


RESEARCH ARTICLE

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# Collaborative modeling of an implementation strategy: a case study to integrate health promotion in primary and community care

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## Abstract

**Background:** Evidence-based interventions are more likely to be adopted if practitioners collaborate with researchers to develop an implementation strategy. This paper describes the steps to plan and execute a strategy, including the development of structure and supports needed for implementing proven health promotion interventions in primary and community care.

**Results:** Between 10 and 13 discussion and consensus sessions were performed in four highly-motivated primary health care centers involving 80% of the primary care staff and 21 community-based organizations. All four centers chose to address physical activity, diet, and smoking. They selected the 5 A's evidence-based clinical intervention to be adapted to the context of the health centers. The planned implementation strategy worked at multiple levels: bottom-up primary care organizational change, top-down support from managers, community involvement, and the development of innovative e-health information and communication tools. Shared decision making and practice facilitation were perceived as the most positive aspects of the collaborative modeling process, which took more time than expected, especially the development of the new e-health tools integrated into electronic health records.

**Conclusions:** Collaborative modeling of an implementation strategy for the integration of health promotion in primary and community care was feasible in motivated centers. However, it was difficult, being hindered by the heavy workload in primary care and generating uncertainty inherent to a bottom-up decision making processes. Lessons from this experience could be useful in diverse settings and for other clinical interventions. Two companion papers report the evaluation of its feasibility and assess quantitatively and qualitatively the implementation process.

**Keywords:** Primary health care, Health promotion, Health education, Preventive care, Implementation strategies, Implementation research, Community of practice, Participatory action research, Learning community, Health information technologies

## Background

Evidence-based interventions are more likely to be taken up if users of these interventions collaborate with researchers in the development of an effective and

research-informed implementation strategy, including structure and supports that help these users to change their practice and organization to perform the proven intervention [1–5]. This type of collaborative bottom-up approach is especially necessary when implementation strategies are conceptualized not only as complex procedures but also as social processes, in which professionals take up a specific intervention or innovation if they chose to do so and creatively apply it in their setting, solving

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competing interests and reaching group consensus on re-design of their care delivery system [5–9]. While few studies appropriately report the details of their implementation strategies [10], there are even fewer describing the process through which these strategies were designed and tailored [11]. The report of the carrying out of this kind of collaborative experience is essential to learn from the process and to inform future refinement and replication.

Our target for improvement was the integration of healthy lifestyle promotion within primary and community healthcare. Health promotion is an excellent example of the need for implementation strategies because of the huge gap between evidence and practice in this area. Despite the sound epidemiological evidence for the impact of individual behavior on population health [12–18], we are failing to progress in the adoption of a healthy lifestyle: less than 10% of the population in developed countries do regular physical activity, follow a balanced diet, do not smoke and do not drink to excess, and the great majority have multiple behavioral risk factors [19, 20]. In addition, the current economic crisis underlines the critical role of the prevention of chronic diseases associated with these behaviors in the sustainability of healthcare systems [21] and primary care practitioners are in the best position within these systems to promote healthy behaviors among the population due to their accessibility and role in providing continuity of care [22].

Nevertheless, despite the availability of effective evidence-based interventions, healthy lifestyle promotion is far from being integrated into routine clinical practice in primary care [23–25]. For example, during the last decade our own research group has contributed with evidence-based clinical interventions for health promotion in routine primary care based on clinical trials [26–28]. Nevertheless, we have to recognize that after these trials finished participating clinicians stopped delivering the interventions [29]. The main reasons which explain this lack of sustainable integration are the inherent difficulties and complexities of changing, on the one hand, people's lifestyles [23, 24, 30, 31], and on the other, clinical practices and the organization of primary care services [2, 23, 32, 33]. As a consequence, as in many other examples, valuable innovative initiatives fail due to implementation weaknesses [34, 35].

