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NETWORKING

Mille general practice governance (MilleGPG): an interactive tool to address an effective quality of care through the Italian general practice network

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The General Practitioner (GP) is the ''gate-keeper'' in patients' treatment and management. Herein, the use of Electronic Medical Records (EMR) could represent an effective support for GPs. Software capable of managing EMRs are available and they can be functional in adopting treatment guidelines by means of computerized prompts and reminders systems. These tools can be also programmed to include clinical algorithms with which to measure the quality of care to make possible the identification of clinical issues, and to take actions for addressing them. Given that similar tools were not available in Italy, we developed MilleGPG, an interactive tool aimed to evaluate, and subsequently improve the quality of care among patients with comorbidities.

Key words: general practice network; interactive tool; MilleGPG

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Context

In western countries, the prevalence of chronic conditions is growing along with the requirements for their proper management. Herein, general practitioners' (GPs) workload extends from uncomplicated respiratory and urinary infections to the longitudinal care of older patients with diabetes, coronary artery disease, arthritis, depression and other chronic disorders (Ara and Brazier, 2011; Grutters *et al*., 2011). Given the increasingly patients' needs and expectations, a top-level primary care service has to be provided.

According to his or her individual skills, the GP exerts a gatekeeper role in patients' treatment and management. In this context, although the consultation of existent literature remains an important phase of clinical practice (Grutters *et al*., 2011), the use of electronic medical records (EMR) could represent an effective support for GPs, who learn from every visit, share part of the information with colleagues and have a feedback loop for clinical decision making in real time. There is evidence that building a cohesive primary care network could improve the quality of care, the research activity, increase patients' and physicians' satisfaction and lower the health-care costs (Thomas *et al*., 2000, 2001).

However, each network needs a complex interplay of supporting mechanisms, which can be assembled in sophisticated informatics tools. Softwares capable of managing EMRs related to an intensive clinical workflow are now available. Specifically, they can be functional in adopting treatment guidelines by means of computerized prompts and reminder systems. These tools can be also programmed to include sophisticated clinical algorithms with which to measure the quality of

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care (ie, performance measures) to make possible the identification of clinical issues and to take actions for addressing them (Campbell *et al*., 2002; Campbell *et al*., 2003; Lester *et al*., 2011; Weingart *et al*., 2011; Delaney *et al*., 2012). To our knowledge, similar tools were not available in Italy to date.

We therefore developed MilleGPG, an interactive tool aimed to evaluate and subsequently improve the quality of care among patients with comorbidities. Herein, the verification of 'quality of care' can be based on a series of 'process' and 'intermediate outcome' measures. MilleGPG templates were purposely implemented in the Italian GP (ie, Millewin®) software, which is standardly used to provide the daily clinical care.

The health search database (HSD)

MilleGPG has been programmed to be an integrated component of the health search – CSD longitudinal patients database (HSD), an Italian general practice database that comprises data given by computer-based EMRs of over 900 GPs distributed across Italy. Physicians voluntarily agreed to collect patients' information and to attend specified training courses for data entry. The HSD contains demographic details that are linked to clinical records (diagnoses (coded by ICD9CM system), referrals and test results), drug prescriptions (drug name (coded by ATC system), date of filled prescription and number of days' supply), lifestyle information (eg, smoking), hospital admissions and date of death through an encrypted patient identifier. To be considered for data contribution, GPs should meet 'up-to-standard' quality criteria pertaining to coding accuracy, prevalence of well-known diseases (eg, heart infarction), mortality rates and years of recording (Lawrenson *et al*., 1999). This 'quality assessment' is generally carried out every 6 months, but it can be customized based on the number of new GPs who become part of HSD.

A number of studies have been published confirming the research validity of HSD (Filippi *et al*., 2003, 2005; Mazzaglia *et al*., 2009).

Informatics approach

MilleGPG (Last version: 1.8.1 August 2012) is an informatics tool based on a new-generation relational database. Genomedics Srl has developed the application in collaboration with Millenium Srl, and the Italian Society of General Practice. The application is a (Embarcadero) Delphi-written Win32 type. Microsoft Windows (XP, VISTA, 7 and 8) can manage MilleGPG through a database engine, Firebird Server 2.5. The indicators can be shared by GPs through a web service environment by using the MilleGPG configuration. MilleGPG technology can be potentially extended to other tools, such as in-hospital electronic clinical charts.

How does MilleGPG work?

MilleGPG provides GPs with a series of 'dashboards' with which they can check several performance indicators. They allow the verification of the GP's activity according to official treatment guidelines, other specific clinical algorithms, the primary care national contract and the regional or local health authority agreements. Furthermore, the GP himself or herself can activate some automatic reminders or alert systems related to single or multiple indicators.

Currently, 216 indicators are embedded in MilleGPG by encompassing three main domains: 'clinical audit', 'pharmacological appropriateness' and 'clinical risk'. All indicators (some of them are depicted in Table 1) have been conceived according to international clinical guidelines during several meetings, which involved specialists and GPs.

Such an example, there are 31 'audit' indicators concerning type 2 diabetes mellitus (T2DM). In addition to the simple computation of T2DM prevalence among his or her patients in HSD, each GP can quickly consult the 'dashboard' (Figure 1) to retrieve the number of T2DM patients without a registration of glycated hemoglobin (HbA1c) or those with HbA1c $\geq$ 7% in the last year. In the same way, GPs can easily quantify individuals with chronic atrial fibrillation (cAF) with no anticoagulant treatment.

