Irish College of General Practitioners

ICGP

Making Every Consultation Count

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EXECUTIVE SUMMARY

In Ireland, 76% of all deaths are due to chronic diseases. With an aging population, and a high number of patients older than 50 suffering from multi-morbidity, the prevalence of chronic diseases is anticipated to grow. By 2020, chronic conditions among the adult population here are expected to increase by 40%. It is estimated that almost one million people in Ireland are affected by one of the four main categories of chronic disease (cardiovascular disease, chronic obstructive pulmonary disease, asthma and diabetes). A variety of lifestyle related risk factors such as; exposure to tobacco smoke, the harmful use of alcohol, an unhealthy diet and a lack of physical activity, represent some of the main causes of chronic diseases.

Primary health care (PHC) is an essential cornerstone for individuals, families and the community and, as such, should play a central role in all aspects of chronic disease management. This can be successfully accomplished by 'Making Every Consultation Count' (MECC). MECC provides a framework for PHC staff to monitor chronic disease risk factors and to give short advice on lifestyle habits– brief interventions– which also includes signposting relevant services.

The aim of the project was to examine the feasibility of recording chronic disease risk factors and delivering appropriate brief intervention for all adult patients in the general practice setting.

The main components of the project were:

- The creation and incorporation of a proforma, called the Physical Health Monitoring (PHM) tab, into each of the three main practice management software (PMS) systems in general practice. In addition, an audit tool was created.
- The inclusion of the guidelines for Irish general practice in relation to recording and monitoring of the identified risk factors into PMS systems via pop-up messages.
- An evaluation of the experiences of the service providers and service users through the use of semi-structured interviews and a self-administered questionnaire survey respectively.

In total, 21 general practitioners (GPs) in 13 GP practices in the Carlow/Kilkenny area were involved in the project. Eleven GPs and four practice nurses participated in semi-structured qualitative interviews and 279 patients completed a questionnaire.

The review of the three main PMS systems (Socrates, HPM and Health One) in terms of their ability to record and extract data, as well as their reporting functionality, revealed significant limitations. The main challenges occurred due to systems recording risk factors through multiple variables and formats and a lack of clarification regarding where and how relevant interventions could be recorded. Furthermore, while the reporting functions may be sufficient for brief clinical reference, they were found to be insufficient for research and audit purposes. Due to such recording difficulties, a structured proforma - the physical health monitoring (PHM) tab - was developed to facilitate the systematic and structured recording

of key physical health variables and brief interventions. Feedback from general practitioners (GPs) on the PHM tab was largely positive with the majority of service providers expressing approval of the tab with suggestions for changes to the layout.

However, although the tab was installed in every PMS system, due to a number of issues which occurred during the extraction of data using the audit uploader tool, only information recorded in the Socrates software system could be extracted from practices and included in the analysis.

The data extracted from the practices which utilize the Socrates system revealed that the overall recording of lifestyle risk factors and interventions was extremely poor; however, substantial improvement was noted in terms of recording brief interventions during the project. The layout of the PHM tab in multiple pages also contributed to low recording rates as the software vendor/systems did not deliver on the auto-population from similar fields and designed the tab over multiple pages rather than on one page – data on the first page was more likely to be recorded and this fits with practice staff indicating time to record data was the greatest barrier.

Substantial delays and difficulties delivering the intended IT solutions were experienced due to non-delivery by the software vendor and functionality issues with the PMS systems.

Reported experiences of undertaking the relevant ICGP eLearning modules were very positive.

Almost all patients agreed that GPs have an important role as well as the necessary knowledge and skills in the management of the patients' lifestyle choices. In total, 88.4% of the patients indicated that the advice given by their GP was very influential regarding potential changes in their lifestyle behaviours.

Patients, GPs and practice nurses consider that general practice has a role to play in supporting patients in terms of lifestyle choices and in monitoring such chronic disease risk factors. However, barriers such as time and resources are a factor in general practice. Data on the prevalence of risk factors can help inform the resourcing of general practice and inform service planning. Improving recording behaviour may require several elements, including financial incentives and training.

The following were some of the key findings from this feasibility study:

- It is feasible for GPs and practice nurses to undertake risk assessments and brief interventions on lifestyle factors during routine general practice consultations.
- While the concept of the PHM page was accepted, it requires re-design for maximum utilization. The feedback from GPs and PNs suggest that a single page for data entry would facilitate utilization.
- GP IT systems need to be rectified to allow uniform uploads of data from different practice management systems.
- Incentives are required for general practice in terms of chronic disease management and monitoring preventive factors.

- The PHM (MECC) page is now on most GP desktop systems in Ireland and is a major opportunity to facilitate a uniform and structured MECC monitoring for patients in general practice.

The recommendations arising from the project are multiple and actions are required from multiple stakeholders in order to be successful. These include the ICGP, the HSE, the GPIT Group and GPs themselves. The recommendations include:

- Financial incentives within primary care to support health promotion and patient self-management; this is required beyond a potential chronic disease contract and should extend to the prevention of chronic disease.
- Improving the validity of diagnostic coding should be a priority in order to provide more accurate prevalence and impact data. Training in data recording and coding principles for practice staff is required.
- Reimbursement for GPs to regularly and accurately maintain patients' electronic records would contribute to an adequate monitoring of chronic conditions and better identification of at-risk groups. However, data recording should not become an end in itself but a means to monitor patient related factors and the impact of interventions.
- The reporting functions in GP practice management software systems are insufficient for research and audit purposes – this needs to be considered when designing national IT infrastructure for the health system. As new chronic disease programmes are developed, the data requirements will change and the PMS systems used by GPs must be able to accommodate these.
- We need to capitalise on the acceptance and potential of the MECC framework. The ICGP, supported by the HSE, is currently promoting this function and providing training on its use, using the materials developed as part of this project. GPs will need to embrace this initiative, along with the training and support that will be provided, in order for MECC in the Primary Care setting to reach its potential.

Our project shows that GPs are willing to undertake these activities and patients place a value on them. However, they need to be more readily demonstrated with evidence from general practice that they occur and lead to patient improvements. These activities need to be financially recognised and the IT systems in general practice need to respond to the requirements of GPs to be able to monitor patients and show the impact of same. GPs themselves, along with the ICGP, GPIT and the HSE have a role to play in order to achieve the recommendations outlined here and it is only by working together that we will do so.

Introduction

Globalisation and economic development have negatively impacted on people's lifestyles and environmental conditions[1,2]. Thus, 21st century societies have experienced increased prevalence of chronic diseases[1]. The burden of chronic illness has challenged healthcare systems worldwide and increased the need for better coordination of healthcare delivery[3,4]. Primary healthcare (PHC) is recognised internationally as an essential part of any functional health system[3,4,5,6]. It plays a central role in terms of prevention, early detection and treatment of chronic diseases[5]. The augmentation of PHC is therefore important.

Prevalence of chronic diseases: the Irish context

According to the World Health Organisation (WHO)[1], chronic diseases are slow and enduring conditions, 'which require a long-term and systematic approach to treatment' (p.35). Due to their characteristics, they produce negative effects on an individual's physical, emotional and mental wellbeing, frequently leading to ill health and disability[2,7]. In 2012, 38 million people worldwide died as a result of chronic illness and according to projections this trend is most likely to continue, reaching 52 million deaths by 2030[2]. In Ireland, 76% of all deaths are due to chronic diseases[8].

The improvement of health treatment and disease prevention in recent years contributed to the better overall health of the Irish population[9]. Despite that, the burden of chronic disease still remains one of healthcare's biggest challenges[10]. Since the population in Ireland is aging, and a high number of patients older than 50 suffer from multimorbidity[11,12,13,14,15], the prevalence of chronic diseases is anticipated to grow. By 2020, chronic conditions among the adult population in Ireland are expected to increase by 40%[8,16].

It is estimated that almost one million people in Ireland are affected by one of the four main categories of chronic disease including: cardiovascular disease, chronic obstructive pulmonary disease, asthma and diabetes[2,8].

In Ireland, 250,000 people live with cardiovascular diseases[8]. With mortality rates of more than 9,000 people per year, CVDs are the major cause of death[17]. In total, 20% of all premature deaths of people younger than 65, are result of cardiovascular conditions[17].

Cancer is the second largest cause of mortality in Ireland[18]. In the period 2012-2014, more than 105,000 people living in Ireland were diagnosed with cancer[19]. The mortality rates accounts for more than 8,000 deaths per year, which is 10% (for male) and 16% (for female) higher than the European average[19].

The number of people with diabetes in Ireland is estimated to be more than 200,000, with the majority of patients between the ages of 20 and 79[20]. Due to increased levels of poor diet and obesity, the prevalence of diabetes is expected to rise by 30% by 2020[18].

Diseases of the respiratory system are very common as well. In 2013, more than 3,000 people died as a result of respiratory tract illnesses, which account for 11.9% of all deaths in Ireland[21]. Hence, Ireland has the second highest incidence of respiratory disease throughout the EU[21], with COPD and asthma being the most prevalent[22,23]. According to the National COPD Strategy, at least 440,000 people have COPD in Ireland[22]. Also, with more than 470,000 cases, Ireland has the fourth highest prevalence of asthma worldwide[23].

Although all of the chronic diseases referred to above are progressive in nature, they are also highly preventable, if modifiable risk factors are recognised and dealt with appropriately.

Chronic disease risk factors

A variety of lifestyle related risk factors such as: exposure to tobacco smoke, the harmful use of alcohol, an unhealthy diet and a lack of physical activity represent some of the main causes of chronic diseases[5,24].

Cigarette consumption, as well as second-hand exposure to tobacco smoke, represents one of the major risks to health[2]. The main behavioural risk factor for asthma and COPD is tobacco use[22,25]. In Ireland, one fifth of the population smokes[26]. Although smoking has declined in comparison with previous years, the number of deaths caused by the detrimental effects of tobacco in Ireland still remains high, accounting for more than 5,200 deaths per year[27].

The use of alcohol is widespread in Ireland, where the majority of people (56%) drink in a harmful manner[28]. Unhealthy drinking patterns are related to the type of alcohol beverage, frequency and amount of beverage consumption[29]. Drinking levels are considerably higher in Ireland than the European average[30]. According to the National Alcohol Diary Survey, harmful drinking is most common among men (69.5%) and among young adults aged 18–24 years (74.7%)[31]. Considering the amount of alcohol and the frequency of consumption, the risk of chronic illness such as heart disease, stroke and cancers of liver and bowel, in Ireland is very high[28].

Furthermore, an unhealthy diet and lack of exercise can easily lead to overweight or obesity which can also increase the potential of developing diseases such as hypertension, diabetes, coronary heart disease and cancers[2]. The World Cancer Research Fund estimated that up to 40% of the most common cancers could be prevented by practicing healthy patterns of diet and regular physical activity[32]. This particular research highlighted the fundamental role of healthcare professionals in making positive impacts on harmful lifestyle choices[32]. The provision of advice and guidance through PHC was also found to be essential[32]. In Ireland, dietary habits and physical activity could still be improved considerably. The Healthy Ireland Survey reported that 65% of those surveyed, consume sweetened drinks and snack food daily[33]. Also, the level of physical activity for 68% is not sufficient enough to maintain a healthy

lifestyle[33]. Therefore, unhealthy dietary habits combined with a lack of exercise, has resulted in 61% of all adults in Ireland being overweight or obese[18].

Making Every Consultation Count through primary healthcare

PHC is an essential cornerstone for individuals, families and the community[34]. Since it is the first point of contact, it also symbolises the frontline of the healthcare system[34]. PHC involves multiple service providers (including GPs, nurses, pharmacists, etc.) which, with joint capacities, are focused on high quality support in terms of the prevention and treatment of various conditions[35]. According to the 'Healthy Ireland' framework[16], PHC should play a central role in all aspects of chronic disease management, including early intervention, prevention and the promotion of a healthy lifestyle. This can be successfully accomplished by 'Making Every Consultation Count' (MECC)[1].

