

**UNIVERSITA' DEGLI STUDI DI MODENA E REGGIO EMILIA**

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**Audit and Feedback interventions to improve healthcare practice in Type 2 Diabetes Mellitus  
and Chronic Heart Failure**

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# **AUDIT AND FEEDBACK INTERVENTIONS TO IMPROVE HEALTHCARE PRACTICE IN TYPE 2 DIABETES MELLITUS AND CHRONIC HEART FAILURE**

## **Background**

Among the interventions aimed at changing health providers' behaviors, "Audit & feedback" (A&F) has been emerging as one of the most promising and its effectiveness has been shown in different settings. Indeed, providing health professionals with structured reports on their performance can stimulate quality improvement when process or outcomes indicators highlight potential problems concerning the delivery of specific health care interventions or the clinical outcomes achieved.

Type 2 diabetes mellitus (T2DM) and Chronic Heart Failure (CHF) are serious and growing common chronic conditions that are increasingly managed by health professionals in outpatient and community settings, through shared clinical pathways. The development and implementation of these pathways require the involvement of different health professionals and demand strong clinical as well as managerial responsibility in constantly monitoring processes and outcomes of care.

## **Objectives**

- To explore the opportunities offered by sources of information and to fully address relevant dimensions of quality of care and health services performance through the use of qualitative research methods (*focus group*).
- To compare different approaches towards the implementation of A&F interventions.
- To implement an A&F intervention for clinical pathways for chronic diseases

## **Methodologies**

A qualitative analysis, through the construction of focus groups, has been conducted among health professionals and patients, to identify the determinants and the dynamics that regulate the hospital-territory continuity of care and to allow the identification of additional information and indicators required in an optimal A&F intervention for the management of effective clinical pathways. Furthermore, a structured questionnaire was administered to different Italian regions implementing A&F interventions to improve clinical practice with the aim of analyzing and comparing different regional initiatives. Finally, following the creation of a multidisciplinary working group and the information obtained through the FGs, a clinical dashboard has been developed and implemented for the T2DM clinical pathway.

## **Results:**

We investigated what health professionals dealing with those diseases think it is important to them to know about the process and outcomes of the care provided. The analysis allowed the identification of weaknesses and strengths perceived by professionals involved in clinical pathways for chronic disease. Within the context of the questionnaires collected among the 7 Italian regions implementing A&F interventions to improve clinical practice, a comparison between the suggestions available in literature and the main results obtained through the analysis of the projects collected has been conducted. We investigated the characteristics of the working group composition, the targeted clinical behaviors, the selected indicators and their informative sources, the feedback procedures to be adopted, the actions expected from the targeted health professionals and other interventions to be carried out along with the A&F procedure to sustain/reinforce its impact. In the year 2022, a reporting system was made available on the intranet portal of the LHA of Reggio Emilia for the T2DM clinical pathway. The IC model of assistance in the Province of Reggio Emilia has progressively increased in the latest years, reaching a total of 13,206 patients in GI as of 31/12/2021. All professionals involved in the management of the T2DM integrated care (IC) have been enabled to have access to the dashboard. Different types of reports have been developed, depending on the type of use (clinical, organizational), with the display of aggregated or individual data at different levels.

# **INTERVENTI DI AUDIT E FEEDBACK PER MIGLIORARE LA PRATICA CLINICA NEL DIABETE MELLITO DI TIPO 2 E LO SCOMPENSO CARDIACO CRONICO**

## **Introduzione**

Tra gli interventi volti a modificare i comportamenti degli operatori sanitari, l'"Audit & feedback" (A&F) è emerso come uno dei più promettenti e la sua efficacia è stata dimostrata in diversi contesti. Fornire agli operatori sanitari report strutturati sulle loro prestazioni può stimolare il miglioramento della qualità, qualora gli indicatori di processo o di risultato evidenzino potenziali problemi riguardanti l'erogazione di specifici interventi sanitari o i risultati clinici raggiunti. Il diabete mellito di tipo 2 (DM2) e l'insufficienza cardiaca cronica sono condizioni croniche in crescita, sempre più gestite dagli operatori sanitari in ambito ambulatoriale e comunitario, tramite l'utilizzo di PDTA condivisi. Lo sviluppo e l'attuazione di questi percorsi richiedono il coinvolgimento di diversi professionisti sanitari e richiedono una forte responsabilità clinica e gestionale nel monitoraggio costante dei processi e dei risultati delle cure.

## **Obiettivi**

- Esplorare le opportunità offerte dai flussi informativi e affrontare le dimensioni rilevanti della qualità dell'assistenza e delle prestazioni dei servizi sanitari attraverso l'uso di metodi di ricerca qualitativa (focus group).
- Confrontare diversi approcci verso l'attuazione degli interventi di A&F.
- Implementare un intervento A&F per i percorsi clinici per le malattie croniche

## **Materiali e metodi**

E' stata condotta un'analisi qualitativa, attraverso la costruzione di focus group, tra operatori sanitari e pazienti, per identificare i determinanti e le dinamiche che regolano la continuità assistenziale ospedale-territorio e per consentire l'individuazione di informazioni e indicatori necessari in un intervento ottimale di A&F. Inoltre, è stato somministrato un questionario strutturato a diverse regioni italiane che attuano interventi di A&F per migliorare la pratica clinica con l'obiettivo di analizzare e confrontare diverse iniziative regionali. Infine, a seguito della creazione di un gruppo di lavoro multidisciplinare e delle informazioni ottenute attraverso i FG, è stato sviluppato e implementato un cruscotto clinico (*dashboard*) di indicatori per il percorso clinico del DM2.

