.

[24] McConnochie KM, Conners GP, Brayer AF, et al. Effectiveness of telemedicine in replacing in-person evaluation for acute childhood illness in office settings. *Telemed J E Health* 2006;12:308–16

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25 McConnochie KM, Wood NE, Herendeen NE, et al. Acute illness care patterns change with use of telemedicine. *Pediatrics* 2009;123:e989–95

26 McConnochie KM, Wood NE, Kitzman HJ, Herendeen NE, Roy J, Roghmann KJ. Telemedicine reduces absence resulting from illness in urban child care: evaluation of an innovation. *Pediatrics* 2005;115:1273–82

27 McConnochie, K. M., Wood, N. E., Kitzman, H. J., Herendeen, N. E., Roy, J., & Roghmann, K. J. (2005). Telemedicine reduces absence resulting from illness in urban child care: evaluation of an innovation. *Pediatrics*, *115*(5), 1273-1282.

28 Lilly, C. M., Cody, S., Zhao, H., Landry, K., Baker, S. P., McIlwaine, J., & Irwin, R. S. (2011). Hospital mortality, length of stay, and preventable complications among critically ill patients before and after tele-ICU reengineering of critical care processes. *JAMA*, *305*(21), 2175-2183.

29 http://medcitynews.com/2014/05/healthspot-cleveland-clinic-kaiser-permanente/#ixzz32r1o6s2R

30 Harari, D., Hopper, A., Dhesi, J., Babic-Illman, G., Lockwood, L., & Martin, F. (2007). Proactive care of older people undergoing surgery ('POPS'): designing, embedding, evaluating and funding a comprehensive geriatric assessment service for older elective surgical patients. *Age and ageing*, *36*(2), 190-196.