MECC provides a framework for PHC staff to monitor chronic disease risk factors and to give short advice on lifestyle habits– brief interventions– which also includes signposting relevant services[36]. MECC involves PHC staff using their consistent contact with patients to opportunistically deliver these brief interventions on chronic disease risk factors such as mental health and wellbeing, diet, physical activity, alcohol consumption and smoking[37]. Several studies have highlighted that brief interventions can produce significant behaviour change[38,39,40]. Brief interventions are found to be particularly effective in reducing alcohol consumption, quitting smoking and improving physical activity[38,40,41]. Opportunistic brief interventions, based on the MECC model, have been shown to be cost effective [42,43,44]. MECC has the potential to be successful across socioeconomic groups because PHC represents many patients' main point of contact with the healthcare system[45].

In 2017, the HSE launched 'Making Every Contact Count'[46] as the new framework focused on health behaviour change in Ireland. The aim of the framework is to enable health professionals to recognise the role and opportunities they have during regular patient consultation and to employ them in order to improve health outcomes[46]. The HSE suggested that the implementation of the 'Making Every Contact Count' approach will be established on four main levels including brief advice, brief intervention, extended brief intervention and specialist services[46]. Health professionals are being encouraged to take part in all levels of the MECC approach, with the aim to build a culture and environment that supports overall health improvement and wellbeing of the population.

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[1]The MECC approach refers to both 'consultation' and 'contact', during which patients are encouraged to adopt healthy lifestyle choices. In the HSE framework launched in 2017 the word 'contact' was applied. However, our project was set up in advance of this publication and the word 'consultation' was used as this is the word closely related to general practice setting.

Risk Factor Recording

In order to tailor brief interventions appropriately, corresponding chronic disease risk factors must be recorded. An accurate recording of behavioural risk factors in patients was found to be essential for good quality preventive action in general practice[47].

A study of Belgian GPs[48] concluded that not systematically recording CVD risk factors was a barrier to effective preventive cardiovascular care. A review[49] of three trials on the effects of training PHC staff in smoking cessation techniques found that provision of brief interventions increased when accompanied with reminders and prompts. Moreover, US PHC staff identified the absence of standard protocols and no general systematic approach as barriers to carrying out brief interventions[50].

When implementing a MECC programme in a sexual health clinic, Lee et al.[51] developed a structured proforma to monitor the mental health, substance use and alcohol use of vulnerable populations. This led to significantly improved documentation in the above areas; the recording of substance use increased from 57% of patients to 82%[51]. Concerns about mental health and alcohol were also recorded significantly more often; increasing from 14% of patients to 47% of patients. The authors concluded that this improved recording would assist clinicians in identifying opportunities to make every contact count.

The present project sought to implement a change in a sample of GP practices whereby GPs *make every consultation count* by accurately recording and delivering opportunistic brief interventions to appropriate patients. Recording and providing interventions were not intended to add to the GPs' workload but to be opportunistically delivered where time allowed and where relevant in a consultation.

Chapter 2

Evaluation of the practice management software systems

In order to assist GPs in making every consultation count, firstly it was necessary to gain a comprehensive understanding of what is happening in practice (on the ground), particularly which resources are available to GPs while assessing patients with chronic conditions. Therefore, at the initial stage, the project commenced with a detailed evaluation of the practice management software (PMS) systems available in Ireland.

In the last 20 years, the practice management software systems (PMS systems) became an integral part of Irish general practice[52]. As complex information healthcare systems, they are responsible for an efficient day to day functioning of the practice. The systems provide assistance in managing and recording patients' demographic information, diagnosis, referrals, prescriptions, observations and the analysis of clinical data. In Ireland there are four accredited GP PMS systems, however the most commonly utilised are HealthOne, Helix Practice Manager and Socrates, all three owned by the Clanwilliam Group. In total 93% of GPs who use software systems during consultations in Ireland, employ these three systems. Although, each of the systems is developed with an aim to allow easier access to patient information, effective management of consultations and the improvement of the practice efficiency, they differ significantly in terms of design, functionality and recording ability.

In order to investigate the feasibility to record, extract and produce reports by PMS systems on the data associated with chronic disease risk factors (alcohol consumption, smoking status, physical activity and BMI) and the provision of brief interventions, a detailed evaluation of the three main PMS systems was necessary. With the aim to assess the quality of data which could be extracted from GP practices, a number of steps were taken within each of the systems. These included the creation of a study patient database, an identification of which data related to risk factors and interventions could be recorded, an identification of the data location and the extraction of the data and engagement with representatives of the software providers in the report production. The evaluation of each system is briefly outlined below.

Socrates

The Socrates software system was designed to allow easy management of the patients' care and the finances of the practice. It gives an impression of being the most user-friendly system available. Socrates provides GPs with a clear overview of the data during patient consultation, and it allows a simple reporting facility, ideal for everyday practice needs.

During consultations with patients, Socrates users have an option to record basic patient information in the section 'Baseline details'.

This particular tab allows a GP to enter data in relation to physical measurement (e.g. weight, height, BMI), social history (e.g. smoking and drinking history) and numerous vital signs (e.g. SBP, DBP, cholesterol, pulse, temperature, physical exercise, etc.). All data related to risk factors can be found here, recorded in one place/page, which essentially allows GPs to have a clear overview of the basic data of a patient's health status.

After thorough examination of the data related to risk factors, it became clear that certain areas are absent. Social history which is entirely based on risk factors, alcohol and smoking, allows recording of current status (smoking status/drinking status/ex-smoker years), frequency of usage (smoke per day/weekly alcohol) and start dates (smoking start date/alcohol start day). However, Socrates software does not provide an option to record the Audit-C screening data in relation to alcohol consumption. This particular test represents an effective screening tool for alcohol consumption and is commonly utilised to identify patients who are hazardous drinkers or have active alcohol use disorders. The unavailability of the Audit-C prevents GPs from accurately detecting and assessing a potential drinking problem, and providing the appropriate alcohol-based brief intervention. Furthermore, although a 'Baseline details' tab allows the recording of physical exercise undertaken, the options provided in relation to this risk factor are rather ambiguous. When recording information about a patient's physical activity level, GPs can choose between four options such as: 'not recorded', '2.5-5 hrs moderately vigorous physical activity per week or 30-60mins most days', 'less than 2.5-5 hrs moderately vigorous physical activity per week or 30-60mins most days' and 'more than 2.5-5 hrs moderately vigorous physical activity per week or 30-60mins most days'. As physical activity is measured in hours per week and minutes per day, this creates a lack of clarity and produces a risk of uncertainty in selecting the right option. Additionally, this leads to an inaccuracy of the data recorded. Furthermore, the Socrates system does not provide fields dedicated to brief interventions which might have been provided to a patient. The only possibility to document this information is through the 'social and past medical history tab', where GPs could type free text into a data field. Free text notes additionally lead to a lack of structure, as well as difficulties in extraction and analysis when intending to examine brief interventions provided on a practice population level. As the free text data is not captured in a standardised manner, spelling errors or acronyms may occur and lead to further negative impacts on the usefulness of the data for re-use.

Multiple issues arise during the extraction of data. Presently, Socrates offers 29 types of standard reports which could be run by its users. However, none of them allow GPs to produce a report on individual risk factors. When running a report which is based on a baseline summary of the individual patient, GPs have an option to extract and run the report on all baseline data for a particular patient. There is no option to select a particular baseline factor (e.g. alcohol status, smoking status, BMI or physical activity) which might be of interest for the GP. Additionally, there is also the lack of an option to enable a user to anonymise data produced in the reports, which leads to the display of a name, address and phone number of the patient(s). Therefore, the report might be sufficient for GPs but not for research purposes.

HealthOne

HealthOne is the most comprehensive of the three systems, which allows GPs to record a wide range of administrative and medical transaction data. In addition, this contributes to the successful storage of detailed information which is vastly valuable during patients' examinations and further data analysis and report production.

During patient consultations, a GP first encounters a 'medical transaction' section. The initial medical transaction data includes tabs such as medical and surgical history, alcohol and tobacco consumption and blood group. However, medical transaction data could be expanded by clicking on the toolbar tabs: 'insert item', 'insert sequence' or 'insert aggregate selector', which in return adds a specific variable of interest to the user. Although, 'insert' tabs are very useful while recording more detailed information, an adverse impact could take place, since each 'insert' tab contains a wide spectrum of data, therefore less familiar users could have difficulty in identifying the location of items within specific tabs.

When focusing only on the risk factors, baseline information contains 'alcohol consumption' and 'tobacco'. When selecting these particular fields, a GP will have a choice to select an appropriate field (alcohol consumption: nil/active/ex/social/rarely/actively/alcoholism; and tobacco: yes/no/ex). If one of the options does not satisfy the GP in terms of a particular patient, all chronic disease risk factors could also be recorded by clicking on the 'insert the form' and/or 'screening' icon, which are located on the toolbar in the 'medical transaction' section. These two icons allow recording of a wide range of variables related to smoking, physical activity, alcohol, BMI and eating habits. Furthermore, the 'insert item' tab could be selected as well, and therefore more options become available. The alcohol item has 12 entry options (e.g. consumption, level, advice, abuse per year, etc.), diet item has 14 options (dietary habits, current diet, dietetics, etc.), physical activity has 10 options (activity, examination, exercise, etc.), weight has 22 options (weight excess, weight changes, increase, overweight, etc.) and smoking has 3 options (habits, advice and smoking in household). In addition, smoking habits could also be assessed through the 'smoking status' icon on the main menu (the icon depicting a cigarette) which allows the user to record 12 variables in relation to cigarette use (e.g. do you still smoke, how many do you smoke per day, advice given, etc.).

An extensive variety and availability of variables, located in different parts of the HealthOne system, creates confusion and it also leads to the risk that the same variable could be recorded in different places, containing different variable names with different results. The initial quality of the data, reflected through too many options, creates issues while recording and also when trying to produce a report. For instance, in practices where five GPs are employed, two GPs could have been recording the risk factor of smoking through the baseline option, and three could have done so using the cigarette icon. Therefore, in running a report based on practice population, the data would appear as inconsistent and inaccurate - especially considering that the user could employ a wide variety of terms to record the data.

The advantage of this system is that it contains an Audit-C tab, which provides a correct evaluation of the potential drinking problem of a patient. The system also allows the recording of brief interventions, however, they are dispersed throughout the system, recorded under

different names (intervention/advice/recommendation) and therefore become almost impossible to overview and analyse accurately. Similar to Socrates, HealthOne also gives an option for typing free text descriptions, which could be recorded for any variable throughout the system. Although the free text notes contain more detailed information than the coded term or options provided, there is a danger of ambiguity and misinterpretation during analysis, which creates inconsistency and lack of accuracy.

The extraction of data for the report generation is the most advanced in comparison with the other two systems. If desired, a GP could analyse the whole population of the practice. The section 'analysis population criteria' allows the input of a patient's criteria (e.g. age, gender, status), transaction criteria (e.g. date range) as well as desirable variables in the sections 'inclusion criteria' and 'exclusion criteria'. Such a wide selection of options allows the generation of a completely anonymised report, based on a particular part of the practice population which is of interest to a GP, or a report based on a particular disease or risk factor. The only disadvantage in terms of the report generation is that the section 'inclusion criteria' has a limited option, where only four items at one time could be entered. Therefore, if a GP intends to investigate/run a report on more than four variables (e.g. alcohol frequency, consumption, diet, BMI, exercise, etc.), the analysis has to be run multiple times. The vendor recommends that as few as possible items are entered in order to prevent a potential system collapse.

Helix Practice Manager

Helix Practice Manager (HPM) is the most recently designed software system for GPs in Ireland. It represents a combination of the Socrates and HealthOne systems. It contains less available options for data entry than HealthOne, but it provides a clear display of the majority of patient information, like Socrates.