## **Risultati:**

Sulla base di un approccio di ricerca qualitativo (*focus group*), è stato indagato ciò che gli operatori sanitari che si occupano di tali malattie ritengono utile conoscere del processo e degli esiti delle cure fornite. L'analisi ha permesso di identificare i punti deboli e i punti di forza percepiti dai professionisti coinvolti nei percorsi clinici per le malattie croniche. Inoltre, sono stati studiati ulteriori informazioni e indicatori necessari in un intervento ottimale di A&F per la gestione di percorsi clinici efficaci, nonché opzioni di feedback ottimali. Nell'ambito dei questionari raccolti tra regioni italiane che attuano interventi di A&F è stato condotto un confronto tra i suggerimenti emersi in letteratura e i principali risultati ottenuti attraverso l'analisi dei progetti. Sono state indagate le caratteristiche della composizione del gruppo di lavoro, i comportamenti clinici identificati, gli indicatori selezionati e le loro fonti informative, le procedure di feedback da adottare, le azioni attese dai professionisti sanitari mirati e altri interventi da eseguire insieme alla procedura A&F per sostenerne/rafforzarne l'impatto. Nell'anno 2022 è stato reso disponibile un sistema di reportistica sul portale intranet dell'AUSL-IRCCS di Reggio Emilia dedicato al percorso Gestione Integrata Diabete Mellito tipo 2. Il modello GI dell'assistenza nella Provincia di Reggio Emilia è progressivamente aumentato negli anni, raggiungendo un totale di 13.206 pazienti in GI al 31/12/2021. Tutti i professionisti coinvolti hanno avuto accesso alla dashboard. Sono state sviluppate diverse tipologie di report, a seconda del tipo di utilizzo (clinico, organizzativo) con visualizzazione di dati individuali o aggregati a diversi livelli.

## **Introduction**

Among interventions aimed at changing health providers' behaviors, "Audit & feedback" (A&F) has been emerging as one of the most promising and its effectiveness has been shown in different settings. In an audit and feedback process, an individual's professional practice or performance is measured and then compared to professional standards or targets. (Ivers, Jamtvedt et al. 2012) (Ivers, Grimshaw et al. 2014, Grimshaw, Ivers et al. 2019) Providing health professionals with structured reports on their performance can stimulate quality improvement when process or outcomes indicators highlight potential problems concerning the delivery of specific health care interventions or the clinical outcomes achieved. However, many factors influence the actual yield of A&F interventions, including the context in which they are applied, the type of targeted behaviors, and how they are structured and delivered. Recommendations on how an A&F system should be conceived and developed in order to be able to fully exploit its potential have been provided by experts in the field (Brehaut, Colquhoun et al. 2016, Brown, Gude et al. 2019) (Gude, Brown et al. 2019, Foy, Skrypak et al. 2020).

A&F include a wide range of interventions (which differ in terms of type of quality indicators used, structure of the report feedback to health professionals, frequency of the feedback). Providing those responsible for the organisation and management of clinical pathways for chronic conditions with timely and exhaustive information on relevant dimensions of the quality of care delivered (safety, effectiveness, appropriateness and equity) is of the utmost importance.

Type 2 diabetes mellitus (T2DM) and Chronic Heart Failure (CHF) are serious and growing common chronic conditions that are increasingly managed by health professionals in outpatient and community settings.

Over the last few years, the Emilia-Romagna Regional Health Care System promoted a reorganisation of primary care, largely based upon the principles of the Chronic Care Model and the adoption of formally structured clinical pathways. (Committee 2009) (Baptista, Wiens et al. 2016, Francesconi, Ballo et al. 2019) The development and implementation of these pathways require the involvement of different health professionals and demand strong clinical as well as managerial responsibility in constantly monitoring processes and outcomes of care. The goal of clinical pathways is to allow a standardisation of the process of care according to the best available evidence, thus reducing unwarranted variations and improving outcomes, while taking into account the organisational specificity of the local contexts. Furthermore, clinical pathways are expected to increase the continuity of care and promote a smooth transition of patients across different healthcare settings, according to their evolving and changing needs (Hoskins, Fowler et al. 1993, Smith, Cousins et al. 2017).

However, achieving those goals is challenging and requires additional efforts in sustaining and guiding health professionals through the changes implied by departing from the traditional hospital-centred models of care, towards new innovative clinical and organisational approaches largely based on outpatient services in the community. (Buja, Toffanin et al. 2018) The value of different mechanisms of audit and feedback (A&F), has been a constant interest of research dealing with the evaluation of different quality improvement approaches and strategies to change health professionals behaviours. Systematic reviews have shown that A&F may have

a variable effect, according to a number of factors, including the context in which it is applied, the characteristics of the professional behaviours addressed, and, lastly, the specific characteristics of the A&F adopted (Ivers, Jamtvedt et al. 2012, Ivers, Grimshaw et al. 2014, Ivers, Sales et al. 2014, Colquhoun, Michie et al. 2017). Indeed, A&F interventions may be conceived and applied in different ways.

The project of this thesis is structured according to the three main aims enlisted below. As first aim (Aim 1), this study is intended to explore the opportunities offered by different sources of information and to fully address relevant dimensions of quality of care and health services performance through the use of qualitative research methods (*focus group*) at the Local Health Authority of Reggio Emilia.

Secondly, the study aimed to compare different approaches towards the implementation of A&F interventions (Aim 2). Finally, the implementation of an A&F intervention for clinical pathways for chronic diseases based upon information drawn from the administrative databases available is described (Aim 3). A procedure for feeding back to health professionals information on process and outcomes of care for patients with T2DM was developed relying on the information already available from administrative databases.

**Aim 1: to explore the opportunities offered by additional sources of information and to fully address relevant dimensions of quality of care and health services performance using qualitative research methods (focus group).**

The first aim of our project was to conduct an analysis through the use of focus groups to investigate the experience of patient representatives, care givers and health professionals directly involved in the clinical pathways of the two considered diseases. As part of the first phase of the project, we wanted to explore the opportunities offered by additional sources of information and to fully address relevant dimensions of quality of care and health services performance through the use of qualitative research methods (focus group, FG).