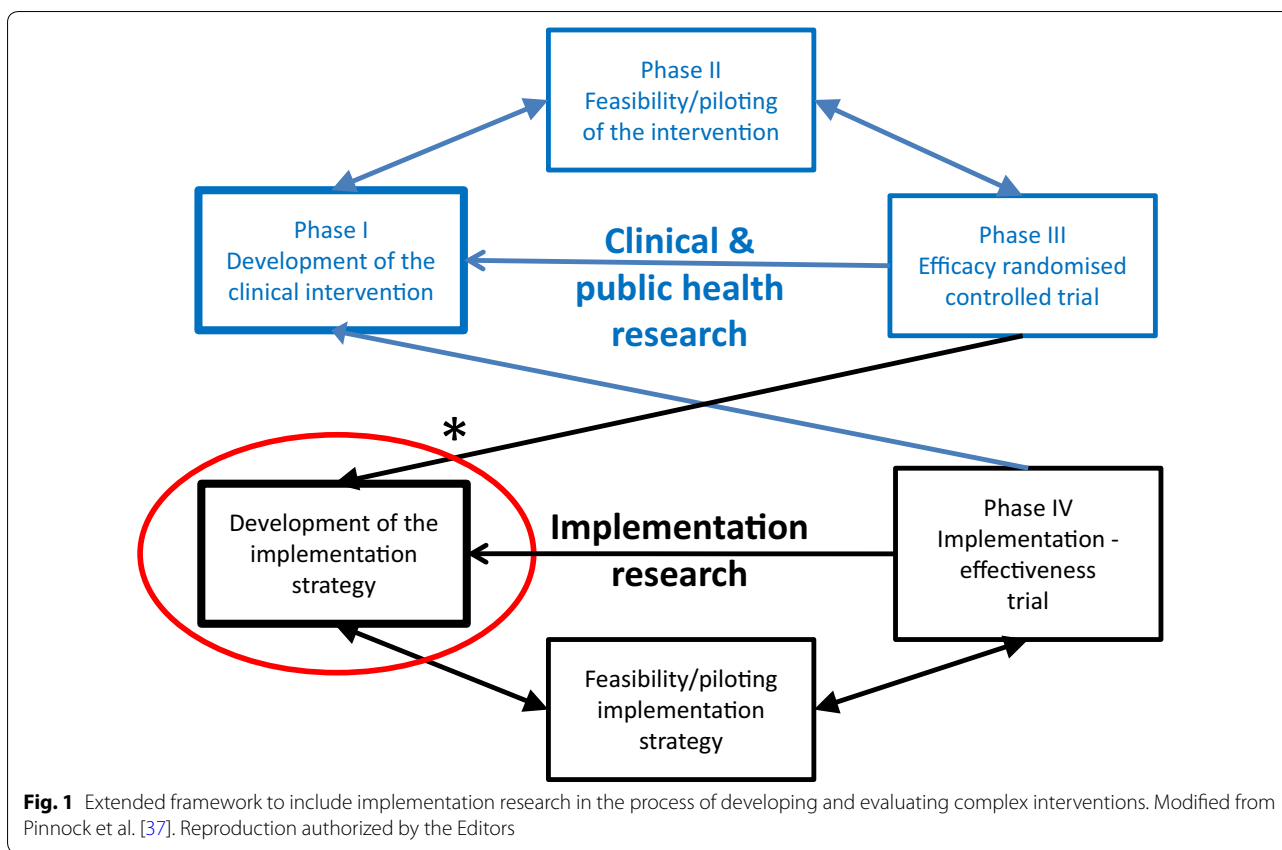
In accordance with the complexity of developing a targeted implementation strategy, we worked step-by-step following the UK Medical Research Council guidance for the development and evaluation of complex interventions [36]. In this paper, we describe the first step of this process, which is better visualized in relation to the extension of this guidance proposed by Pinnock et al. for phase IV implementation studies [37] (see Fig. 1). As previous

preparatory work, an expert panel analyzed the causes of the implementation gap and identified roadblocks to change [23, 29]. In brief, they recommended a process of mutual adaptation of evidence-based interventions to the specific context of the primary health care (PHC) centers and, in turn, redesigning the practices and organization of these centers with the active participation of the healthcare practitioners and managers of these services, researchers and community members. They also recommended adopting the Chronic Care Model as a validated general framework to guide the redesign of primary care delivery necessary to integrate health promotion into routine practice [38–40]. Therefore, possible actions to be included in the strategy were considered at different levels: self-management support, delivery system redesign, decision support, e-health tools integrated into the clinical information systems, community resources, and health system organization.

This paper describes the process of how to engage primary care staff and members of the community to reorganize primary care delivery system to optimize physical activity, healthy diet and smoking cessation interventions in primary and community healthcare. This is the companion article of two recently published in a series documenting the development and subsequent piloting of the Prescribe Healthy Life implementation strategy (PVS— from the Spanish '*Prescribe Vida Saludable*'-) (Fig. 1) [41, 42].

## Methods

Action research principles were used to collaboratively model a multi-component implementation strategy for health promotion interventions [1–4]. This was a bottom-up process of dialogue, discussion and consensus among a multi-professional primary care team and community members for shared decision making on actions to be included in the implementation strategy. The study protocol has been published previously [43]. Briefly, we refer to this method as collaborative modeling, defining this as the process of redesigning the primary healthcare delivery system with a dual purpose: on the one hand, adapting available evidence-based health promotion interventions to the context of each of the collaborating PHC centers, and on the other, reaching a consensus among professionals and community members on reorganizing the practice delivery system, creating a multi-professional workforce, defining new professional roles, and redistributing tasks and workflows. Intervention mapping was used as a guide to schedule structured discussion/consensus meetings and the Institute of Medicine Plan-Do-Study-Act improvement cycles were carried out [44, 45]. The study protocol was approved by the Primary Care Research Committee of the Basque Health



Service and by the Basque Country Clinical Research Ethics Committee (Ref: 06/2009).

**Setting and participants**

Four public community PHC centers were selected for convenience by managers of the district primary care organizations on the basis of their especial motivation favorable to health promotion [42]. For a candidate center to be included, individual written commitment to the project was required by a majority of the staff within each of the professional categories (administrative and clerical staff, nurses, family physicians, pediatricians, and others), after an informative session in the center explaining the objectives of the project and the work plan. Primary care professionals of these centers, managers of the Basque Health Service, community partners, and researchers were engaged to model the implementation strategy. A local champion was identified in each of the collaborating centers and on-site supportive practice facilitation was provided by the research team.