HPM offers an overview of the patient data through six main fields including 'Documents', 'Medication', 'Consultation Notes', 'Tests', 'Medical history' and 'Recall Opportunities'. Data entered in these fields provide a clear overview of patient history, medication prescribed and any tests undertaken by the patient. Specific alerts about the patient or any potential allergies are at the immediate disposal upon opening the patient file. The exam module offers an overview on a patient's vital signs, which are essential in monitoring risk factors. Each time a vital sign is amended, there is a date attached to that new information (e.g. completed 27.7.2017.).

Potential monitoring of risk factors takes place in the 'Exams' section under the 'Vital signs' category. In this section, variables connected with alcohol status ('Drinks alcohol', 'Date stopped alcohol' and 'Alcohol units a week'), smoking status ('Smoking', 'Date stopped smoking', 'Cigarettes per day' and 'Years smoking') and BMI can be recorded.

While entering the information for risk factors, very limited options are provided, such as merely confirming that a patient drinks alcohol or smokes. All the data, including units consumed per week and the number of cigarettes consumed per week, is entered manually.

The option for any additional comment is provided as well. In the 'Exams' section under the 'Social habits' category, a GP has the opportunity to record a wide spectrum of data connected with risk factors (type of beverage consumed, frequency of drinking, type of cigarettes consumed, exercise duration, etc.). However, all information is entered manually as well. In terms of alcohol, the data entry is particularly confusing as alcohol consumption can input under 'result' and 'unit'. Therefore, one GP could view the consumption of two glasses of wine per week as a 'result', and another GP could view it as a 'unit'. Thus, the problem arises when trying to analyse these results based on practice population. Overall the recording of risk factors is very limited in HPM, including inadequately developed options to record each factor, the absence of the Audit-C and inability to record brief interventions except through free text notes in the 'Consultation notes' section. As already discussed, free text notes are not an adequate solution when aiming to run and analyse reports based on practice population.

Furthermore, during the report production, HPM does not allow one to focus on both age group (e.g. patients older than 18) and a specific date range. Therefore, the extraction of data based on multiple variables is not accommodated. In order to produce a report based on risk factors, two reports need to be produced; a report based on 'vital signs' (which contains blood pressure, BMI, years of smoking, temperature) and a report based on 'social habits' (focus on alcohol and smoking habits). A number of features could not be tested adequately within the test environment. In addition, during the report production, all variables are categorised vertically, instead of horizontally, and therefore each patient appears multiple times in the final report, which creates substantial difficulty in terms of analysis.

Conclusion

The review of the three main GP PMS systems (Socrates, HPM and Health One) in terms of their ability to record and extract data, as well as their reporting functionality, revealed significant limitations. Although all three systems are now owned by the same vendor, their design, options for data entry and report production differ significantly. Furthermore, they each have their own development team. The PMS systems in Irish general practice do offer a variety of patient data entry options and they are an important factor in practice organisation and GP support. However, they were found not to be adequate to permit the accurate recording and data extraction of chronic disease risk factors and brief interventions. The main challenges occurred due to a system recording risk factors through multiple variables and formats and a lack of clarification regarding where and how relevant interventions could be recorded. These issues created a risk of data misplacement and inconsistency. An absence of the option to record all risk factors among systems, created a lack of data essential for appropriate monitoring of chronic diseases. Furthermore, the reporting functions allowed a limited number of data items to be extracted in one upload and some were inflexible in terms of selecting specific date ranges. The reports generated may be sufficient for brief clinical reference, however the reports were found to be insufficient for the analysis required for the needs of research and audit.

Methodology

Aims and objectives

The aim of this project was to examine the feasibility of recording chronic disease risk factors (smoking, alcohol consumption, physical activity and diet) and delivering appropriate brief intervention for all adult patients, in the general practice setting. The project also aimed to evaluate the effectiveness of the brief interventions delivered by monitoring the prevalence of each of the risk factors at baseline and at intervals after the intervention had been delivered.

Within this, the specific objectives were:

- To analyse the level of recording of chronic disease risk factors in the general practice setting at baseline;

- To assess at baseline, the use of brief interventions when these risk factors are identified;

- To implement a specific template (proforma) incorporated into the electronic PMS systems for recording risk factors and brief interventions;

- To assess the recording of chronic disease risk factors and brief interventions at 6 and 12 months after the introduction of the proforma;

- To identify barriers to promoting healthy lifestyle choices;

- To identify the additional training needs for delivery of brief interventions.

Project design

The project comprised of four individual work packages, which were interlinked. Aspects of the packages were undertaken simultaneously.

Work Package 1

Work package 1 investigated the status of recording of the relevant risk factors at baseline. In order to do so, the recorded baseline data relevant to chronic disease risk factors and brief interventions was obtained from the PMS systems in each practice. The data was obtained through the development of a specific proforma called the Physical Health Monitoring (PHM) tab, which was incorporated into each of the three main PMS systems.

The PHM tab allowed the extraction of all information from the existing baseline detail area of each system and it provided additional relevant variables/fields where chronic disease risk factors and brief interventions could be recorded (see Appendix 1). The PHM tab was incorporated into the Socrates (in September 2017), the Helix Practice Manger (in January 2018) and the Health One (in July 2018).

Alongside the PHM tab, we created a sample audit (similar to those we have created in other areas – www.icgp.ie/audit), linked to the guidelines which will permit Irish GPs to undertake an audit within their practice on this topic.

An audit tool was created which allowed anonymous data to be extracted at practice commencement and at six and twelve months post commencement. This provided the practice with a report of their activities in respect of recording risk factors and interventions.

Work Package 2

Work package 2 assessed which eLearning modules relevant to chronic disease risk factors were undertaken by participating GPs and provided access to further courses, including: 'Chronic Condition Self-Management', 'Promoting Physical Activity', 'Promoting Alcohol Reduction', 'Smoking Cessation', 'Hypertension, 'Heart Failure', 'COPD' and 'Diabetes Foot Care'. GPs participating in this study were encouraged to undertake these courses and were required to undertake that on 'Chronic Condition Self-Management' plus one other at a minimum. Participants in the project who did not previously have access (for example if not an ICGP member) were given access to courses.

Work Package 3

Work package 3 aimed to incorporate the guidelines for Irish general practice in relation to recording and monitoring of the identified risk factors into PMS systems. The relevant guidelines were reviewed and pop-up messages and advice to GPs incorporated into the physical health monitoring tab on their PMS systems when 'at risk' data was entered at a patient level notifying the GP of the recommended action to take in each case.

Work Package 4

Work package 4 evaluated the experiences of the service providers and service users. The semi-structured interviews were conducted with the service providers, GPs and practice nurses in order to examine their experience of using the PHM tab, in terms of practicality, acceptability, and impact on the workload. The service user (patients') opinion regarding the management of lifestyle choices and the provision of brief interventions in general practice setting was examined as well. For that purpose, an anonymous paper-based self-administered questionnaire survey was developed.

Recruitment

At the beginning of the recruitment phase, all GP practices in the Carlow and Kilkenny area were contacted through email and via advertisement in the ICGP monthly publication 'Forum' and in its quarterly eZine. This outlined the nature of the study and the criteria for participation. An information evening about the study followed, where all GPs interested in participation could obtain more detailed information and raise any additional enquiries.

Potential participants were given written information and research agreement forms. These provided details on the purpose and process of the study, potential benefits and harms, their rights under the Freedom of Information Act, data collection procedures, time commitment, voluntary participation, the right to withdraw without prejudice, assurance of confidentiality and researchers' contact details. Participants were given a minimum of seven days to decide whether they wished to participate in the study.

GP participation in the study

The main aspects of GP participation in the study included:

- Utilisation of the PHM tab, including the recording of chronic disease risk factors and brief interventions. GPs were asked to record only what they thought was relevant and addressed during the consultation.

- To carry out brief interventions where possible, given time constraints. GPs were not required to spend any additional time on consultations.

- Upload anonymised aggregated data relating to the specified risk factors and brief interventions recorded on the PHM tab. The data was extracted at practice commencement and at six months and twelve months post-commencement.

- Undertake a minimum number of pre-agreed eLearning modules.

- Take part in a semi-structured interview discussing their experience in using the PHM tab and undertaking the E-Learning modules.

- Facilitate the recruitment of the practice nurse for a semi-structured interview.

- Facilitate the survey with patients. Initially semi-structured interviews with patients were planned but this was changed to a survey in the course of the study.

Patients' participation in the study

Patients' participation in the study included taking part in an anonymous survey distributed in their general practice.

The survey was offered to all patients who met the inclusion criteria (patients aged 18 years and over; and patients able to provide informed consent) and who have attended a general practice during the time when the survey was distributed. Prior to their participation in the survey, patients were provided with an information leaflet, which outlined information about the study as well as their potential participation. The aim of the survey was to obtain patient views regarding the management of lifestyle choices and the provision of brief interventions in the general practice setting.

Data Analysis

Quantitative Data

The anonymous, aggregated data was extracted at practice level and uploaded to a central database via a secure connection. The analysis focused on overall description of the participating practices, as well as frequency of recording of chronic disease risk factors and brief interventions within the practice population. The data from the participating practices was analysed using SPSS Statistics 23.

The anonymous patient survey data was analysed using Microsoft Excel and SPSS Statistics 23.

Qualitative Data

The qualitative data was collected through telephone semi structured interviews, which were audio recorded and transcribed verbatim. The interviews were undertaken with service providers - GPs and practice nurses. Semi-structured telephone interviews were considered the most effective method for qualitative data collection. Interview via telephone is a method which was seen to be beneficial with regards health-related research due to the complexity in accessing and the time constraints faced by health professionals. Prior to the interviews, a topic guide was developed, in consultation with the Steering Group of the study. The interview guide consisted of 17 questions grouped into three main sections: experience in using the PHM tab, experience in undertaking the eLearning modules, and recommendations/ importance of recording. The data obtained through the interviews was transcribed and analysed using thematic analysis, by the research team through the NVIVO 12 data management software.

Ethical considerations

The ethical repercussions of this research were minimal. Most concern, in common with the majority of research endeavours, centres upon the protection of data collected. Data protection was secured via compliance with the data protection legislation. Therefore, throughout all stages of the research process, the research team ensured that the core ethical principles including informed consent, confidentiality and anonymity, data protection and limitation of risk undertaken.

1. All data from the participating practices was extracted within the practices, uploaded to a central database via a secure connection, and only anonymous aggregated data was supplied to the researchers. On receipt of the practice uploads, the researchers made sure that all data was held in a secure, password protected electronic file accessible only to dedicated members of the research team.

2. In order to ensure that all information provided by GPs and practice nurses was captured accurately, semi-structured interviews were audio recorded. Prior to the interviews sessions, the participants were asked for permission to record the session. Recorded data was anonymised with no identifying information recorded. The participants' wellbeing took priority over the research study. Prior to each interview the researcher explained in detail how the participant participation will look like, how much time it would take, and which type of topics would be discussed. Non-anonymised audiotapes and transcripts were saved on a password-protected computer, accessible only to dedicated members of the research team.

3. All patients who participated in the survey were treated with dignity and respect. If a patient had any queries in relation to the survey or was concerned by any elements of the survey, they were invited to speak to the principal investigator (whose contact details provided in the patient information leaflet) or their GP prior to completing the survey. The anonymous surveys collected from the participating practices were entered onto Microsoft Excel programme and the original questionnaires were immediately destroyed. The data is stored in a password protected and encrypted excel file during the course of the study and no patient or practice details were identifiable.

Ethical approval was obtained from the Irish College of General Practitioners' Research Ethics Committee.

Physical Health Monitoring tab

A thorough investigation of the PMS systems revealed that the quality of data collection and reporting structures available in general practice in Ireland were not adequate to permit accurate recording and data extraction of chronic disease risk factors and brief interventions. Hence, the ICGP via the Irish Primary Care Research Network (IPCRN), created the Physical Health Monitoring tab (PHM tab), which was incorporated in all three PMS systems including Socrates, Health One and Helix Practice Manger.