Focus groups were chosen as a survey technique based on discussion between a small group of people, where the participants are invited by one or more moderators to talk to each other on a selected topic that is investigated (S. 2005) (R.A. 1998) Furthermore, focus groups are used to understand participant's point of view, to stimulate the involvement of target groups and to collect from them relevant information for research purpose (C. 2004)

In our study, the analysis of the point of view of patients and their care-givers aims to bring out needs not yet highlighted, as well as unresolved criticalities within the care pathways. It will also make it possible to understand if, and to what extent, their priorities are actually represented and representable by the information available in the information sources for the construction of reports (eg regional administrative databases).

In the same way, the different professional figures involved in the two care pathways will be solicited to express evaluations and perceptions on the current pathway design, on the sharing of information during the care process, on the interaction with the different professionals involved and with the users, to understand the information needs and the data sources currently available.

The information collected through this qualitative in-depth analysis will allow to investigate the dynamics that regulate the hospital-territory continuity of care within the clinical pathways, as well as to define the characteristics of an optimal A&F procedure, with particular attention to the methods of structuring the reporting system in able to have a positive impact on the quality of care.

## Materials and methods

In order to guide the construction of focus groups within the A&F intervention, an analysis of the most recent scientific literature was conducted to identify studies that report previous experiences, which possibly made use of qualitative methodology on the same topic.

### *Focus group with Professionals*

Regarding the focus groups with professionals, some articles in literature suggest elements and themes to be considered as a guide for conducting the meetings.

A review of the available literature (Colquhoun, Michie et al. 2017) suggests, in order to structure future A&F intervention, to pay particular attention to elements such as the recipients of the feedback reporting, the content of such reporting, the presentation method and the timing of distribution.

**Table 1. Key questions to structure future A&F intervention. (Colquhoun, Michie et al. 2017)**

<ul style="list-style-type: none"><li>• Who to return the feedback to?<ul style="list-style-type: none"><li>- To return feedback individually, collectively to groups of subjects or both.</li><li>- To return the feedback to those who will have to implement the change in their clinical practice or to their facility managers</li></ul></li></ul>
<ul style="list-style-type: none"><li>• What information to return and how?<ul style="list-style-type: none"><li>- Feedback on care processes, patient outcomes, individual professional performance, individual cases or groups of patients.</li><li>- Feedback identifying specific behaviors that should be changed.</li><li>- Feedback presented through comparisons or through graphic elements that make the interpretation of the results clearer and more immediate?</li></ul></li></ul>
<ul style="list-style-type: none"><li>• When to return feedback?<ul style="list-style-type: none"><li>- To carefully select the time interval between the conduction of an audit and the presentation of the feedback.</li><li>- To carefully select how often to return feedback</li></ul></li></ul>
<ul style="list-style-type: none"><li>• How to return the feedback?<ul style="list-style-type: none"><li>- Return feedback via face-to-face meeting.</li><li>- Open the debate on the implications of the results in clinical practice</li></ul></li></ul>

A previous study (Foy, Eccles et al. 2005) presents a list of questions that should guide those responsible for an audit and feedback intervention. Among these, some questions integrate the key issues reported in Table 1.

**Table 2. Key questions to structure future A&F intervention (Foy, Eccles et al. 2005)**



- What terms of comparison should be selected? Should they be anonymous?

- How and by whom should the results be presented?

- Should they be presented through the use of paper reports, through a portal or a periodic email or during a front meeting?
- Which professional figure should present the results? A department colleague, a professional carrying out the same activity, a manager, an external figure (clinical or non-clinical)?

### *Patients*

One study (Alazri, Neal et al. 2006) explored the perceptions and experiences of a group of patients with type 2 diabetes mellitus through the use of focus groups. The study was conducted on a sample of 79 patients to explore the elements that regulate the continuity of care. During the meetings, three categories of questions were used, relating to the definitions and experiences of continuity, the factors perceived as promoting or inhibiting continuity, the advantages and disadvantages perceived within the continuity of care.

**Table 3. Key questions to structure future A&F intervention (Alazri, Neal et al. 2006)**

- Which definitions of continuity of care were reported? Which experiences of continuity of care were reported?

- Which factors are perceived as promoting or inhibiting continuity **of care**?

- Which advantages and critical points are perceived by the patients within the continuity of care?

From the analysis of the interviews, different facets of the perception of continuity of care emerge. Patients experienced three different types of continuity:

- relational (or longitudinal) continuity (i.e. relational continuity with a named GP or practice nurse with whom the patient consulted regularly);
- cross-boundary (or team) continuity (i.e. consulting more than one GP or professionals)
- continuity of information (i.e. the availability of the patient's health data by other professionals involved in the care pathway).

A further study (Sentell, Seto et al. 2016) investigated the point of view of patients suffering from diabetes mellitus or heart failure through qualitative analysis, starting from questions regarding the factors perceived as involved in their hospitalizations.

**Table 4. Key questions to structure future A&F intervention (Sentell, Seto et al. 2016)**

<ul style="list-style-type: none"><li>• <b>What was happening at home and with your health before you arrived at the hospital?</b></li></ul>
<ul style="list-style-type: none"><li>• <b>Is there anything different that could have been done to stop you from coming to the hospital? Something your doctor could have done?</b></li></ul>
<ul style="list-style-type: none"><li>• <b>Are there any things you will do differently when you get home from the hospital this time?</b></li></ul>

## FGs protocol drafting

The purpose of the focus groups was to compare the perception and experience of professionals and patients on two clinical-care pathways involving chronic diseases (Type 2 Diabetes Mellitus and Chronic Heart Failure), evaluating different moments (first access, treatment plan, provision of services, evaluation and feedback).