The Basque Health Service (Osakidetza) provides universal coverage free at the point of delivery funded through regional general taxation. In Spain, primary care services are almost exclusively delivered in publically-owned centers. Each citizen is registered on the list of

one family physician or pediatrician, and these clinicians work in PHC teams including nurses and administrative personnel. They provide comprehensive primary care with easy accessibility for residents in a defined geographical area (70% of the population visiting their family physician at least once a year). Healthcare staff have a civil-servant like employment status and they are paid a fixed salary with small capitation payments for physicians.

**Modeling the implementation strategy**

Table 1 summarizes the stages, planning and quality improvement techniques used for modeling the implementation strategy. This process was organized through discussion and consensus meetings to assess needs, prioritize areas for improvement and select common goals; provide education on evidence-based health promotion interventions and selection by PHC center staff and community members of the most appropriate clinical interventions to be implemented; make consensus on how to redesign workflows and redistribute tasks; and then brief piloting; followed by training, auditing and feedback (see Table 1). The research team acted as practice facilitators for this modeling process, including organizing and summarizing meetings, providing selected documentation

**Table 1 Steps in the collaborative modeling of the PVS implementation strategy under a participatory action research framework involving primary care staff and community members supported by external facilitation provided by the research team**

| Implementation goals   | Contents and activities  | Techniques of consensus, planning, quality improvement and evaluation  |
|--|--|--|
| <p>1st—descriptive stage (three or four 90–120 min sessions)<br/>To obtain the <i>commitment</i> of the majority of the professionals to a common health promotion goal, after prioritizing which behaviors and groups to target</p>                         | <p>Presentation of PVS objectives and plan<br/>Assessment of attitudes, perceived practice and organizational climate in the primary health care center<br/>Gathering of information on general and local epidemiology of unhealthy behaviors</p>    | <p>Strategic evaluation of healthy lifestyle promotion practice (audit and feedback)<br/>Individual identification of areas for improvement (gaps and needs assessment)<br/>Prioritization and consensus (nominal group)</p>   |
| <p>2nd—creative stage (three 90–120 min sessions)<br/>To acquire <i>competence</i> in planning the preliminary intervention program: specify objectives and actions, and identify agents and resources involved</p>  | <p>Analysis of determinants of behavior<br/>Review of evidence-based interventions<br/>Tailoring of interventions to the actual context of the center<br/>Redesign of workflows and staff roles</p>  | <p>Educational sessions on theoretical models and health promotion interventions<br/>Group discussion—consensus and planning<br/>Specific objectives (behavior determinants)<br/>Mapping of actions and interventions<br/>Redistribution of tasks and responsibilities: what, who, how, when and where</p>     |
| <p>3rd—piloting stage (four to six 90–120 min sessions)<br/>To achieve active <i>cooperation</i> among the multidisciplinary team within the center and with community agents, optimization of intervention components and their sustainable integration</p> | <p>Practical exercise of implementing intervention actions in real-world conditions, for the identification of feasible strategies<br/>Monitoring of performance measures<br/>Standardization of preliminary program on the basis of feasibility</p> | <p>Brief Plan-Do-Study-Act cycles for piloting<br/>Audit and feedback in group sessions<br/>Learning sessions to identify readjustments<br/>Strategic evaluation of the center's capability to address the planned programs and availability of resources necessary for their implementation (SWOT matrix)</p> |

and periodical activity reports. A local coordinator was selected at each center that was the liaison with the research team and led the process at the local level.

The main contribution at the management level was to ensure the availability of new information and communication technology tools, intervention materials, and other resources necessary to facilitate the organizational change at the level of the primary care system. Further, management were required to set aside time 1 day a week for the local champion of the program in each center to support and supervise implementation at local level, and on average 2 h a month for the discussion and consensus meetings within working hours, to allow participation of the entire primary care team, covering clinical and administrative tasks with additional staff. District primary care authorities also lent institutional support to the project, which helped to initiate coordination with community organizations.

At the community level, PHC center staff were asked to identify potential partners and resources in their primary care catchment area. The research team contacted these community agents by letter, informed them of the objectives of the project, and invited them to collaborate in the subsequent sessions of the collaborative modeling. Public health practitioners from the Basque Department of Health and Consumer Affairs contributed to link community organizations and the PHC centers.