The PHM tab allowed users to systematically and accurately record chronic disease risk factors and brief interventions. While the PHM tab mirrors some data already collected in 'baseline details' or 'vital signs' areas (depending on the PMS system employed in the practice), it also provided for more comprehensive and structured information to be recorded. By selecting this tab, GPs were able to fill in fields including: *Measurements, Smoking, Physical activity, Audit-C, Substance misuse, Vaccines, Tests, Brief Intervention and Referral*. If any of this information was already recorded in a particular PMS system, that information is transferred to the PHM tab, or vice-versa. As part of the PHM tab, an ability to run audit on any of the chronic disease risk factors among practice population was also provided.

The content of the PHM tab fields

The 'Measurements' field contains a wide range of variables, including: Weight, Height, BMI, Waist/Abdominal circumference, Cholesterol, Systolic, Diastolic, HBA1c, Random non-fasting glucose and FEV1.

The 'Smoking status' field allows a brief smoking screening by identifying patients as 'Current', 'Ex-Smoker', 'Non Smoker' or 'Passive' smoker.

The 'Audit-C' tool contains four main questions which enable GPs to accurately assess alcohol consumption and identify patients with active alcohol use disorders or a hazardous drinking status.

The 'Physical activity' field provides assessment in terms of frequency as well as the intensity of physical activity during a typical week for a patient.

The 'Substance misuse', 'Vaccines' and 'Tests' fields allow concise identification and recording of potential substance abuse; vaccines given (Flu Vaccine, Pneumococcal vaccine and Pertussis) and examinations undertaken (Smear test, Mammogram, Bowel cancer screening, PSA test, INR test and ECG).

The 'Brief intervention' field gives GPs the opportunity to record all relevant interventions in one place during consultations. GPs can select multiple interventions including: Weight, Smoking, Alcohol, Physical activity, Diet, Medication adherence, Substance misuse, Sexual health, Depression/anxiety, Other interventions and Patient Declined. Recording all relevant interventions in one place provides GPs with a comprehensive overview of the type of advice offered to a particular patient.

The 'Referral option' field contains multi check-box options to select which service the patient was referred to. The options provided are: community/voluntary programme, community service (e.g. PHN, dietitian, OT), hospital/specialist service, Other referral and Patient declined.

The guidelines for monitoring chronic disease risk factors were incorporated in the PHM tab. They served as a reminder of which action and which measures should be taken by GPs. Namely, when entered data suggests that a patient is at risk, an information message appears, containing a reminder about the potential risk as well as a suggestion for undertaking the next steps based on appropriate guidance (e.g. NICE, WHO, ICGP). Information based messages appear if:

- The patient is a smoker

- Total alcohol score is >4

- When physical activity is inadequate

- When BMI indicates overweight/obese

- If blood pressure is ≥140/90

The purpose of the PHM tab was to assist GPs in monitoring chronic disease risk factors by facilitating systematic and accurate recording; and by providing adequate guidelines and reminders when a patient is identified as being of risk. It aimed to help Irish GPs to simplify their work, save time, and ultimately improve patient care.

Chapter 5

Findings

The findings chapter consists of quantitative and qualitative data analysis, including the analysis of:

- Data uploaded from the participating practices
- Surveys with the patients
- Semi-structured interviews with the participating GPs and practice nurses

In total, 13 GP practices were recruited in the Carlow/Kilkenny area, comprising of 21 participating GPs. The demographics of the practices can be found in Table 1.

Table 1. Demographics of the participating GP practices

Type of the practice	
Single handed	46.2% (n=6)
Group practice	53.8 % (n=7)
Location of the practice	
Urban	7.6% (n=1)
Rural	46.2% (n=6)
Mixed	46.2% (n=6)
Software system of the practice	
Socrates	46.2% (n=6)
Helix Practice Manager	30.7% (n=4)
Health One	23.1% (n=3)

Quantitative data analysis – the analysis of data uploads

The analysis of data uploads was based on five practices using the Socrates software system, whose data was successfully uploaded. The sixth Socrates practice did not continue their participation after the first data upload, and therefore the data from this practice was not included in the analysis.

The total number of the practice population accounted for 32,872 patients, of which 80.0% were adults. Of the adult patient population who visited in the last year 47.7% (n=5228) were GMS patients and 47.8% (n=5240) were private patients. The median number of consultations per adult patient in the last year was seven (Table 2).

*Table 2. Overall description of five Socrates practices (data in respect of **one year** prior to the first data collection/upload)*

	Number of GPs in the practice n	Total practice population n	Total adult practice population n (%)	Average number of adult consultations in the last year Median	Patient status for adults who visited in the last year			
					GMS n (%)	Private n (%)	DVC n (%)	Other n (%)
Practice 1	1.5	2,170	1,581 (72.9)	7.0	540 (45.5)	575 (48.4)	70 (5.9)	3 (0.3)
Practice 2	2	6,039	4,651 (77.0)	8.0	1,171 (49.0)	1,177 (49.2)	0	42 (1.8)
Practice 3	1.5	8,300	6,990 (84.2)	4.0	990 (37.8)	1,526 (58.2)	89 (3.4)	15 (0.6)
Practice 4	1	3,310	2,640 (79.8)	8.0	625 (57.7)	392 (36.2)	62 (5.7)	4 (0.4)
Practice 5	4	13,053	10,442 (80.0)	7.0	1,902 (51.8)	1,570 (42.7)	203 (5.5)	0
Total	10	32,872	26,304 (80.0)	7.0	5,228 (47.7)	5,240 (47.8)	424 (3.9)	64 (0.6)

When investigating the frequency of recording chronic disease risk factors and brief interventions, the data was examined through three equal length periods in order for data to be comparable. The data uploads took place at commencement, six months and 12 months post-commencement and each upload included data for the six months prior to the upload.

Therefore, the uploads were named: 'first upload' (included data recorded six months prior to the first upload), 'second upload' (included data recorded six months prior to the second upload) and 'third upload' (included data recorded six months prior to the third upload).

In the first upload, a total of 9,527 adult patients were included, of which 20.9% (n=1,993) had at least one chronic condition. The number of patients in the second upload slightly decreased totalling 9,196 patients. However, 28.3% (n=2,603) of these patients had a chronic disease. Finally, 9,185 patients were included in the third upload, of which one third suffered from a chronic condition (30.3%, n=2,781) (Table 3).

Regarding chronic disease risk factors, for 6.6% (n=634) of the patients, blood pressure was recorded at least once in the first upload.   The blood pressure recordings increased slightly in the second upload to 6.7% (n=617) of patients, followed by a slight drop in the third upload, where 6.4% (n=594) of patients had blood pressure recorded at least once in the previous six month period (Table 3).

The BMI recordings were the same in the first and the third upload, accounting for 9.4% of patients for whom BMI was recorded at least once at commencement and twelve months post-commencement. However, in the second upload, the recordings of patients BMIs slightly dropped to 9.2% (Table 3).

Overall, smoking and alcohol consumption status were recorded poorly. Although the recording of smoking status slightly increased between the first and the second upload, the levels of recording in the third upload remained at the same level as the second upload, showing no change in the recording patterns. Across all three periods, smoking status was recorded for less than 10% of all adult patients who visited in the six-month period prior to the first (9.7%, n=928), second (9.8%, n=909) and third upload (9.8%, n=907) (Table 3). Alcohol consumption status was recorded for 97 (1%) adult patients who visited prior to the first upload, 18 (0.2%) of patients who visited prior to the second upload, and 16 (0.2%) patients who visited prior to the third upload.

Although the recording of physical activity increased between the first and second upload, the third upload revealed a decline in the recordings again. Physical activity recording was overall very low, accounting for 5 (0.05% in the first upload), 12 (0.13% in the second upload) and 5 (0.1%) patients for whom physical activity was recorded during consultations in the relevant period (Table 3).

The recording of brief interventions provided during patient's consultations was overall very low; however, a small change was noted. Prior to the first upload, brief interventions were recorded only five times, yet in the third upload brief interventions were recorded 126 times, which represents a sharp increase. The participating practices recorded brief interventions 25 times more twelve months at later stage of the study in comparison with the commencement of the study.

Table 3. Recording of chronic disease risk factors and brief interventions

	Total number of adults who visited in a six month period n	Median Number of consultations	Number of patients coded with chronic disease n (%)	Blood pressure recorded n (%)			BMI recorded n (%)			Physical activity evaluations n (%)	Smoking status recorded n (%)			Alcohol consumption status recorded n (%)	Brief interventions recorded n (%)
				1	>1	Total	1	>1	Total		1	>1	Total		
FIRST UPLOAD	9,527	4.00	1,993 (20.9)	583 (6.1)	51 (0.5)	634 (6.6)	768 (8.1)	128 (1.3)	896 (9.4)	5 (0.05)	765 (8.0)	163 (1.7)	928 (9.7)	97 (1.0)	5 (0.05)
SECOND UPLOAD	9,196	4.00	2,603 (28.3)	571 (6.2)	46 (0.5)	617 (6.7)	738 (8.0)	108 (1.2)	846 (9.2)	12 (0.13)	738 (8.0)	171 (1.8)	909 (9.8)	18 (0.2)	13 (0.13)
THIRD UPLOAD	9,185	4.00	2,781 (30.3)	553 (6.0)	41 (0.4)	594 (6.4)	765 (8.3)	99 (1.1)	864 (9.4)	5 (0.1)	728 (7.9)	179 (1.9)	907 (9.8)	16 (0.2)	126 (1.4)

Quantitative data analysis – the analysis of surveys with the patients

In total, 279 patients were surveyed. The aim of the survey was to investigate patients' views on the delivery and importance of the role of their GP in the provision of advices on lifestyle choices. Overall, the majority of those surveyed were female (63.2%, n=172), older than 45 years (67.1%, n=186) and without any chronic condition (68.5%, n=187). Regarding the frequency of GP visits, the vast majority of the patients expressed that they had visited their GP five times or less in the last six months (80.8%, n=224) (Table 4).

Table 4. Patient demographics

	n (%)
Gender	
Male	100 (36.8)
Female	172 (63.2)
Age range	
18-24	18 (6.5)
25-34	33 (11.9)
35-44	40 (14.4)
45-54	61 (22.0)
55-64	56 (20.2)
≥65	69 (24.9)
Patient status	
GMS	127 (46.9)
Private	115 (42.4)
Over 70's card	29 (10.4)
Frequency of visiting GP in the past 6 months	
0-2	112 (40.4)
3-5	112 (40.4)
6-8	37 (13.4)
>8	16 (5.8)
Having a chronic condition	
Yes	86 (31.5)
No	187 (68.5)

At the most recent visit, 38.4% of the patients (n=103) were provided advice regarding their lifestyle choices on the GPs own initiative. In total 17.5% (n=47) of the patients had to ask a GP first, and 30.6% (n=82) were not provided with advice because they expressed that they did not have health issues related to their lifestyle. When advice was provided, a large majority of the patients were able to understand the advice (96.3%, n=182) and find it useful (91.4%, n=149).

The majority of patients either strongly agreed or agreed that GPs have an important role (93.1%, n=255) as well as the necessary knowledge and skills (91.2%, n=249) in the management of the patients' lifestyle choices. In total 88.4% (n=243) of the patients expressed that the advice given by their GP is very influential regarding potential changes in their lifestyle behaviours (Table 5).