Of the 'pharmacological appropriateness' indicators, physicians can check the proportion of patients using statins because of high cardiovascular risk (secondary prevention). Finally, the 'clinical risk' indicators allow the quantification of those patients aged 64+ who have not received any vaccine for the seasonal flu and/or pneumococcus pneumonia, as well as individuals aged 30+ years

Table 1 Examples of consultable 'quality of care' indicators by using MilleGPG

Category	Definition	Denominator
Audit	Prevalence of T2DM	Population recorded in the HSD
Audit	Patients without registration of glycated hemoglobin (HbA1c) or those with HbA1c ⩾ 7% in the last year	Patients with T2DM
Audit	Patients without anticoagulant treatment	Patients with cAF
Pharmacological appropriateness	Patients who have at least one statin prescription	Patients with positive history of major cardiovascular events (ie, heart infarction, stroke)
Clinical risk	Patients who have not received any vaccine for the seasonal flu and/or pneumococcus pneumonia	Patients aged 64+
Clinical risk	Patients who are not receiving anticoagulant therapy	Patients aged 30+ years with severe degree (CHADS score) of cAF

MilleGPG = Mille general practice governance; T2D = type 2 diabetes mellitus; HSD = health search database; cAF = chronic atrial fibrillation.

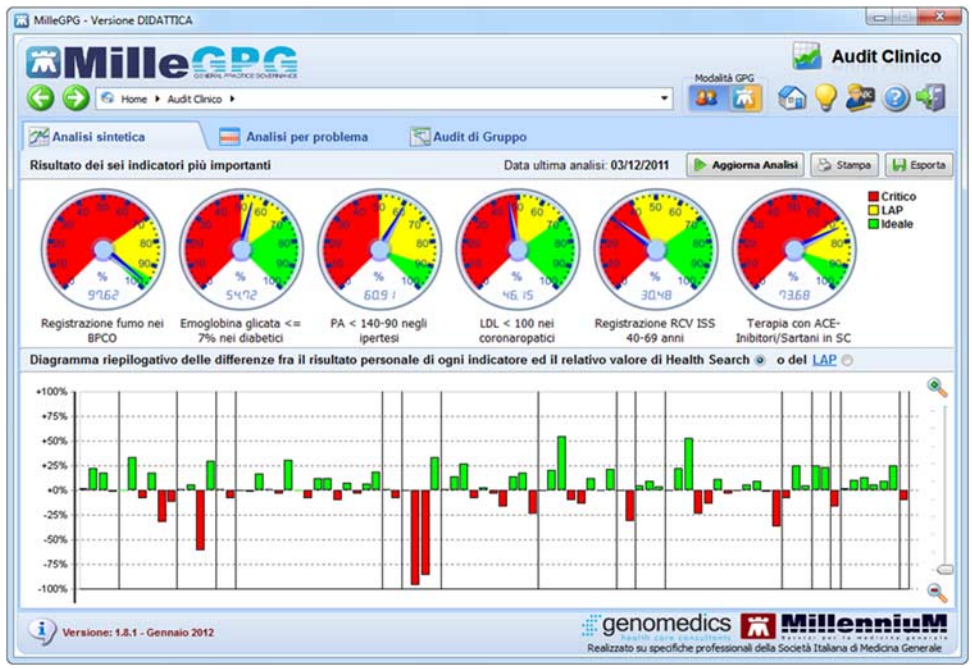

Figure 1 Some examples of the MilleGPG 'dashboards' visualized by physicians. First dashboard from the left: percentage of COPD patients with smoking habits being registered; second dashboard: percentage of diabetic patients with HbA1c ⩾ 7%; third dashboard: percentage of hypertensive patients with blood pressure >140 (systolic) or >90 mmHg (diastolic); fourth dashboard: percentage of patients with coronary artery disease with LDL cholesterol <100 mg/dl; fifth dashboard: percentage of patients aged 40–69 years old registered in the cardiovascular risk registry (Italian Institute of Health); sixth dashboard: percentage of patients with heart failure on therapy with ACE inhibitors or angiotensin receptor blockers. COPD = chronic obstructive pulmonary disease; LDL = low-density lipoprotein; ACE = angiotensin-converting enzyme.

who do not stay on anticoagulant therapy according to their severity degree (estimated by CHADS score (Lane and Lip, 2010)) of cAF.

Some limitations concerning these reminding systems have to be accounted for. It has been demonstrated that the efficiency of alerts, prompts

and reminders may be overridden or ignored by physicians mainly because of alert-related fatigues (van der Sijs *et al*., 2006; Russ *et al*., 2012). However, the automatic alerting system is only a component of MilleGPG, which can either be activated or not by GPs directly.

Conclusions

In the evidence-based medicine era, the GPs' performances need to be constantly measured and improved. To do this, doctors have to be able to perform their tasks quickly, reliably and consistently by using informatics support. Among them, MilleGPG is an advanced platform apt to update, preserve and remind clinical information according to quality of care indicators and physician needs. The next step will consist of testing MilleGPG on epidemiological bases (eg, experimental or quasi-experimental studies). Thereafter, its proper use might sensibly improve the GPs' daily practice along with networking and research participation.

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