### Data and analyses

First, we describe actual engagement of professionals and community in the process of modeling the implementation strategy. To this end, we documented their participation in each of the steps of the implementation strategy by asking participants to sign a register at each event, keeping signed registers of attendance at meetings, and writing summary reports of each of the meeting listed in Table 1. Second, based on the abovementioned documentation, we outline the final implementation strategy designed in terms of clinical actions to be performed, distribution of tasks between participants, definition of new roles assigned to each participant, and the new organization of the health promotion delivery system. Third, we describe the experience of professionals involved. At the end of all the collaborative modeling sessions listed in Table 1, a final meeting was organized for qualitative evaluation. The nominal group technique was used to explore the opinions of primary care professionals about their experience in the process of collaborative modeling of the PVS program [46]. As a preparatory part of the nominal group technique participants were surveyed about the positive and negative aspects of the collaborative process, the implementation climate, facilitators and barriers related to the feasibility of the implementation

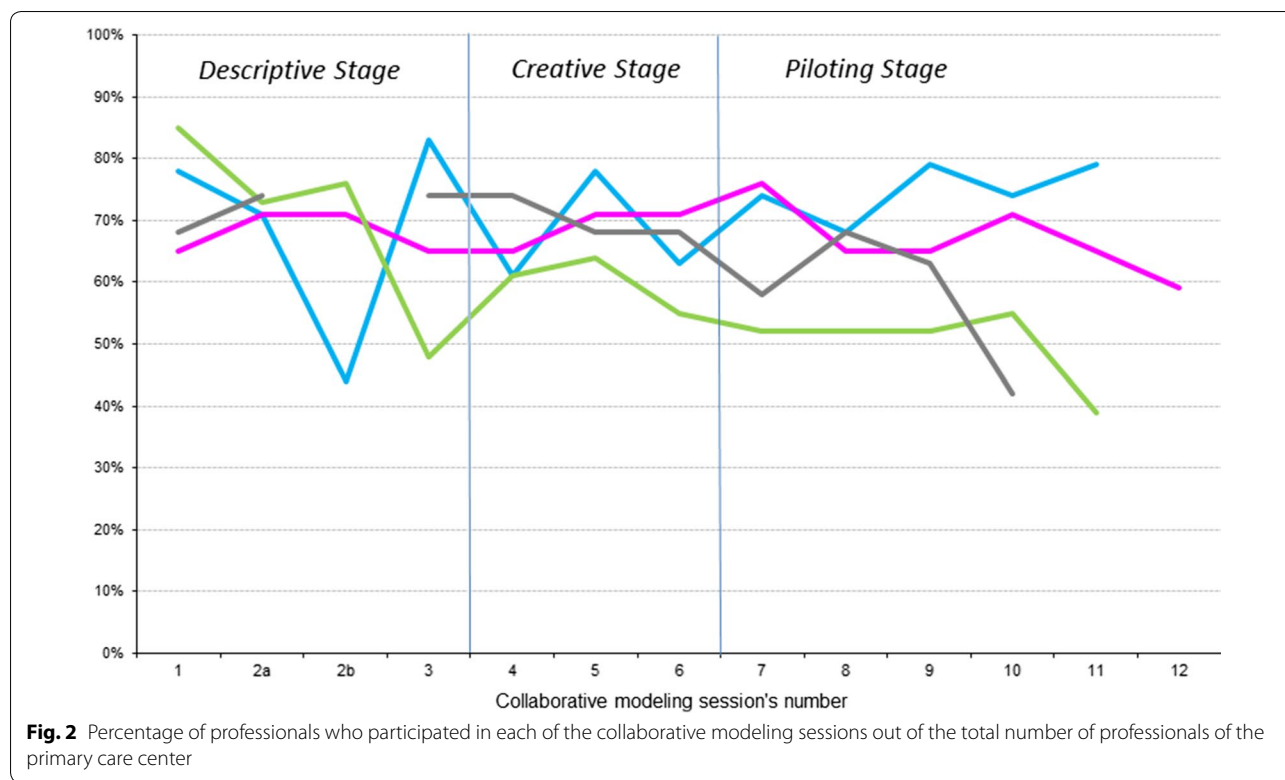
strategy designed, and the relationship between researchers and PHC center staff. The results of the survey were summarized and reported back to the group followed by a 90-min open-group discussion session to prioritize the most relevant aspects of the process of modeling the PVS implementation strategy.

### Results

The same sequence of meetings was performed at each PHC center for collaborative modeling of the PVS implementation strategy. It required different numbers and lengths of discussion and consensus meetings at each center, ranging from 10 to 13 structured sessions lasting between 90 and 120 min. Active engagement of 71 (80%) of the 89 staff working in the four PHC centers was achieved. The highest proportion of participation was observed among family physicians ( $n = 24$ , 92% of the 26 working in the four PHC centers), followed by reception staff ( $n = 18$ , 86%), nurses ( $n = 23$ , 74%), pediatricians ( $n = 3$ , 50%), and midwives ( $n = 2$ , 50%), while the only dentist also participated. The staff participation remained above 50% in all of the discussion and consensus sessions in one center, in all but one session in two other centers, and in all but two sessions in the fourth center (Fig. 2).