Table 5. Importance of a GP in contributing in the management of lifestyle choices

	Strongly agree n (%)	Agree n (%)	Not sure n (%)	Disagree n (%)	Strongly disagree n (%)
GPs have important role in the management of lifestyle choices	152 (55.5)	103 (37.6)	12 (4.4)	5 (1.8)	2 (0.7)
My GP has the necessary knowledge and skills to help with the management of lifestyle choices	151 (55.3)	98 (35.9)	19 (7.0)	3 (1.1)	2 (0.7)
My GP is able to spend enough time to give advice related to lifestyle choices	133 (48.9)	85 (31.3)	36 (13.2)	12 (4.4)	6 (2.2)
Advice given by a GP could successfully influence patients lifestyle behaviour/choices	140 (50.9)	103 (37.5)	23 (8.4)	8 (2.9)	1 (0.4)
If I have an issue related to lifestyle choices, I would ask my GP for advice	151 (54.9)	81 (29.5)	30 (10.9)	11 (4.0)	2 (0.7)

Qualitative data analysis

Experiences of service providers (users of the Socrates and Helix Practice Manager software)

In total, 15 semi-structured interviews were conducted with eleven GPs and four practice nurses. The main themes that emerged from the analysis were:

- Experience of using the PHM tab
- Recording within the PHM tab
- Experience of undertaking eLearning modules
- Recommendations for the future

A brief description of the themes can be found in Table 6.

Table 6. Description of the key themes

Main Theme	Description/summary
Experience of using the PHM tab	Positive experience The PHM tab was seen as easy, clear and user-friendly. When used, it prompted participants to ask additional relevant questions. Negative experience The process of the recording within the PHM, considering the number of pages and information contained, was seen as time-consuming.
Recording within the PHM tab	Risk factors contained on the first page (which is identical to 'baseline'/'vital signs' tab from the participant's PMS systems) were recorded the most often. Brief interventions and other variables located further in the PHM tab were recorded irregularly.
Experience of undertaking E-Learning modules	The experiences of undertaking the E-Learning modules, proposed by the study, were highly positive.
Recommendations for the future	The participants suggested: Better allocation of the resources towards management of patients with chronic conditions. Incorporation of all the pages within the PHM tab into one page. Provision of the options that the recommendations are given during the consultation be printed afterward.

Experience of using the PHM tab

Overall, the PHM tab was viewed in a very positive context. GPs agreed that the format and content of the tab were very clear and easy to use, with a simple recording procedure, stating that:

'PHM is a worthwhile exercise...I found it very easy to use...recording was quick and convenient' (GP1)

'Tab was perfectly clear... very easy to understand, very clear…step by step which I like... very user-friendly…' (PN 2)

'As I said I am using it every day, it's a second nature…it is a huge step forward' (GP11)

The tab also served as a reminder to GPs about the possibility to record additional information during consultations:

'I used the PHM tab quite a lot actually, I think it is handy. The tab encouraged me to record some additional data, and more information on exercising or alcohol…' (GP2)

'Format and set up was good…and it would prompt you to ask a few more questions that you normally would not. It was clear and practical' (PN 4)

Regarding adding to workload, GPs experiences differed: for some participants recording did not take any extra time during the consultation (GP1, GP6, GP11). It was suggested that after the initial adjustment to the format of the PHM tab and getting used to recording regularly, the recording itself should not take any significant amount of time during the consultations: *'… once I start doing it [recording] regularly I would actually do it quite quickly, and now I can do it in two to three minutes. It's up to myself how long will I take...'* (GP11).

However, the majority of the participants found that the amount of time it took them to record *all* of the patient's information in the options provided in the PHM tab is significant. They believed that the overall layout of the tab, which contained six pages with a wide range of information, was adding to their workload. In total, seven GPs and two practice nurses highlighted that in order to record everything that was contained in the tab, it would require a much longer consultation than an average ten minutes. Some of the participants stressed that considering the workload they experience on a daily basis, any additional recording was seen as practically impossible:

'… it does take additional time to click through all the boxes, pages… It does take a few extra minutes, and we are very limited for time' (PN1) and *'The concept is great, but unfortunately, it is actually so busy working in general practices at the moment. There is not enough time to ask patients a lot of questions... It definitely takes more time to record'* (GP4).

Although the PHM tab provides an opportunity for GPs to record a wide range of variables, it is not necessary that each of these variables be recorded during every consultation. Therefore, an increased awareness of what requires recording for each patient could contribute to an overall better utilisation of the tab and potentially lessen the workload of the user.

The participants often suggested that 'minimisation of the screen' (GP2) or integration of all the tabs into one page (GP3, GP7, GP8, PN3) could contribute to the quicker recording of information as well as to be a better motivation to record more often.

One of the sections within the PHM tab was a guidelines section which appeared as pop-up messages when 'at risk' data (e.g. high blood pressure, high BMI, etc.) was entered during the consultation with a patient. The purpose of the messages (advices) was to inform/remind the GPs of the recommended action to take in each case. The thoughts of the participating GPs on the guidelines section were: *'I find the advices helpful…they cut to the point with the patients'* (GP10) *and 'Advice section is very useful, and it is excellent that it serves as a brief reminder about the further steps that we should take'* (GP1).

The interviews revealed that the guidelines provided did not only serve as a reminder to a GP but also as an additional source of communication with a patient to get the GP's point (advice) across. The GPs would often use these pop-up messages to communicate with their patients and demonstrate their advice in a more depth:

'They were good. I showed them to the patients, so they could actually see it…and I believe they were actually able to hear them, take them on board. I also say to my patients this is the advice that computer has given you and I would also say the same…' (GP11)

'When advice would come up, I would go through it with the patient…that just prompted them better into thinking about it..' (GP9)

It seems that any additional source of information is important as an aid to GPs in the management of their patients' lifestyle habits and choices.

Recording within the PHM tab

At the beginning of the study, the participants stated that they used the PHM tab regularly, on a daily or weekly basis, '… *more often with new patients who have just registered*' (GP8). When recording into the PHM tab, the majority of the participants were focused mostly on 'baseline'/'vital signs' area where BMI, blood pressure, smoking, and alcohol were recorded:

'*I would use the smoking and alcohol tabs mainly, weight, height and exercise occasionally*' (GP1)

'*I tried to record physical activity in baseline, as well as smoking and alcohol*' (GP7)

'*I would mostly use the first page. I haven't used the other tabs that much*' (GP2)

The first page of the PHM tab includes the same set of variables which could be seen on the baseline details area of the system they use (Socrates/HPM). Seemingly the variables which are the most recorded are those which would be often routinely recorded during any consultation and which are the most convenient to record. Recording of physical activity, as one of the main risk factors for the development of chronic diseases, was noted to be significantly low, where the participants admitted to using this 'sometimes' or 'rarely'. Since

the main focus was on the first page of the PHM tab, the recording of other variables located further down (on the second/third/fourth page) appeared to be poor.

Furthermore, brief interventions would be commonly offered to the patient during the consultation. The PHM tab provided an option of recording brief interventions in a more systematic and accurate way, however, brief interventions were found to be poorly recorded. The main reasons why they were not recorded more often were: the participants were either more likely to record them in the way they used to – free text notes, or they would simply forget to record them because they were not on the first page:

'I would provide them as much as I can. I would record them in the notes as 'diet discussed..' (PN1)

'People were recording into open text (brief interventions)…and not going down the line of the PHM tab… '(GP7)

For some GPs the recording of advice provided to patients would be time consuming: *'Brief interventions which I already have addressed with patients, I would not record again. It would be time-consuming to do that'* (GP8). However, when reminded, GPs were aware of the importance and advantages of recording and they were willing to get into the habit to record more often in the future:

'It is important to provide brief interventions during the consultation, but we do it anyway all the time, every day, but the recording of it is important. I will definitely try to record it more often from now on' (GP4)

'Absolutely, recording is important. If you are doing it [recording] on a more regular basis, it is more likely to introduce it as a part of your consultation every time…and it could increase patient's awareness of a bad habit' (GP 6).

Experience of undertaking eLearning modules

The vast majority of the GPs interviewed had undertaken elearning modules. Their experiences were very positive:

'They [eLearning Modules] were very good, very clear, gave advice how the patients should be accessed..' (GP6)

'They were good, great approach, offering training and videos. They take place in our own time. They are very short and concise'. (GP3)

'I have used the 'Alcohol reduction' and 'Chronic disease management' modules, I found them very helpful, efficient, well resourced. They helped drive my attention towards certain issues' (GP1)

Recommended eLearning modules aimed to help GPs in facilitating self-management of patients with chronic conditions, and the positive experience of GPs who undertook the modules was found to be significant in proving the importance and helpfulness of the modules.

Recommendations for the future

Overall, the most commonly suggested recommendations were regarding the overall format of the PHM tab, where participants insisted that all of the options contained in the tab should be located on one page. They believed that this would provide a better overview of the fields available, it will take a less time to record, and it will contribute better to the overall uptake of recording in the PHM tab.

One participant suggested that incorporating an option in the PHM tab where a GP could *'print off something for patients, information leaflet'* (GP8) after the consultation, would be useful from the patient education point of view, and it might contribute towards better awareness of the chronic disease risk factors.

Better support from the Department of Health, as suggested by two participants would also contribute to a better recording of the chronic disease risk factors: *'I think it would be helpful if the Department of Health allocate more resources and give us more time to do it [record]'* (PN 3).

One of the GPs suggested that in order the PHM tab be used in a meaningful and regular manner the IT issues regarding extraction and recording of the data need to be resolved in the future: *'...I do think as we move towards more focus on proactive care in general practice that this is [PHM tab] a vital tool on how we will tackle that...because it will give us the evidence based on our practice population. We can record the information in a useful and meaningful way. It is the IT problem how it could be extracted, and that needs to be fixed as soon as possible..'* (GP11).

Chapter 6

Discussion

The main aim of this project was to examine the feasibility of recording chronic disease risk factors and recording and delivering appropriate brief interventions for all adult patients, in the general practice setting. In order to do so, the study was focused on two main aspects:

- What is currently happening on the ground (in GP practices)?

- What are the perceptions and experiences of service providers (GPs and practices nurses) and service users (patients)?

At the beginning of the study, it was identified that all three PMS systems utilised in the general practices in Ireland have a number of limitations in the recording of chronic disease risk factors and brief interventions. Therefore, the PHM tab was designed and installed in the PMS systems of each of the participating practices. As outlined in Chapter 4, the PHM tab aimed to assist GPs and practice nurses to record chronic disease risk factors and brief interventions in an accurate and systematic manner. As a result, this would contribute to obtaining an accurate overview of the prevalence of chronic disease risk factors within the Irish population. Accurate and regular recording of data on chronic disease risk factors would be highly beneficial in developing strategies focused on lifestyle modifications and adoptions of healthy behaviours among the population.

However, although the tab was installed in every PMS system, due to a number of issues which occurred during the extraction of data, only information recorded in the Socrates software system was able to be extracted from practices and included in the analysis.

The data extracted from the practices which utilize the Socrates system revealed that an overall recording of lifestyle risk factors and interventions was extremely poor. Blood pressure, smoking status and BMI were each recorded for less than 10% of the adult population at all three points of the data upload. Physical activity and alcohol consumption status were recorded for less than 1% of the overall adult population. Considering that more than 20% of patients who visited the participating general practices are diagnosed with chronic disease, assessing and recording of lifestyle risk factors, which potentially affect patients' condition, were found to be exceptionally low. Although the recording of brief interventions was found to be very low as well (less than two percent of patients had brief interventions recorded), the data uploaded twelve months post-commencement revealed a slight change. During the first two uploads, brief interventions were recorded 18 times; however, this number increased during the third upload reaching 126 brief interventions being recorded, which represents significant progress.

The health statistics based on the data retrieved from the practices are often used to inform health policies. Therefore, inaccurate data produces a harmful effect on adequate allocation and management of resources, which could be directed towards a reduction of chronic disease risk factors and a prevention of chronic conditions. When comparing with other countries including UK, Netherlands, and Australia, where data retrieved from general practice represents a rich source of information; in Ireland, due to significant under-recording and the limitations in extracting data across all systems, the availability and quality of data remains poor.