Through the focus groups, we tried to collect elements that could be valuable:

- when trying to improve patient and professional experience in the care pathways and the management of the disease;
- when structuring an A&F intervention; in particular, in the light of the experience of those who are directly involved in the management of the pathologies considered, which information are most valuable to be included in a reporting system.

The focus group protocol was drafted and shared, reaching agreements between the Clinical Governance Unit and the Department of Primary Care of the Local Health Authority-IRCCS of Reggio Emilia.

### *Sampling and recruitment of patients*

In the Local Health Authority of Reggio Emilia, two FGs for each pathology were organized. The first FG included doctors, nurses and other professionals figures involved in the clinical pathway considered; the second FG included patients and caregivers involved in the considered pathways.

**Table 5. Number of focus groups for each pathway**

<b>FGs for Type 2 diabetes mellitus clinical pathway</b>		
<b>Focus groups</b>	<ul style="list-style-type: none"><li>• 1 FG with patients and care givers</li></ul>	
	<ul style="list-style-type: none"><li>• 1 FG with health professionals</li></ul>	
	<b>FGs for Chronic heart failure clinical pathway</b>	
	<ul style="list-style-type: none"><li>• 1 FG with patients and care givers</li></ul>	
	<ul style="list-style-type: none"><li>• 1 FG with health professionals</li></ul>	

A minimum of 8 to a maximum of 12 people was considered to participate in the focus groups to allow an adequate development of the discussion. A moderator was entitled to guide the discussion in order to produce a deep understanding of the experiences and attitudes of the participants. Moreover, the moderator was helped by the presence of an observer.

After the definition of selection criteria, we started the enrolment of the patients and the professionals potentially involved in the focus groups which took place from September until November 2019 (4 FG for each site).

### **Conducting focus groups**

#### *Role of the moderator:*

- to introduce the topic of the survey to the participants;
- to guide the participants towards the topics of interest, using the stimulus-response technique and making the questions are not misunderstood and ensuring that the results are representative of the group discussion.

#### *Role of the observer:*

- before the implementation of the focus group, to identify the members of the discussion group
- during the development of the focus group, to have an organizational and logistical role (from recording the meeting, to annotating indications and comments, to observing the dynamics within the group).
- after the focus group, to communicate to the moderator his impressions on the dynamics established in the group (these reflections could serve as a starting point in the management of the following focus groups).

## **Structure of the focus group**

A text with FG's key questions was drafted. The stimulus questions were organized in a specific structured grid with the aim of supporting the moderator in conducting the discussion. All the questions to be included in the grid had to be short, clear and appropriate to the language of the participants. The definitive formulation of these questions were defined in a preparatory meeting addressed to all the conductors (moderator and observer) of the focus groups.

## *Themes*

During the FGs, the first questions have the purpose to activate the discussion and to propose the stimuli, using at first general questions and then more specific ones.

The moderator tried to conduct the conversation by investigating the following themes:

1. Experiences, criticalities and strengths perceived, improvement actions suggested for each phase of the clinical pathway (i.e. enrollment and access phase, definition of the plan of care and communication / relationship with the user, provision of services).
2. Continuity experiences (definitions and experiences, promoting or limiting factors) understood as relational continuity, with the patient and with other professionals involved or continuity of information on patient's health data
3. Equity (to identify the unmet needs and the community resources already activated)
4. Information to be included in the feedback of an ideal A&F system applied to clinical pathways (What information should be included? When should they be returned? How often? To whom should they be sent/communicated? How? In which way (paper, e-mail, in person)?)

Since the project is aimed not only at evaluating the existing pathways, but also at structuring an ideal reporting system, particular attention was paid to the latter point.

## **Focus groups with professionals**

It was planned to hold two different meetings with health professionals, one for those involved in the care pathway of the patient with type 2 diabetes mellitus, one with the professionals involved in the care of patients with heart failure.

Each meeting will last approximately two hours.

During these meetings the conductors / facilitators were able to use a track of questions, which allows the emergence of useful elements for the structuring of an optimal audit & feedback system. These questions focused both on the knowledge of the current clinical pathway in which patients suffering from the pathologies considered are enrolled. We tried to highlight obstacles, critical issues, possible improvement actions, strengths, in the light of the professional experience. The elements that will outline the methods of structuring the audit & feedback process will also be examined, in order to extrapolate the information that professionals consider essential for the management and improvement of their clinical activities in shared clinical pathway.

The questions used as a track are listed in the following tables.

**Phase 1 : Introduction**

**Table 6. Theme and questions for introduction**

<b>Theme</b>	<b>Questions</b>
Introduction on the organizational methods of the clinical pathway	How does the clinical pathway is structured in the Local Health Authority? Is it homogeneous in all Districts? Are the figures involved always the same? What services and structures are involved? What are the responsibilities?