During the creative phase (Table 1), participants selected four theoretical models of behavior change as a basis for their programs, among the models most frequently used for health promotion [47]: the health belief model, the theory of planned behavior, the transtheoretical model and the social-cognitive model. The 5 A's (Assess, Advise, Agree, Assist, and Arrange follow-up) behavioral counseling intervention was identified in all four PHC centers as the most effective and feasible evidence-based clinical intervention for the objectives set [48]. Specific tasks, goals and actions were distributed among the primary care staff as shown in Table 2 and Fig. 3. Some examples of the planned distribution of clinical intervention tasks between participants are the following. The "Assess" step was performed by receptionists before patients were seen by physicians, outside the center by school teachers, by company occupational health departments, or by individuals themselves through the Internet. The "Advice" and "Agree" steps were mainly delivered by family physicians or company doctors. The "Assist" step was mainly performed by nurses. All participants inside and outside the centers were involved in the follow-up process with particular involvement of receptionists and nurses (Table 2).

Innovative e-health tools were developed and integrated into the electronic health record (EHR) to guide PHC professionals in the process of assessment and tailored delivery of the clinical intervention for the



management of healthy lifestyles (regular physical activity, adequate diet and abstinence from smoking) [41].

At the community level, 30 organizations or institutions were contacted and 21 (70%) agreed to participate in the collaborative modeling process and were actively involved in the identification and prioritization of the health promotion goals of the programs. They also participated in the design of the interventions, as well as in piloting the programs. Of the 21 community participants, nine were local authority departments, six were schools, four were sports facilities and two were manufacturing companies. The community participants mostly contributed to healthy lifestyle assessment (e.g., questionnaires administered in schools), some also participated in the advice and support steps (e.g., physicians and nurses of the occupational health departments of the collaborating companies) and in arranging follow-up actions (e.g., referral to sports facilities). In three of the four neighborhoods, local PVS health promotion councils have been set under the local authority to foster and strengthen linkages between clinical practices and community organizations. The main objectives of these councils are to identify and make information available about resources and facilities for health promotion in the community, to increase communication between organizations, and to identify referral mechanisms between them.

The experiences of participants were mixed, with both positive and negative feelings. Among the positive aspects, PHC center staff agreed that the modeling process enhanced the importance of healthy lifestyle promotion in primary care. They highlighted the engagement of the entire primary care team, including reception staff and community members, in shared decision making and cooperation in a community-based program. In addition, the availability of technological tools integrated in the EHR for supporting the clinical interventions was rated positively. Lastly, they also valued the fact that the discussion and consensus meetings were held within working hours.

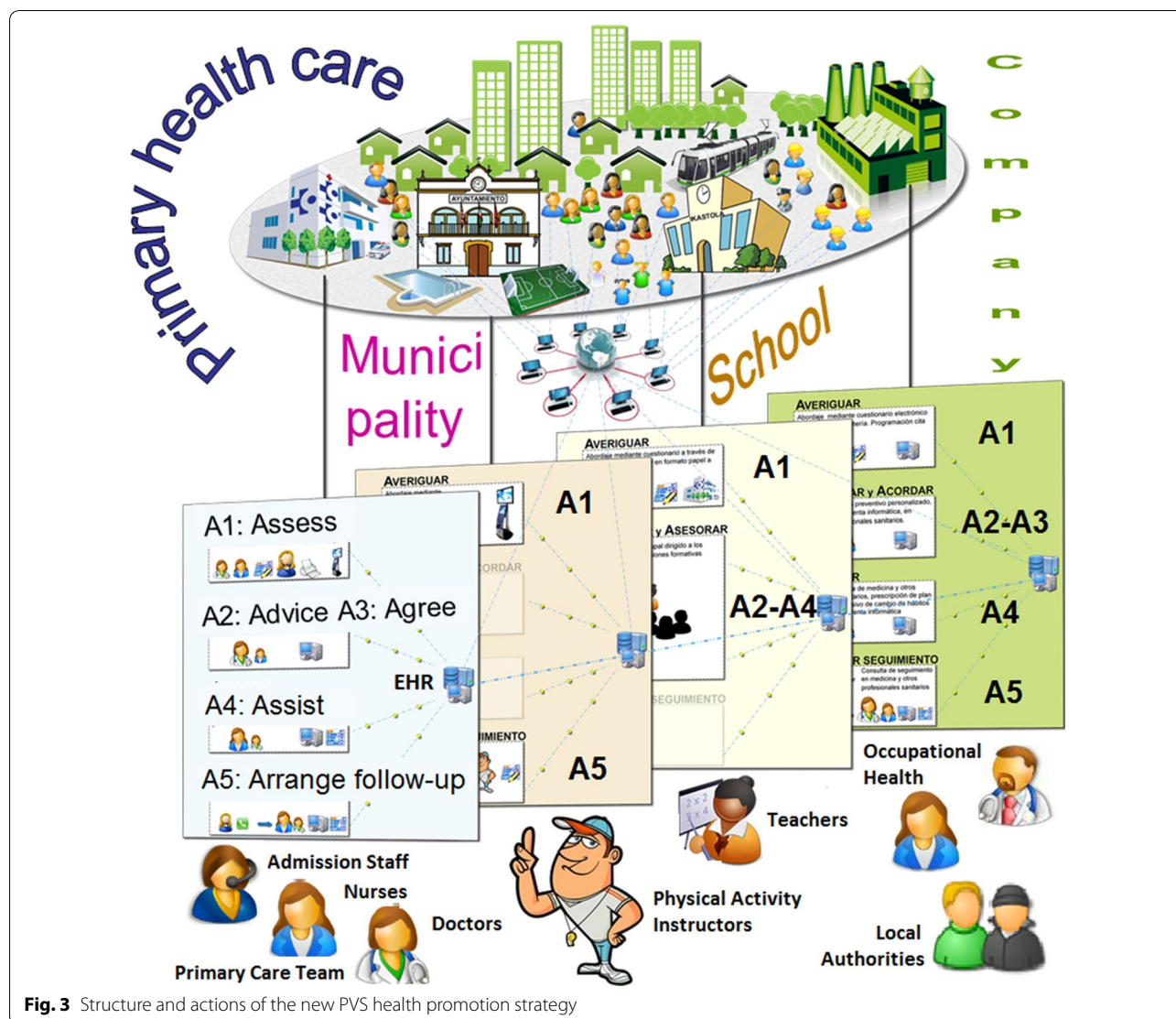
As for the negative aspects of the process, the PHC center staff emphasized the heavy workload associated with the new health promotion activities compounded the problem of lack of time in the routine context of primary care. They noted the “awkward” language used in the theoretical educational sessions, and, above all, the feeling of uncertainty inherent in the innovation process: “not knowing where the process will end”. Some of the participants felt that there was a hidden agenda managed by the research team to lead them to some predetermined outcome. Additionally, participants pointed out the inherent difficulty of changing behaviors, the complexity of health promotion interventions, and the difficulty to achieve short-term results.