Being aware of the importance of the PHM tab, the research team and members of the Steering Group invested a considerable amount of time and resources in the development of the PHM tab. As a final product, the PHM tab provided an option to the participants to record a wide range of information. However, it was stressed to all participants on a number of occasions (during initial information session, through email liaisons, in the telephone conversations, after the interviews, etc.) that only the information that GPs or practice nurses find relative to the consultations should be recorded. Of course, the participation in the study should serve as a reminder of the importance of recording chronic disease risk factors and brief interventions.

The interview analysis revealed that the PHM tab was seen as 'easy, clear and user-friendly' by the participating GPs and practice nurses. The fields contained in the tab prompt the participants to ask additional questions, which are considered to be of benefit for patients' care. However, the interviews also disclosed that the majority of the participants found that recording within the PHM tab was time consuming. The participants believed that the tab contained too much information which could be recorded, and considering their daily workload, they found it impossible to record all relevant information during the average ten minute consultation. Therefore, they would be more focused on recording information on the first page including 'BMI', 'Blood pressure' and 'Smoking status', which was reflected in the results, where these three risk factors were recorded considerably more than 'alcohol consumption status' or 'physical activity' (located on the second page). Regarding brief interventions, the participating GPs and practice nurses often stated that the provision of lifestyle advices would be considered as part of their regular practice: the advices would be provided on daily basis, to a wide range of patients. The survey conducted with the patients clearly outlined patients believe that GPs hold an essential role in the provision of advice and management of their lifestyle choices. The majority of the patients strongly believed that their GP has the necessary knowledge and skills (55.3%, n=151) as well as time (54.9%, n=151) to provide appropriate advice.

However, this was not reflected in the analysis of data retrieved from the practices, where brief interventions were recorded only 144 times for the adult population that visited practices in the twelfth month period. Without the interventions being recorded, the study was unable to assess whether GPs and practice nurses actually had asked about lifestyle risk factors and offered advice to their patients.

Therefore, the effectiveness of brief interventions, as one of the objectives of the study, could not be evaluated simply because they were not recorded as variables in the PHM tab, although likely recorded as free text notes.

The recording of patients' adverse lifestyle choices is vital to inform further investigations, treatment, care and follow up with patients and other healthcare services. Despite the formal study requirements and the existing knowledge on the importance of lifestyle risk factors for treatment and prognosis, the recording of lifestyle factors in the participating general practices remain under-utilized. Therefore, the analysis revealed that the development and installation of the PHM tab did not contribute to a better recording of the chronic disease risk factors and brief interventions. Due to a low level of recording and utilization of the PHM tab, it is impossible to investigate with accuracy the prevalence of lifestyle risk factors in the Irish population through a general practice setting.

What are the main barriers?

Previous research highlighted time constraints, level of motivation and limitations of the software systems[53], as some of the obstacles that health care professionals commonly face.

Time constraint was found to be one of the main reasons for under recording in the Irish general practice. Lack of time seemed to be related to manpower shortages in general practices: '*it is so busy working in general practices at the moment. There is not enough time to ask patients a lot of questions…*' and '*Being a busy practice, I would not have time to check/record everything*', were some of the answers interviewees provided. A lack of manpower in Irish general practice is an ongoing issue[54,55]. The Financial Emergency Measures in the Public Interest Act (FEMPI) cuts introduced in 2009, created a vast resource reduction to practices. A lack of control over increased care demand and reduced infrastructure[55,56], created additional pressures in the general practice workforce environment. Stress levels rose among GPs as the resource cuts to nursing and administrative staff changed their working day and the care delivery to patients[57]. One of the solutions suggested by previous studies was that an introduction of financial incentives and administrative support could significantly improve the recording of patient's data, including diagnosis, risk factors, prescriptions, etc. [58,59,60]. Financial incentives already exist in a number of countries, including UK, Germany, Austria, Netherlands and Australia[61,62,63]. Currently, GPs in Ireland are reimbursed only for the provision of the primary care for patients with type 2 diabetes. Further financial support would allow GPs to employ more staff, and therefore create more time as well as raise levels of motivation for recording. Since the majority of the participants interviewed were aware that the recording of information during consultations with a patient is essential, there is no doubt that with appropriate support from the Government, the recording and monitoring of chronic disease risk factors would be higher.

Software development issues

All three PMS systems (Socrates, Health One and Helix Practice Manger) employed by the Irish GPs were found to be inadequate to perform the MECC study, as outlined in detail in the Chapter 2. Hence, the ICGP research team created a tab incorporated in all three systems which would permit the accurate and systematic recording of chronic disease risk factors and brief interventions. In order to create the tab, later named the Physical Health Monitoring (PHM) tab, the ICGP research department collaborated with the software developer – Clanwilliam Group. During the creation of the tab, the ICGP research team encountered a number of issues with the software developer, which considerably delayed and caused significant alterations of the project. The main issues occurred in four areas:

- Development and incorporation of the PHM tab into the PMS systems

- Visual appearance of the PHM tab

- Recording and upload of the data

- Uploader failures

Developing and incorporating the PHM tab into the PMS systems

The MECC project officially started in October 2016. After the initial period which included in-depth research and agreement upon specifications of the PHM tab, it was specified by the software developer that the PHM tab would be developed and available for all three PMS systems by July 2017. Regrettably, this was not the case. The PHM tab first appeared in the Socrates system in October 2017, containing a number of issues. After constant liaison (through emails, telephone calls, and in-person meetings) between the ICGP research team and representatives of the Clanwilliam group, the PHM tab became available for the Helix system users in February 2018, and finally for the Health One users in July 2018. As a consequence, the participation of the practices which use the Helix Practice Manager or Health One system was postponed, as they could not either record or upload their data. It became evident that due to the significant delays in the participation, the data from the practices which use these two systems would not be available by the deadline of the MECC project, December 2018.

The visual appearance of the PHM tab

Considering the high workload in general practice, the PHM tab aimed to allow accurate recording without adding additional time during consultations. In discussion with the software developers, the initial idea was that all the variables recorded in the PHM tab be located on one page. Therefore, when opening the PHM tab, GPs would have a clear overview of all information which could be entered, and the data significant for the MECC study would take less than 30 seconds to be record. The PHM tab, which was developed for the Socrates and Helix Practice Manger systems, contained six pages.

The first page was identical to the main page of their own software ('baseline details'/'vital signs' page), and the rest of the pages contained a wide range of other variables. The reason why the software developer created so many pages within the PHM tab was that the two particular software systems were unable to support all variables on the same page. As a result, the participating GPs felt that opening page after page was time-consuming (an issue discussed in the interviews) and they preferred to record their data on the first page, which significantly affected the levels of recording.

Furthermore, although various specifications for the PHM tab were agreed with the software developer at the first stages of the project (which is discussed in the next paragraph), when the PHM tab was incorporated into the systems, it contained a number of visual issues including spelling mistakes, inadequate fields, inadequate variable names, etc. which needed correction. The correction of the mistakes made by the software developer which occurred in the PHM tab, even if spotted instantly after implementation of the tab into the PMS systems, required on average more than two months. These mistakes also created uncertainty and confusion among the participating GPs.

Recording and uploading data

At the beginning of the MECC study, the ICGP research team and the internal software development advisor created the requirement document (RD) for the PHM tab. The RD contained very detailed specifications on technical and functional requirements regarding the 'uploader' which represents a data upload component of the PHM tab. To simplify, the RD outlined what type of information and how that information should be pulled from the GP PMS systems through the PHM tab. The RD document was used to communicate with the Clanwilliam software development team. Although the specifications of the uploader were highlighted and agreed upon in the RD document, a number issues regarding recording and uploading of the data occurred.

The RD document highlighted that entries made in 'baseline details' and 'vital signs' areas in each of the PMS systems, should auto populate into their corresponding fields in the PHM tab, and vice-versa. However, this was not the case. Some data recorded in the main areas of the systems was not automatically populating in the PHM tab, which firstly caused confusion among GPs, and secondly created the impression that the same information should be recorded twice (e.g. in the baseline details and in the PHM tab), which was impossible for GPs to do. This issue was corrected eventually, but the software developer took a considerable amount of time to do so.

In order to investigate if all the data was contained in the RD uploading, the ICGP research department ran a number of tests, prior to asking the participating GPs to upload their data. During these tests, a large number of issues regarding recorded data was identified (recorded data was not being pulled in, e.g. smoking status not being pulled, frequency of alcohol consumption not being pulled, prescriptions not being pulled, patient's status not being pulled, etc.).

Although the software developer corrected these issues, the corrections were again time consuming, and since the practices could not be asked to upload their data until the uploader was working properly, this caused a substantial delay in data upload.

One of the requirements also outlined in the RD was the ability for auto uploads. Following the consent of the GP, the MECC uploader was meant to upload the data automatically every six months. To simplify, the researcher was to remind the participating GP to upload the data only the first time, and six and twelve months after the initial upload the uploads ought to have been automatic. However, the automatic uploads never took place, 'due to the technical limitation of the GP software itself' as stated by the Clanwilliam representative. Therefore, the researchers took the responsibility on themselves to liaise with the GPs before every upload, and considering the GPs' busy schedules the uploads were never done exactly on time. This additionally contributed to the fact that the data was uploaded in unequal period ranges (several days/weeks later than planned).

Uploader failures

The most significant problem which occurred in the study and of which the ICGP research department was only informed in May 2018, was the inability of the software developer to upload the data from the Helix Practice Manger software. After months of liaison with the software developer, the ICGP research department was informed that the extraction of data from the Helix system was impossible. The physical health monitoring tab was available in the Helix system, and as such it provided GPs using the system with a mechanism to record and monitor the physical health of their patients. But the data extraction/audit aspect was not operational. The development in relation to the Helix system was regrettable and after working with the Clanwilliam representatives over an extended period to try to find a solution, the reasoning behind the failure was due to the way xml files were created by the Helix system that was causing the issues during upload, which could not be overcome.

As a result, the Helix practices have been excluded from the evaluation of the MECC project. The Helix practices still have access to the PHM tab, which means that the improvements in terms of data recording and monitoring patient care are still available to them.

Experiences of working with the participating GP practices

As outlined in the Chapter 3, under the recruitment section, after the 'advertisement phase' and the information meeting, only the GPs interested in participating in the MECC study were recruited. The participating GPs signed the agreement form which highlighted different aspects of their participation. A good level of enthusiasm and interest in the study was evident, especially at the initial stage. However, due to a number of software development issues, the start of the MECC study was delayed for all participants, and going further, at various stages of the study, the participants encountered a number of data uploading and recording issues within their practice software system.

We believe that these issues did not only delay the project, but they did lessen the enthusiasm and interest of many participating GPs, which became most evident during the interview process.

Overall, regarding the participating GPs, the researchers encountered two main difficulties: delays in scheduling/conducting the interviews and a lack of dedication to the study.

Throughout the study, the researchers were acutely aware of the high volume of workload that GPs often experience. Therefore, when scheduling interviews, GPs were given freedom to decide what date and day/time in a week would be the most suitable for them. While contact with the majority of the GPs was relatively straightforward, the scheduling of interviews was more difficult than anticipated. The timespan for some of the interviews, including the sending of an initial email to schedule the interview, up until when the interview was conducted, was up to two months in length, and for one practice in particular took up to eight months. This involved a large volume of emails and telephone calls.

Furthermore, it was quickly apparent that when asked about the advantages/disadvantages and their experiences of the PhM tab, GPs were recalling their actions from a few months prior, and not necessarily at present. Although the participating GP had agreed to use the tab during the whole length of the study, it was evident that their knowledge, awareness and utilization levels of the PhM tab were based on the initial stage of the project. Some GPs admitted that they utilized the PhM tab often in the first month, but after the project progressed further, they stopped using the tab, which was reflected in the data obtained. In addition, the GPs who agreed to participate were asked to inform their practice nurses of the study, so the nurses could also use the PhM tab. However, in the interviews with the practice nurses, many of them were not aware of the study. For the nurses who were interested in the study, the researcher had offered to send an information sheet and instructions for the recording in the PhM tab. Therefore, they were also interviewed. However, since many GPs did not inform the practice nurses about the study, many of the nurses were very hard to reach and consequently, their views of the PhM tab were not captured.