## Phase 2 : Discussion

**Table 7. Theme and questions for discussion**

Theme	Questions
First access and enrollment in the clinical pathway	<p>How is the access phase organized?</p> <p>Do you think that the current access methods is working?</p> <p>Which strengths and weaknesses are present in this phase?</p> <p>Which are the improvement actions to be implemented?</p>
Access to services	<p>Which are the main difficulties for patients in using the services? What criticalities do you perceive in the pathway (provision of services, patient assistance, support in adhering to the clinical pathway) and which strengths? Where in your opinion it is necessary to intervene? Which are the areas for improvement?</p>
Care and information plan	<p>During the enrollment phase, is the procedure explained to the patient? Is it difficult to take into account their personal needs in planning the pathway?</p> <p>Which is the compliance to clinical pathway from patients? Which are the main difficulties? Have patients in distress been helped? How?</p>
<p>Awareness of being part of a team –</p> <p>Continuity of care (relational continuity with the patient, relational continuity with the other professionals involved, continuity of information or the availability of patient's health data)</p>	<p>Do you often interface with other professionals? Are there structured and defined moments of integration? Do you feel you are part of a team? Would you find it useful to change some part of the clinical pathway?</p> <p>What does continuity of care represent to you? Which experience do you have in your clinical practice? Which elements could promote continuity and which ones inhibit it? What advantages and disadvantages do you perceive?</p>
Feedback information	<p>Which information should be available to monitor the care process in which you are involved? Which information could be relevant to the improvement of your clinical practice?</p>

	Should there be indicators related to the process of care or to patient outcomes or to individual performance of the single professional or related to individual cases or groups of patients?
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The discussion on how to return the audit was conducted by collecting the opinions of the participants with written form. Once completed, these forms were collected and discussed with the moderator.

**Table 8. Theme and questions for feedback**

Theme	Questions
Feedback recipient	Should the feedback be returned to those who need to implement the change in their clinical practice or at other levels (e.g. managers)?  Should the feedback be returned at individual practitioner level or collectively to groups of practitioners?
How to return feedback	Which professional figure is best suited to present the results? A clinic colleague, a professional carrying out the same activity in other settings, your manager, an external figure (clinical or non-clinical)?  How should the results be returned? On paper, through a portal or a periodic email or during a front meeting? In presenting the results, what should be the terms of comparison?
Timing for feedback	What time interval should be left between conducting the audit and submitting feedback?  How often to return feedback?

### Phase 3: Conclusions

**Table 9. Theme and questions for conclusions**

Theme	Questions
Conclusions	How do you evaluate the clinical pathway?  Would you like to add or suggest something, keeping in mind your experience?



## Focus groups with patients

Two different meetings with patients were planned, one aimed at representing patients with type 2 diabetes mellitus, one aimed at representing patients with heart failure.

During these meetings, the conductors / facilitators tried to bring out the patients' experiences in the management of their pathology, with points of view on the clinical pathway context in which they are inserted.

The questions used as a track are listed in the following tables.

### Phase 1: Introduction

**Table 10. Theme and questions for introduction**

Theme	Questions
Introduction and description of the clinical pathway  (with the help of a billboard containing the explanation of the clinical pathway)	Do you know the clinical pathway that has just been described to you?  Does this clinical pathway correspond to what has been proposed to you?  What was your personal experience?

### Phase 2 : Discussion

**Table 11. Theme and questions for discussion**

Theme	Questions
First access and enrollment in the clinical pathway	Who proposed you to be enrolled in the pathway? When? How it happened?  Were there any problems in accessing the treatment pathway?
Care and information / relationship plan	Have you been explained how the clinical pathway works? Have you been given a treatment plan that says how it is organized? For example: have you been told how tests and therapies work? Did the doctors book your visits and inform you about the appointments?

	<p>Have you been asked for personal information in order to build a tailor-made itinerary? Were you involved in the decisions? What would you find most useful?</p> <p>Do the operators you met work together in a coordinated way? Do you have the perception that the different operators work with each other in an organized way or instead does it seem to you that each one work in an independent way? Please give an example (e.g. did you receive conflicting opinions or contradictory information?)</p>
<p>Provision of services; patient assistance and support in adhering to the path</p>	<p>Were you followed along the clinical pathway?</p> <p>Have you been helped in difficult moments? Who was the main reference figure in overcoming the problems you encountered?</p> <p>Did the operators do what they said at the beginning?</p> <p>Which is the adherence to the pathway that was initially proposed to?</p> <p>What criticalities do you perceive in the pathway and in the use of the services?</p> <p>What difficulties did you encounter and in what moments?</p> <p>What would you have liked to be different?</p> <p>What are the strengths and aspects that you appreciated the most?</p>

### Phase 3: Conclusions

Table 12. Theme and questions for conclusions

Theme	Questions
<p>Conclusions</p>	<p>How do you evaluate the pathway as a whole?</p> <p>Has anything changed in your life since you have been enrolled?</p> <p>Is there something important that you want to add, referring to your experience?</p>

## **Selection of the participants and Focus group composition**

When structuring the focus group, a total of approximately 8-12 people per meeting was considered the best standard to allow the active participations of all the actors.

To select the participants, criteria of inclusion were identified. These criteria allowed on one side a representation of all the professionals involved, with major attention to the figures more represented like GPs and nurses.

On the other side the criteria allowed a distribution of patients for sex, age and length of stay (new/old inclusion) in the IC DM2 pathway, possibly allowing different experiences of the various phases of the pathway.

Regarding the composition of the FGs, for Type II Diabetes Mellitus, the professionals to be involved were considered among the following categories included in the clinical pathway:

- GPs belonging to different “Case della Comunità”- Community Houses and NCP coordinator)
- Doctors of the diabetes service
- Dietitian
- Nurses belonging to chronicity care clinic, GP’s office, diabetological hospital clinic
- Physicians of the Primary Care Department- Clinical Pathway Program (professionals with managerial responsibilities)

For FGs addressed to investigate heart failure clinical pathway, the professionals to be involved were considered among the following categories:

- GP (belonging to different “Case della Comunità”- Community Houses, NCP coordinator)
- Cardiologist (belonging to Hub hospital or spoke hospital)
- Nurse (belonging to chronicity care clinic, GP’s office, cardiologist hospital clinic)
- Dietician
- Physiotherapist
- Physician of the Primary Care Department- Clinical Pathway Program (professionals with managerial responsibilities)

Regarding the composition of the FGs addressed to explore patients experience and perceptions of the two clinical pathways considered, a few criteria were identified.