**Table 2 Targets, actions and agents of the new PVS programs to promote physical activity, healthy diet and smoking cessation in primary and community care**

| Specific behavioral-cognitive objectives   | Intervention actions  | Who and How   |
|--|---|---|
| Identify unhealthy lifestyle behavior and at-risk population<br>Identify attitudes and intention to change to healthier lifestyles   | A1 assess: assessment of healthy lifestyle behavior and intention to change   | Population self-evaluation through web-based questionnaire linked to electronic health record<br>PVS questionnaires provided to eligible population at the health care center or through community resources (schools, sport facilities, collaborating companies, etc.)<br>Data entry into the electronic health record by scanning by administrative staff or manually by clinicians   |
| Increase perceptions of severity of risks and vulnerability associated with unhealthy lifestyles<br>Strengthen beliefs and knowledge regarding healthy lifestyles and their positive consequences<br>Increase intention to change behavior<br>Strengthen positive beliefs and knowledge regarding healthy lifestyle at the community level | A2 advise: personalized verbal advice centered on the benefits and risks of lifestyle choices<br>A3 agree: assessment of intention to change behavior and agreement of general change goals   | Physicians or nurses <sup>a</sup> , guided by PVS software tools included in the clinical information system in routine or scheduled appointments<br>A four-page pamphlet summarizing the abovementioned information on benefits, risks, motivation, and help offered by health care professionals<br>Communication and diffusion of information strategies such as informal talks given by health care professionals in community settings |
| Enhance self-efficacy perception for behavior change<br>Decrease perception of barriers to behavior change<br>Strengthen coping skills and self-management abilities to facilitate behavior change<br>Improve knowledge regarding community resources to facilitate and support behavior change and prevent relapse                        | A4 assist: reinforcement of reasons and intention to change<br>Identification of barriers to and solutions for behavior change<br>Prescription of a behavior change plan through specific goal setting and action planning, including a self-monitoring log | Nurses <sup>b</sup> assisted by PVS software, which includes tools for action planning, time management, database with contact information for community resources, and health problem-tailored information (evidence-based information on benefits related to a variety of health problems)<br>Provision of a folder containing a brief guide to behavior change with the printed prescription attached                                    |
| Increase reinforcement related to progress in behavior change and health improvements<br>Strengthen perception of support for behavior change within health care, family and community contexts  | A5 arrange follow-up<br>Review of behavior change plan, reinforcement centered on achievements, relapse prevention advice and plan re-design<br>May include referral to community resources   | Recall system managed by administrative personnel<br>Nurses <sup>a</sup> in scheduled appointment assisted by PVS software, which includes tools for review and re-design of behavior change plans and a database with contact information for community resources  |

<sup>a</sup> In primary health care center, although in some cases collaborating companies may also do this

<sup>b</sup> Mainly nurses in the primary health care center and/or at collaborating companies; in some cases family physicians may also do this



**Fig. 3** Structure and actions of the new PVS health promotion strategy

Participants highlighted the following critical areas for optimization to enhance the feasibility and sustainability of the modeled implementation strategies for future application: (a) at the PHC center level, first of all reorganization of on-demand care to minimize work overload, to improve the coordinated flow of care to avoid extra visits by patients, with coordinated working at all professional levels, to foster communication between different tiers of professionals and to provide sufficient staff resources; (b) concerning the information system, improvement of efficiency and reliability of the information and communication tools and databases integrated into the EHR; (c) at the patient level, innovative ways of motivating patients not ready to change and ensuring continuity of care for those with intention to change behavior to minimize false expectations; and (d) at the

community level, improvement of coordination with community resources to align forces and avoid duplication of efforts.