Although the study encountered certain difficulties with the participants, it is important to stress that the overall collaboration with GPs and practice nurses was a positive experience. The dedication and enthusiasm of particular GPs was exceptionally high which contributed greatly to the overall study. We suspect that the IT delays impacted substantially on participation and enthusiasm. The layout of the PHM tab as desinged by the software vendors was not conducive to encouraging GPs to complete it. GPs may have underestimated the amount of work involved in participating in this study.

Chapter 7

Recommendations

Financial incentives within primary care exist in many European countries in order to support health promotion and patient self-management. Allocation of dedicated funding for disease prevention to primary care in Ireland would enhance these activities further and improve prevention and early intervention with regard to chronic disease risk factors. At the time of writing, a new GP contract is being negotiated in Ireland and it is anticipated that this will be agreed soon. Further to this, we understand that a 'Chronic Disease Contract' is being negotiated and this has the potential to re-engineer the health system in terms of caring for those with chronic conditions at primary care level. Consideration by all relevant stakeholders is required in terms of how prevention can be incorporated so that interventions occur prior to the onset of chronic conditions, particularly those where lifestyle factors are a key component.

An efficient use of information technology in health care is essential for high quality, continuity and co-ordination of care. Additional training in computer use and coding principles of practice staff could contribute to a better quality of recording. Currently in Ireland, there is no formal training of GPs regarding computer use or appropriate recording. Therefore, the proficiency in this area depends on the motivation of individual GPs and priorities towards coding which are established on an individual practice level. The provision of better Government support and the introduction of training in software use seem to be essential in order to increase levels of recording in a general practice setting. This project commenced during a difficult time in the general practice financial and IT environments. However, with training and support provision, we obtained engagement from GPs and demonstrated that it is feasible to provide/record risk assessments and brief interventions on lifestyle factors during routine general practice consultations. For many of the participating GPs, lifestyle risk assessment, delivery of brief intervention and the recording of both are now a routine part of their day-to-day consultations, even if they were not before.

Data on the prevalence of risk factors can help inform the resourcing of general practice and inform service planning. Reimbursement for GPs to regularly and accurately maintain patients' electronic records would contribute to an adequate monitoring of chronic conditions and better identification of at-risk groups. Improving the validity of diagnostic coding should be a priority in order to provide more accurate prevalence and impact data. GPs, along with the ICGP and the national GPIT Group have a role in this. Improving recording behaviour will require several elements, such as financial incentives and training. In all of this, the patient is critical and the focus cannot be on data return or the recoding of data only – it must be on the impact of such.

Hence, we acknowledge that data recording should not become an end in itself but is a means to monitor patient related factors and the impact of interventions.

Data is critical to monitoring and developing services. General practice is a potential source of very valuable data, which is not being accessed. While cognisant of data protection legislation, consideration needs to be given to how we can access such data for service planning and development purposes. The reporting functions in GP practice management software systems are insufficient for research and audit purposes – this needs to be considered when designing national IT infrastructure for the health system. The question has arisen, so we need a new practice management software system in the Irish primary care arena. We understand that there may be new systems being developed. These systems need to have input from GPs while being developed. They also need to be able to respond the new developments and requirements in a reasonable time and cost-efficient manner – for example as arose last year with new GDPR requirements. In particular, they need to respond to the needs of their customers – GPs. As new chronic disease programmes are developed, the data requirements to monitor patients and to obtain payment from the Health Services Executive or others as appropriate will change, and the PMS systems used by GPs must be able to accommodate these.

It is clear from GPs, practice nurses and patients that general practice has an important role to play in disease prevention and that substantial activity occurs in this area. The level of risk factor recording and interventions were not adequately captured here due to software issues and that GPs often record this data in different locations or in free text notes on PMS systems. While the preference is of course to be able to measure such activity, in the absence of the IT infrastructure to do so, we need to capitalise on the acceptance and potential of the MECC framework. The HSE and the ICGP have embarked on a training and awareness program for GPs around the framework and the PHM tab to address the deficiencies identified in this project. We acknowledge that some redesign of the PHM tab is preferred, which could not be accommodated by the PMS software providers during this project, however, it still provides a workable solution for the recording of all physical health variable and interventions needed to monitor a patient's lifestyle changes. The ICGP, supported by the HSE, is currently promoting this function and developing a bespoke module for GPs to demonstrate BI in general practice including training in the use of the MECC tab, using the materials developed as part of this project. This GP specific MECC training is designed to support GPs to embrace this initiative in order for MECC in the Primary Care setting to reach its potential. This training will be operational from June 2019 and hoped that there will be a good uptake.

Risk factor assessment, monitoring and intervention occurs in general practice as is during consultations relating to chronic disease. Our project shows that it is feasible to provide MECC risk assessments and brief interventions in routine general practice. Our study further shows that GPs are willing to undertake these activities and patients place a value on them. However, they need to be more readily demonstrated with evidence from general practice that they occur and lead to patient improvements. These activities need to be financially recognised and the IT systems in general practice need to respond to the requirements of GPs to be able to monitor patients and show the impact of same.

GPs themselves, along with the ICGP, GPIT and the HSE have a role to play in order to achieve the recommendations outlined here and it is only by working together that we will do so.

In summary, the recommendations from this project are:

- The PHM tab should be re-named the "MECC" tab and the data fields should be made available on one page. Auto-population of data from similar fields is required in order to maximise efficiency.
- We need to capitalise on the acceptance and potential of the MECC framework. The ICGP, supported by the HSE, is currently promoting this function and developing a bespoke module for GPs to demonstrate brief intervention in general practice including training in the use of the MECC tab, using the materials developed as part of this project. This GP specific MECC training is designed to support GPs to embrace this initiative in order for MECC in the Primary Care setting to reach its potential. This training will be operational from June 2019 and hoped that there will be a good uptake.
- All stakeholders should actively consider how MECC interventions can be utilized in the primary prevention of chronic diseases.
- Improving the validity of diagnostic coding should be a priority in order to provide more accurate prevalence and impact data. Training in data recording and coding principles for practice staff is required.
- Financial incentives are needed within primary care to support health promotion and patient self-management; this is required beyond a potential chronic disease contract and should extend to the prevention of chronic disease, by recording of chronic disease risk factors and recording of corresponding brief interventions that are delivered.
- Reimbursement should be provided for GPs to regularly and accurately maintain patients' electronic records and to audit the recorded chronic disease risk factors and brief interventions. This would contribute to adequate monitoring of chronic conditions and better identification of at-risk groups. However, data recording should not become an end in itself but a means to monitor patient related factors and the impact of interventions.
- The reporting functions currently in GP practice management software systems are insufficient for research and audit purposes – this needs to be considered when designing national IT infrastructure for the health system. As new chronic disease programmes are developed, the data requirements will change and the PMS systems used by GPs must be able to accommodate these.

Acknowledgments

Bibliography

1. World Health Organization. *Preventing Chronic Diseases: a Vital Investment*. Geneva, Switzerland: World Health Organisation; 2005 [cited 2017 Mar 8]. Available from: http://www.who.int/chp/chronic_disease_report/full_report.pdf

2. World Health Organization. *Global status report on noncommunicable diseases 2014*. Geneva, Switzerland: World Health Organisation; 2014 [cited 2017 Mar 8]. Available from: http://apps.who.int/iris/bitstream/10665/148114/1/9789241564854_eng.pdf

3. Busse R, Blümel M, Scheller-Kreinsen D, Zentner A. *Tackling chronic disease in Europe: Strategies, interventions and challenges*. European Observatory on Health Systems and Policies; 2010 [cited 2017 Mar 8]. Available from: http://www.euro.who.int/__data/assets/pdf_file/0008/96632/E93736.pdf

4. Nolte E, Knai C, McKee M. *Managing chronic conditions. Experience in eight countries*. Europenan Observatory on Health Systems and Policies; 2008 [cited 2017 Mar 8]. Available from: http://www.euro.who.int/__data/assets/pdf_file/0008/98414/E92058.pdf

5. World Health Organization. *Global status report on noncommunicable diseases 201*0. Geneva, Switzerland: World Health Organisation; 2011 [cited 2017 Mar 8]. Available from: http://www.who.int/nmh/publications/ncd_report_full_en.pdf

6. World Health Organization. *The World Health Report 2008. Primary Health Care - Now More Than Ever*. Geneva, Switzerland: World Health Organisation; 2008 [cited 2017 Mar 8]. Available from: http://www.who.int/whr/2008/whr08_en.pdf

7. Darker C, Whiston L, Shea BO. *Chronic Disease Management in Ireland Perspectives from patients and clinical stakeholders – implications and recommendations for the Irish healthcare system*. Dep Public Heal Prim Care, Trinity Coll Dublin; 2014 [cited 2017 Apr 15]. Available from: http://www.adelaide.ie/wp-content/uploads/2015/04/Chronic-Disease-Management-overview-of-patients-and-clinical-stakeholders-implications-recommendations-for-Irish-healthcare-system-Darker-et-al.-2015.pdf

8. Jennings S. *Preventing Chronic Disease: Defining the Problem. Report from the Prevention of Chronic Disease Programme*. Dublin, Ireland: Health Service Executive; 2014 [cited 2017 March 15]. Available from: http://www.lenus.ie/hse/bitstream/10147/338212/3/PreventingChronicDisease_DefiningtheProblem.pdf

9. Department of Health and Children. *Tackling chronic disease: A Policy Framework for the Management of Chronic Diseases*. Dublin, Ireland: Department of Health and Children; 2004 [cited 2017 Mar 15]. Available from: http://health.gov.ie/wp-content/uploads/2014/03/tackling_chronic_disease.pdf

10. Irish Medical Organisation. *Solving the Chronic Disease Problem through General Practice*. Dublin, Ireland: Irish Medical Organisation; 2016 [cited 2017 Apr 15]. Available from: https://www.imo.ie/news-media/events/2016/solving-the-chronic-disea/Solving-the-Chronic-Disease-Problem-Booklet.pdf

11. Public Health Ireland. *IPH Press Release: Conference hears that more than half of our over 50s are living with two or more chronic diseases and that number is likely to increase dramatically by end of decade*. Dublin, Ireland: Public Helath Ireland; 2013 [cited 2017 Mar 12]. Available from: http://www.publichealth.ie/news/press-release/iph-press-release-conference-hears-more-half-our-over-50s-are-living-two-or-more

12. Slattery BW, O'Connor L, Haugh S, et al. Prevalence, impact and cost of multimorbidity in a cohort of people with chronic pain in Ireland: a study protocol. *BMJ Open*. 2017; 7(1):e012131.

13. Glynn LG, Valderas JM, Healy P, et al. The prevalence of multimorbidity in primary care and its effect on health care utilization and cost. *Fam Pract*. 2011; 28(5):516-23. doi: 10.1093/fampra/cmr013.