For type II Diabetes Mellitus, patients aged more than 18 years and included in the IC DM2 for the chronic management of their disease were selected.

To allow the participation of patients with a different history of pathology, the criteria of length of stay in the clinical pathways was used. The purpose was to give representation to patients recently admitted in the clinical pathways (included for less than 12 months) as well as patients with a longer experience (included for more than 12 months). To allow an equal representation of gender, both female and male patients were included. Regarding age, patients aged less than 65 years and patients older than 65 years were included. To understand their experience in the management of the disease, also representatives of care-givers were included.

For patients suffering from heart failure, in order to give voice to different experiences, subjects included in the clinical pathway for less or more than a year were included. If not possible to meet these criteria in the selection of patients, an attempt was made to include patients with diagnoses received at different time in the focus group.

Furthermore, by subdividing the patients according to the protocol envisaged in the clinical pathway (NYHA class I-II and NYHA class III-IV), two different groups will be obtained not only in terms of severity, but probably also in terms of average age. In the group with greater clinical severity, there could be a significantly higher average age than the other.

The importance of the caregiver was considered also in this category. If the presence of more advanced patients in the focus groups is not possible, it will be equally useful for their experience to be represented by the relative care givers, who already in everyday life have to operate in monitoring the therapy and the patient's vital parameters.

As far as healthcare personnel are concerned, there are no exclusion criteria.

As regards to the group of patients and caregivers, the subjects will be excluded if one of this conditions occurred:

- presence of psychological deterioration;
- inability to participate due to difficulties in movement.

The final focus group composition is described in Table 13. for the two clinical pathways considered.

**Table 13. Focus group composition for professionals and patients involved in Integrated Care of Type 2 Diabetes Mellitus**

<b>Type 2 diabetes mellitus</b>
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<b>Professionals</b> ( <i>Professionals figures involved</i> )	<b>N.</b>	<b>N. of participants</b>
<ul style="list-style-type: none"> <li>• GP (belonging to different “Case della Comunità”- Community Houses, NCP coordinator)</li> </ul>	4	10
<ul style="list-style-type: none"> <li>• Diabetologist</li> </ul>	1	
<ul style="list-style-type: none"> <li>• Dietician</li> </ul>	1	
<ul style="list-style-type: none"> <li>• Nurse (belonging to chronicity care clinic, GP’s office, diabetological hospital clinic)</li> </ul>	3	
<ul style="list-style-type: none"> <li>• Physician of the Primary Care Department- Clinical Pathway Program</li> </ul>	1	
<b>Patients</b>	<b>N.</b>	<b>N. of participants</b>
<ul style="list-style-type: none"> <li>• Patient included in IC DM2 from less than 12 months*</li> </ul>	2 men 2 women (50% <65 years)	10
<ul style="list-style-type: none"> <li>• Patient included in IC DM2 from at least 12 months*</li> </ul>	2 men 2 women (50% <65 years)	
<ul style="list-style-type: none"> <li>• Care-giver</li> </ul>	2	
<p>* If not possible to respect the criteria indicated, the time elapsed from the diagnosis of the disease will be used as a criterion, in order to divide the patients into new or old diagnosed groups.</p>		

**Table 14. Focus group composition for professionals and patients involved in Chronic Heart Failure clinical pathway.**

<b>Chronic Heart Failure</b>		
<b>Professionals</b> ( <i>Professionals figures involved</i> )	<b>N.</b>	<b>N. of participants</b>
<ul style="list-style-type: none"> <li>GP (belonging to different “Case della Comunità”- Community Houses, NCP coordinator)</li> </ul>	4	12
<ul style="list-style-type: none"> <li>Cardiologist (belonging to Hub hospital or spoke hospital)</li> </ul>	2	
<ul style="list-style-type: none"> <li>Nurse (belonging to chronicity care clinic, GP’s office, cardiologist hospital clinic)</li> </ul>	3	
<ul style="list-style-type: none"> <li>Infermieri territoriali afferenti al dipartimento di Cure Primarie dell’AUSL</li> </ul>	2	
<ul style="list-style-type: none"> <li>Dietician</li> </ul>	1	
<ul style="list-style-type: none"> <li>Physiotherapist</li> </ul>	1	
<ul style="list-style-type: none"> <li>Physician of the Primary Care Department- Clinical Pahtway Program</li> </ul>	1	
<b>Patients</b>	<b>N.</b>	<b>N. of participants</b>
<ul style="list-style-type: none"> <li>Patient included in the pathway from less than 12 months*</li> </ul>	2 men 2 women (NYHA class also considered)	8
<ul style="list-style-type: none"> <li>Patient included in the pathway from at least 12 months*</li> </ul>	2 men 2 women (NYHA class also considered)	
<ul style="list-style-type: none"> <li>Care giver</li> </ul>	2	
* If not possible to respect the criteria indicated, it the time elapsed from the diagnosis of the disease will be used as a criterion, in order to divide the patients into new or old diagnosed groups.		

## **Data analysis**

### **Informed consent**

The data analysis took place only after approval by the individual participants, by signing the informed consent form. In order to collect the written informed consent of the participants, a form was sent, together with the invitation to participate. Then the signed informed consent was collected from all the participants at the time of the focus group.

### **Data collection and transcription**

Once the focus groups have been conducted, the transcription of the meetings was carried out by the same subjects (moderator and observer) who conducted the focus groups. The texts thus obtained was used for subsequent qualitative analysis by experts of the LHA of Reggio Emilia.

### **Expected results**

The contents emerged during the focus groups were processed and subjected to a qualitative analysis by thematic areas. The purpose was to translate the emerged results into elements useful for the structuring of the audit & feedback intervention, in light of the experience of those who are directly involved in the management of the pathologies considered.