**Discussion**

This paper illustrates a real world example of developing an implementation strategy through a collaborative bottom-up process engaging PHC staff, community agents and researchers. The three steps followed in this process (Table 1: descriptive, creative, and piloting stages) pursue three Implementation goals needed to introduce change into an organization: first, commitment to a shared common goal; second, planning competence to tailor evidence-based interventions to the different context of each center; and third, real cooperation among the entire group of participants [49].



All the centers chose the 5 A's clinical intervention and this is probably due to its simplicity, meaning that less time and training are required than for other interventions, and because of the strong scientific evidence available of its effectiveness in the general population [46]. We used the Chronic Care Model as a framework to guide this effort to redesign a healthcare delivery system with the goal of improving health promotion in primary and community care [38–40]. Our approach to changing and reorganizing clinical practice is consistent with newer frameworks such as the Consolidated Framework for Implementation Research, which considers five major domains that may influence successful implementation of healthcare interventions: intervention characteristics, outer setting, inner setting, characteristics of the individuals involved, and the process of implementation [50]. Such frameworks provide no specific blueprints on how they should be operationalized in practice and researchers trying to design implementation strategies for health promotion interventions need detailed examples such as that provided herein on how they should be used [51].

Cooperation among all the PHC center staff and linkage with community agents are extremely challenging and complex social processes [5–9, 52–54]. Consequently, small steps that make progress in this direction should be considered very important. In our experience, these processes present considerable challenges. Firstly, it is not easy to sustain the commitment of staff to the common goal of integrating health promotion into routine practice, over the course of the long process of modeling and implementation. Secondly, the development of useful and efficient information and communication support tools for addressing healthy lifestyle promotion in routine primary care practice should be accelerated. Thirdly, there is resistance to organizational changes, which are essential for successful cooperation among professionals in the implementation of intervention programs. Fourthly, it would be desirable to prioritize health promotion objectives, to avoid conflicts with multiple other activities in daily practice.

All these difficulties are consistent with findings in previous initiatives for integration of health promotion in primary care [55, 56]. Institutional support from managers of healthcare services, to facilitate and ensure the organization and execution of group dynamics in each center, is essential to address these difficulties. In particular, setting aside time in the agenda of practitioners and provision of substitutes to cover regular duties of all staff to free them to attend are necessary requirements to ensure participation of PHC center staff in discussion/consensus meetings.

Prescribe Healthy Life strategy (from the Spanish 'Prescribe Vida Saludable') was greatly influenced by previous

programs such as Prescription for Health or STEP-UP, carried out in primary care practice-based research networks in the USA [55, 56]. In turn, factors associated with the successful implementation of PVS are similar to those that arose in those programs, i.e., selection of the 5 A's intervention strategy, active participation of primary care professionals in the decision making process to adapt the intervention to a specific context, the development of innovative information and communication technologies, and linkage with community resources. The PVS project may serve as an example for other primary care services of how to do this.

The main limitation of this study is the selection of centers by convenience. It would have been desirable to measure the readiness for change of the PHC centers, a necessary condition for quality improvement, and use this information in the selection of participating centers. However, measuring organizational readiness for change is not an easy task [57]. Past performance of the organization, the main selection criteria used in this study, is probably the best predictor of successful improvements [58], along with leadership and coaching by facilitators [2, 34, 59]. The two companion papers by Sánchez et al. and Martínez et al. [submitted] evaluate quantitatively and qualitatively the feasibility/piloting of the implementation strategy (see Fig. 1). In brief, they identify a set of key factors that facilitate or hinder the PVS program implementation, show that it is feasible to improve its uptake in routine clinical practice and that contextual factors conditioned each center's performance [41, 42].

## Conclusions

This detailed description of the design of the PVS implementation strategy can be used by implementation researchers for planning their implementation research projects and will help readers to understand the two companion papers, which describe quantitative indicators of adoption and implementation, as well as PHC center staff's qualitative perception of the performance of the described strategy. The development of the strategy has been difficult and complex. Lessons learned will be used to improve the implementation strategy and test it in a future experimental implementation trial we are currently planning.

## Abbreviations

5 A's: Assess, Advise, Agree, Assist, and Arrange follow-up; PVS: Prescribe Healthy Life strategy (from the Spanish 'Prescribe Vida Saludable'); PHC: primary health care; EHR: electronic health record.

## Authors' contributions

GG and AS conceived the idea and are the study guarantors. They are primarily responsible for the study design and planning, project coordination and supervision, analysis and interpretation of results. GG drafted the manuscript. JMC and HP collaborated in the study design, obtained funding, and were

responsible for study coordination and interpretation of the modeling process. MHC, EP, JM, and EG were local champions at the primary care centers and contributed to implementation and interpretation of the process. LB and CM were responsible for the analysis of results of the nominal groups. All contributors have critically reviewed the manuscript and approved this version submitted for publication to BMC Research Notes. All authors read and approved the final manuscript.