14. Irish College of General Practitioners. *General Practice is key to sustainable healthcare*. Dublin, Ireland: Irish College of General Practitioners; 2016 [cited 2018 Apr 2]. Available from: http://www.lenus.ie/hse/bitstream/10147/620597/1/Submission+to+the+Oireachtas+Committee+on+the+Future+of+Health+Care.pdf

15. Department of Health. *Better Health, Improving Health Care*. Dublin, Ireland: Department of Health; 2016 [cited 2017 Mar 29]. Available from: http://health.gov.ie/wp-content/uploads/2016/05/Better-Health-Improving-Health-Care.pdf

16. Health Service Executive. *Healthy Ireland in the Health Services National Implementation Plan 2015 – 2017*. Dublin, Ireland: Health Service Executive; 2015 [cited 2017 Mar 15]. Available from: http://www.hse.ie/eng/health/hl/hi/HIDocs/HIimplementationplanWeb.pdf

17. Department of Health and Children. *Changing Cardiovascular Health. National Cardiovascular Health Policy 2010-2019*. Dublin, Ireland: Department of Health and Children; 2010 [cited 2017 Mar 15]. Available from: https://www.hse.ie/eng/services/list/2/PrimaryCare/practicenursing/practicenursecaseload/cardiovascular-disease/National-Cardiovascular-Health-Policy

18. Department of Health and Children. *HI Healthy Ireland: A framework for improved health and wellbeing 2013 – 2025*. Dublin, Ireland: Department of Health; 2013 [cited 2017 Mar 8]. Available from: http://health.gov.ie/wp-content/uploads/2014/03/HealthyIrelandBrochureWA2.pdf

19. National Cancer Registry. *Cancer in Ireland 2011: Annual Report of the National Cancer Registry*. Cork, Ireland: National Cancer Registry; 2016 [cited 2017 Mar 15]. Available from: http://www.ncri.ie/sites/ncri/files/pubs/NCRReport_2016.pdf

20. International Diabetes Federation. *IDF Diabetes Atlas*. Brussels, Belgum: International Diabetes Federation; 2015 [cited 2017 Mar 25]. Available from: http://www.diabetesatlas.org/IDF_Diabetes_Atlas_8e_interactive_EN/

21. Eurostat. *Causes of death — diseases of the respiratory system, residents, 201*3. Eurostat; 2013 [cited 2017 Mar 20]. Available from: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Causes_of_death_—_diseases_of_the_respiratory_system,_residents,_2013.png

22. Irish Thoracic Society, Irish College of General Practitioners, Health Service Executive. *National Respiratory (COPD) Framework*. Irish Thoracic Society Irish College of General Practitioners Health Service Executive; 2008 [cited 2017 Mar 20]. Available from: http://irishthoracicsociety.com/wp-content/uploads/2017/05/Draft_RespFramework_Oct_000.pdf

23. National Asthma Programme. *Asthma Check Chronic Disease Watch - Asthma*. Dublin, Ireland: Health Service Executive; 2012 [cited 2017 Mar 9]. Available from: http://www.hse.ie/eng/about/Who/clinical/natclinprog/asthma/workstreams/asthmacheck.pdf

24. World Health Organisation. *Non-communicable diseases* [Internet]. World Health Organisation; 2015 [cited 2017 Mar 8]. Available from: http://www.who.int/mediacentre/factsheets/fs355/en/

25. BearingPoint, Atos Healthcare, Protection Department of Social. *Asthma*. Dublin, ireland: Department of Social Protection; 2009 [cited 2017 Mar 15]. Available from: http://www.welfare.ie/en/downloads/protocol12.pdf

26. Department of Health and Children. *HI Healthy Ireland Survey 2018: Summary of Findings*. Dublin, Ireland: Department of Health; 2018 [cited 2019 Mar 4]. Available from: https://health.gov.ie/wp-content/uploads/2018/10/Healthy-Ireland-Survey-2018.pdf

27. Hickey P, Evans DS. *Smoking in Ireland 2014: Synopsis of Key Patterns*. Dublin, ireland: Health Service Executive; 2014 [cited 2017 Mar 8]. Available from: http://www.hse.ie/eng/about/Who/TobaccoControl/Research/smokinginireland2014.pdf

28. Health Service Executive. *Alcohol misuse* [Internet]. Health Service Executive; 2016 [cited 2017 Mar 8]. Available from: http://www.hse.ie/eng/health/az/A/Alcohol-misuse/Introduction.html

29. Zhou Y, Zheng J, Li S, et al. Alcoholic beverage consumption and chronic diseases. *Int J Environ Res Public Health*. 2016; 13(6):1–27.

30. Department of Health. *Steering Group Report On a National Substance Misuse Strateg*y. Dublin, Ireland: Department of Health; 2012 [cited 2017 Mar 8]. Available from: http://www.drugsandalcohol.ie/12388/2/Steering_Group_Report_on_a_National_Substance_Misuse_Strategy.pdf

31. Long J, Mongan D. *Alcohol Consumption in Ireland 2013: Analysis of a National Alcohol Diary Survey*. Dublin, Ireland: Health Research Board; 2013 [cited 2017 Mar 14]. Available from: http://alcoholireland.ie/download/reports/how_much_do_we_drink/Alcohol_Consumption_in_Ireland_2013_web_version.pdf

32. World Cancer Research Fund / American Institute for Cancer Research. *Policy and Action for Cancer Prevention. Food, Nutrition, and Physical Activity: a Global Perspective*. [Internet]. Washington, DC: American Institute for Cancer Research; 2009 [cited 2017 Mar 15]. Available from: http://www.aicr.org/assets/docs/pdf/advocacypapers/WCRF_Policy_US_Summary_final.pdf

33. Department of Health (DoH); Ipsos MRBI. *Healthy Ireland Survey 2015: Summary of Findings*. Dublin, Ireland: Department of Health; 2015 [cited 2017 Mar 15]. Available from: http://health.gov.ie/wp-content/uploads/2015/10/Healthy-Ireland-Survey-2015-Summary-of-Findings.pdf

34. Valentijn PP, Schepman SM, Opheij W, Bruijnzeels MA. Understanding integrated care: a comprehensive conceptual framework based on the integrative functions of primary care. *Int J Integr Care*. 2013;13:1–12.

35. Colin-Thomé D, Gill J, Jalal Z, Taylor D. *Primary Care in the Twenty-first Century*. London, England: University College London School of Pharmacy; 2016 [cited 2017 Mar 15]. Available from: https://www.ucl.ac.uk/pharmacy/departments/practice-policy/primarycare-twentyfirst-century

36. Varley E, Murfin E. *An Implementation Guide and Toolkit for Making Every Contact Count: Using every opportunity to achieve health and wellbeing*. England: National Health Service; 2014 [cited 2017 Mar 25]. Available from: https://www.england.nhs.uk/wp-content/uploads/2014/06/mecc-guid-booklet.pdf

37. Lawrence W, Black C, Tinati T, Cradock S, Begum R, Jarman M, et al. "Making every contact count": Evaluation of the impact of an intervention to train health and social

care practitioners in skills to support health behaviour change. *J Health Psychol*. 2014; 1–14.

38. Raistrick D, Heather N, Godfrey C. Review of the effectiveness of treatment for alcohol problems. *Natl Treat Agency Subst Misuse*. 2006; 1–212.

39. Bertholet N, Daeppen J-B, Wietlisbach V, Fleming M, Burnand B. Reduction of alcohol consumption by brief alcohol intervention in primary care: systematic review and meta-analysis. *Arch Intern Med*. 2005; 165(9):986–95.

40. Stead LF, Bergson G, Lancaster T. Physician advice for smoking cessation. *Cochrane Database of Systematic Reviews*. 2008.

41. National Institute for Health and Clinical Excellence (NICE). Four commonly used methods to increase physical activity: brief interventions in primary care, exercise referral schemes, pedometers and community- based exercise programmes for walking and cycling. *Public Heal IntervGuid*. 2006; (Guidance 2):1–37.

42. Law M, Tang JL. An analysis of the effectiveness of interventions intended to help people stop smoking. *Arch Intern Med*. 1995; 155(18):1933–41.

43. Thijs GA. GP's consult & health behaviour change project. *Patient EducCouns*. 2016; 67(3):267–71.

44. Spanou C, Simpson S a, Hood K, Edwards A, Cohen D, Rollnick S, et al. Preventing disease through opportunistic, rapid engagement by primary care teams using behaviour change counselling (PRE-EMPT): protocol for a general practice-based cluster randomised trial. *BMC FamPract*. 2010; 11:69.

45. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Milbank Q*. 2005; 83(3):457–502.

46. O'Brian M, Scott A. *Making Every Contact Count: A Health Behaviour Change Framework and Implementation Plan for Health Professionals in the Irish Health Service*. Dublin, Ireland: Health Service Executive; 2016 [cited 2017 Aug 18]. Available from https://www.hse.ie/eng/about/who/healthwellbeing/making-every-contact-count/making-every-contact-count-framework.pdf

47. Pocetta G, Votino A, et al. Recording Non Communicable Chronic Diseases at Risk Behaviours in General Practice. A qualitative study using the PRECEDE-PROCEED Model. *Ann Ig*. 2015; 27(3):554-61. doi: 10.7416/ai.2015.2047.

48. De Muylder R, Lorant V, Paulus D, Nackers F, Jeanjean M, Boland B. Obstacles to cardiovascular prevention in general practice. Vol. 59, *ActaCardiologica*. 2004. p. 119–25.

49. Lancaster T, Silagy C, Fowler G. Training health professionals in smoking cessation. *Cochrane Database Syst Rev*. 2000;(3):CD000214.

50. Calfas KJ, Long BJ, Sallis JF, Wooten WJ, Pratt M, Patrick K. A controlled trial of physician counseling to promote the adoption of physical activity. *Prev Med (Baltim)*. 1996; 25(3):225–33.

51. Lee MJ, Oza B, Pakianathan M, Hegazi A. Making every contact count: improving the assessment of gay, bisexual and other men who have sex with men using a structured proforma. *Sex Transm Infect*. 2016;92(1):48–48.

52. EHealth Ireland. GP Practice Management Systems [Internet]. 2017 [cited 2017 July 15]. Available from: http://www.ehealthireland.ie/Case-Studies-/GP-Systems/

53. Lusignan, S. The barriers to clinical coding in general practice: A literature review. Medical informatics and the Internet in medicine. 2005; 30: 89-97.

54. Health Service Executive. Medical Workforce Planning: Future Demand for General Practitioners 2015-2025; 2015 [cited 2018 Nov 1]. Available from: https://www.hse.ie/eng/staff/leadership-education-development/met/plan/gp-medical-workforce-planning-report-sept-.pdf2015

55. Irish College of General Practitioners. Briefing document: submitted in support of the ICGP opening statement: manpower and general practice. 2017 [cited 2018 Nov 5]. Available from: http://www.oireachtas.ie/parliament/media/committees/ health/presentations/ICGP-Submission.pdf

56. Irish Medical Organisation. IMO submission on the review of the operation of cuts under the financial emergency measures in the public interest act 2009. 2013 [cited 2018 Oct 25]. Available from: https://www.imo.ie/national-professionwide-i/ fempi-submissions-2013/GPs-FEMPI-SUBMISSION.pdf (accessed 6 February 2018).

57. O'Dea B, O'Connor P, Lydon S, et al. Prevalence of burnout among Irish general practitioners: a cross-sectional study. Ir J Med Sci. 2017; 186(2): 447–453.

58. Lehtovuori, T., Kauppila, T., Kallio, J., Raina, M., Suominen, L., Heikkinen, A. M. Financial team incentives improved recording of diagnoses in primary care: a quasi-experimental longitudinal follow-up study with controls. BMC research notes. 2015; 8(1): 668.

59. Sutton, M., Elder, R., Guthrie, B., Watt, G. Record rewards: the effect on risk factor monitoring of the new financial incentives for UK general practices (No. 08/21). 2008. HEDG, c/o Department of Economics, University of York.

60. Wilson, C. L., Rhodes, K. M., Payne, R. A. Financial incentives improve recognition but not treatment of cardiovascular risk factors in severe mental illness. PloS one. 2017; 12: 6.

61. Australian Government, Department of Human Services. Practice Incentives Program. 2018 [cited 2018 Nov 1]. Available from: https://www.humanservices.gov.au/organisations/health-professionals/services/medicare/practice-incentives-program

62. vanDijk, CE. Changing the GP payment system Do financial incentives matter? 2012 [cited 2018 Nov 5]. Available from: https://www.nivel.nl/sites/default/files/bestanden/Proefschrift-Christel-van-Dijk.pdf

63. Masseria, C., Irwin, R., Thomson, S., Gemmill, M., Mossialos, E. Primary care in Europe Policy brief. 2009. European Commission Directorate-General "Employment, Social Affairs and Equal Opportunities" Unit E1 – Social and Demographic Analysis.