### **Qualitative analysis method**

A thematic analysis was made (Boyatzis 1998). This analysis which consists of two phases:

- 1) Identification and description of the thematic categories
- 2) Conceptual analysis of the speech, oriented to the interpretation of the content through the use of a reading grid /analyses.

The support of the Atlas.ti (or T-lab) software was also used to conduct the analysis of the texts.

A final report containing the results of the focus groups was compiled.

## Results

### *Professionals*

#### **Main results emerged from the focus group with professionals involved in Type2 Diabetes Mellitus clinical pathway**

As previously described among the questions used to conduct the focus group, professionals involved in DM2 IC were asked to share their opinion both with respect to the organization of the clinical pathway and with respect to the type of information that can support them in daily clinical practice.

These information could be of potential interest in order to evaluate the quality of the clinical pathway and to identify possible areas for improvement. Moreover the information is functional to the construction of an audit & feedback system, a tool for improving the assistance quality through a collection of information and return to the operators.

#### **Organization of the clinical pathway**

With reference to the organization of the clinical pathway, the following critical issues emerged from the FG with professionals:

- Lack of adhesion by some GPs to the DM2 IC pathway, with consequently inequalities of access for some patients;
- Lack of information regarding the professionals involved and the different organization of the clinical pathway in different contexts and districts of the Province

*"Because I get the perception that someone has the nurse working in the clinic, someone doesn't. And I must say that I would like to understand how many there are, how many patients who are in integrated care have a nurse who calls them, etc., and how many instead have only the GP because maybe he works in his own office and does not have a dedicated nurse.*

- Lack of shared medical records or a shared information system

*"It does not work. But IT management is important, because even the doctor, alone, needs all the data"*

- Poor communication between the different professionals who are part of the clinical pathwa and lack of meeting opportunities to do an integrated analysis (eg "*meetings like this*")

*"We see each other very little and it would be useful.. I don't know, a periodic focus with the diabetologist and the diabetoly clinic staff, but also twice a year, every six months, to tell you where*



*we are, all together. We make the point of the situation, maybe your criticality, ours, ones of the nurse who calls the patients”*

- Shortage of dedicated staff, related to organizational issues and which causes long waiting lists and discomfort to patients

*“The figure of the dietician was always been missing. I understand that something is moving”*

- Difficulties in accessibility due to the fact that services are not always present in all the villages and there are not always connections with the city. In some cases, patients do not know how to reach the clinical pathway clinics. This could also be an element of inequity.

*“Given the average age of the population, moving to the clinics in Reggio is very tiring; I have a hard time sending them to the dietician who is in Reggio for an interview. And then if they go there, they go if they live in Casina or Vezzano , actually there are significant logistics issues”.*

### **Suggestions for critical issues**

Regarding the critical issues highlighted, professionals have suggested some possible improvement actions:

- To organize periodic meetings between operators involved in the clinical pathway (GPs, specialists, nurses,...) in order to promote more frequent and informal contacts;

*“I don't know, maybe a periodic focus with the diabetologist and the staff, or twice a year, every six months, to see where we are, to make the point all together of the situation”*

- To improve the system for booking visits and make it homogeneous;

*“The different possibility of booking between Reggio and the suburbs. In Reggio we have a secretary who makes mornings, afternoons, plus the possibility of booking from CUPtel (by phone). In the suburbs they have to come to the CUP (booking desks).”*

- To improve the integrated system for the management of emergencies (eg the possibility of an urgent diabetic visit);

*“We would like to have a dedicated space for urgencies; currently I do not have a specific space of urgency on the agenda and therefore if I get an urgent call, I have to insert it in the middle of all the others and if I postpone by half an hour, that's fine, but if I begin to see two urgencies in one day, I have to postpone all more than an hour and it becomes problematic ”*

- To organize meetings between nurses to facilitate a comparison on the information they provide to patients (sometimes they are different and inhomogeneous);

- To provide information on centers that have a referral chronic nurse;
- To create a shared medical record.

### **Audit and feedback intervention**

As regards to the audit and feedback process, the following results emerged in particular with respect to the areas investigated:

#### **a) which information to collect and return in the a&f process?**

- Clinical and laboratory data: eg. renal function value over time, blood glucose value, glycated hemoglobin, etc.
- Data of periodic visits of patients in integrated care
- Data of patients in integrated care with indication of drugs with therapeutic plan (some drugs require more frequent checks)
- Data and indicators on both individual and core care outcomes:
  - n. of complications
  - n. patients reviewed before periodic check-up,
  - n. patients who decompensate
  - n. patients who leave the IC due to complications
  - compliance in the use of drug therapy
  - n. of admissions to hospital and reason
  - data related to the time elapsed before the reactivation of the disease
  - n. of patients who respect the control schedule
  - time elapsed before the reactivation of the disease
  - n. of patients participating in educational groups
  - difference in health outcomes between those who join educational groups and those who does not

*“But also within the same reality, where perhaps there is a dietician, to understand if there are differences between those who participate to therapeutic educational meetings and other patients; understand if there is a difference in attending meetings or not with a dietician or also with you”*

- Information on the continuity of care such as n. of patients who report information from specialist visits to GPs

*"And I would really like to know how many of those I see then really go to the doctor to show if everything is fine or not... maybe they go there after 3-4 months and so on"*

- They would also like to have information about patient compliance and adherence to the clinical pathway as a whole, such as n. of patients who respect the control schedule on the total, n. of patients participating in educational meetings. Furthermore, they would like to have qualitative information regarding the reasons of not participating.