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#### Acknowledgements

We acknowledge the large group of members of the PSV group who made the collective contribution of this action research project:

*Research Team: Primary Care Research Unit of Bizkaia, Basque Health Service-Osakidetza.* Principal investigator: Gonzalo Grandes; co-investigators: Álvaro Sánchez, Haizea Pombo, Josep M Cortada, Catalina Martínez, Paola Bully, and Aitor Sanz-Guinea.

*Basque Health Service-Osakidetza:* Carlos Sola, Deputy Director of Healthcare Services; Martín Begoña, Susana Iglesias, Maite Cuadrado, and Nuria González, from the Department of Information Technology; Teresa Garmendia, M<sup>a</sup> Luz Jáuregui, and Amaia Hernando, from the *Management Team of Goierri-Alto Urola District*; Jesús Larrañaga, Maribel Romo, and Pilar Isla, from the *Management Team of Bilbao District*; Enrique Maiz, Cristina Domingo, and Carmen Esparta, from the *Management Team of Interior District*; M<sup>a</sup> Luz Marqués, Encarnación San Emeterio, and Antón Elorriaga, from the *Management of Uribe District*.

*Beasain Health Center* (Coordinator: Justo Múgica; María Pilar Alberdi, M<sup>a</sup> Ángeles Arrondo, Amaia Azkoitia, Xabier Epaizabal, M<sup>a</sup> Aranzazu Echeverría, M<sup>a</sup> Esperanza García, M<sup>a</sup> Ángeles García, María Erkuden Imaz, M<sup>a</sup> Antonia Iparaguire, M<sup>a</sup> Isabel Irizar, M<sup>a</sup> Rosario Larrea, M<sup>a</sup> Dolores López, Petra Pacheco, María Yolanda Porres, Begoña San Juan, M<sup>a</sup> Aranzazu Suquia, M<sup>a</sup> Teresa Arrospide, Carolina Diez, Miren Arantxa Igartua, Oihana Jauregui, Alazne Saizar, M<sup>a</sup> Jose Tilves, M<sup>a</sup> Lourdes Etxeberria, María Aurora Valdivielso, Xabier Mugica, M<sup>a</sup> Mercedes Lasagar, Coro Zabaleta).

*La Merced Health Center* (Coordinator: M<sup>a</sup> Isabel Urcelay, Mary Helen Corrales; M<sup>a</sup> Ángeles Crespo, Javier José María Jesús de Ordozgoiti, María Iciar Elguezabal, Susana Esteban, Catalina Frau, Laura Gallo, Inés Yolanda Martín, Nerea Ordorika, José Ramón Pérez, M<sup>a</sup> Begoña Relloso, María Soledad Sangroniz, María Iluminada Santos, Patxi Xabier Iturbe).

*Matiena Health Center* (Coordinator: Esther Gorostiza; M<sup>a</sup> Esther Azpitarte, Bixente Barrutia, Amaia Bengoa, Francisco José Miguel, Ana Isabel Etxebarria, M<sup>a</sup> Belén García, M<sup>a</sup> Jose Ibars, M<sup>a</sup> Jose Las, M<sup>a</sup> Carmen Martínez, Maura Pernudo, Lourdes Oribe, M<sup>a</sup> Dolores Ustarroz, Valentina Camino, Leire Corpión, Leire Ortuondo, M<sup>a</sup> Carmen López, Rosana Abalde, Eneko Ibarruri, Javi Alonso).

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*Others:* Basque Institute for Healthcare Innovation: O + berri (Roberto Nuño), Osarean (Josu Llano), Osatek SA (Enrique Gutiérrez), University of Colorado, School of Medicine, Department of Family Medicine (Maribel Cifuentes), University of Massachusetts Boston, College of Education and Human Development (Gonzalo Bacigalupe), Laval University, Faculty of Nursing Sciences (Marie-Pierre Gagnon).

#### Competing interests

The authors declare that they have no competing interests.

#### Availability of data and materials

Data sharing not applicable to this article as no datasets were generated or analyzed.

#### Consent for publication

Not applicable.

#### Ethics approval and consent to participate

The study protocol was approved by the Primary Care Research Committee of the Basque Health Service, Osakidetza, and by the Basque Country Clinical Research Ethics Committee (Ref: 6/2009). Health care professionals that committed to participate also gave written consent for the anonymous management and publication of data pertaining both to patients assigned to their practices and indicators related to their health care delivery activity.

#### Funding

The PVS project was funded by the Carlos III Health Institute of the Spanish Ministry of Economy and Competitiveness, co-financed by the European Regional Development Fund (PS09/01461, PI12/02113), the Health Department of the Basque Government (2009111072, 2011111145), the Basque Foundation for Social and Health Care Innovation (Grant CA-2012-086), the Basque Research Center in Chronicity-Kronikagune (Grant 11/056), and the Spanish Primary Care Research Network for Prevention and Health Promotion (redIAPP RD12/0005/0010).

#### Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Received: 22 August 2016 Accepted: 30 November 2017

Published online: 06 December 2017

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