*"Therapeutic education, the problem is that nobody wants to participate; when they are put into integrated care, therapeutic education is proposed but "well yes maybe I go to the dietician but ... they prefer the individual ... Why? It would be really useful to possibly propose it in a different way "*

*"That is, in addition to the number of non-members, what we said before, that is, how many are then those who have made the entire journey, who have made all the visits, in what times ... but in addition to the number, understand the reasons"*

- They would also like to receive qualitative information about the patient's opinion, his satisfaction and his perception of the IC and therefore in particular in relation to the transition to integrated management. For example, understanding whether the patient feels adequately supported also in the lifestyle change process (nutrition, weight loss,..)

*"I would be curious about the opinion of the patient in integrated care maybe after two visits or maybe after a few years in which the compensation is good: what do you think? Are you satisfied?"*

- Operators also wish to have information about the quality of life of patients and in particular about the lifestyles they adopt (e.g. change in BMI from one year to another) and also with respect to the social and working context of patients

*"You could see for example after two years if the patient still has the same weight or not, if he still smokes or not, if he practices physical activity or not, to say, these things, perhaps with some more objective parameters."*

*"There are people still of working age. When they hear they have to stay for two hours, they say "no".*

**b) Who / how / when would they be returned?**

Professionals said it would be helpful for the collected data and information to be returned to all professionals involved in the clinical pathway:

- GPs
- Specialists
- nurses
- dieticians
- other professionals.

The information and data should be returned both by those with managerial responsibilities in the clinical pathways by sending a report, and by the coordinator of NCP during meetings with their colleagues. In these meeting the data provided can be discussed together with all the professionals involved. The feedback procedure should therefore be both by paper report and face-to-face meetings.

The frequency suggested by professionals for these meetings (and therefore also for the reports) is every six months.

## **Patients**

### **Main results emerged from the focus group with patients involved in Type2 Diabetes Mellitus clinical pathway**

Patients involved in Type2 Diabetes Mellitus clinical pathway were asked to share their experiences and their opinion regarding the integrated care for diabetes, highlighting in particular positive aspects, critical issues and possible proposals for improvement. The questions used are previously listed.

The main results that emerged are presented below divided by positive aspects, critical issues and proposed improvement actions.

### **Positive aspects**

- The role of the general practitioner (GP) is of central importance, as a reference figure to ask for information on the care pathway, and because in some cases he has an active role and contacts patients directly more frequently.

*"Let's say my GP is the one who reminds me of the things I have to do: he is my point of reference and I always call him first if I need to"*

- The explanation of numerous information in a clear and understandable way by the operators of the diabetes center in the initial phase of the pathway

*"Then I must say that the first time I came here, the first year, I must say that I was well looked after; they told me what diet I had to take, the exams and everything that was well explained to me"*

- The presence of a nursing figure at some GPs office who helps to ask patients for information about their daily life, contact to arrange visits, etc.

*"But then she was the nurse who checked everything on me; here the nurse tested me for diabetes, she weighed me, checked my blood pressure ... it's a bit of a link between all the pieces and sometimes mine also calls "*

## **Critical issues**

- The feeling of being less followed and monitored because visits to the diabetes clinic are infrequent. Although there is an awareness that this is due to the fact of being relatively "well", in some patients remains the feeling of being less followed.
- Little involvement of the GP in some cases: there is an inequality due to whether or not GPs belong to "Case della Comunità". In fact, patients who have an external GP report that they have received little information after enrollment and have experienced little involvement in general.
- The presence of the dietician in the clinical pathway is not uniform and patients report the need and desire to receive this type of support. On the other hand, some share the fact that they have privately contacted the specialist with very positive results

*"But since I entered the center many years ago, I've never seen a dietician; what I was told, I was told not explained in detail"*

- The high costs of drugs and other medical devices as they are not always provided and the costs are therefore significant in the family budget

*"Once they even gave us free medicines, exempt from the payment. But now no, I also have the card exempt from the payment. I always pay 20-22 euros every time."*

- Difference in treatment and offer depending to the different services and the different structures where a patient goes or depending on the nurse who takes care of them: this type of criticality brings with it inequity of access linked to different variables such as geographical, economic, etc ...

*"But there is no check every three months, every six months, like here at least they are lucky enough to have the nurse who at least weighs you down, makes an update ..."*

- Difficulties in attending the meeting appointments for those who work, with risk of creating inequality of access linked to the working variable

*"And I fortunately still work, but always have problems, I can't keep appointments so, in my opinion, I would appreciate a better coordination"*

## **Suggestions**

Patients also suggested possible improvement actions.

- The possibility of receiving more information on behaviors and nutrition, on the pathological condition and treatment alternatives (eg "if there are new drugs") and on the organization of services (eg where a GP is available in a group medicine or a dietician). Furthermore, the patients suggested that information on their social, economic and family conditions could be periodically collected, to allow operators to be updated on their ability to move independently, to benefit or not from the support of a family member and on the concrete possibility of purchasing drugs or other material.
- The presence of a nutritionist or dietician in an uniform way in the territory, who can provide patients information on how to eat and to cook, who gives advice that doctors cannot give us given the limited time they have available.
- The organization of group meetings to share information, advice, experiences on nutrition with a dietician but also between patients.

*"In fact, in my opinion it would be useful to have group meetings on diet but it would also be useful to have group meetings on the risks of the disease; on the duration of the treatment, because for example I think "will I have to take metformin all my life?", "what happened in other cases?"*

- The offer of economic support to support the costs of drugs and the purchase of other medical devices.

## *Professionals*

### **Main results emerged from the focus group with professionals involved in chronic heart failure clinical pathway**

As previously described, professionals involved in chronic heart failure clinical pathway were asked to share their opinion both with respect to the organization of the clinical pathway and with respect to the type of information that can support them in daily clinical practice.

#### **Organization of the clinical pathway**

With reference to the organization of the clinical pathway, the following critical issues emerged from the professionals:

- Complexity of the enrollment form.

*"Entering data in the enrollment form for patients is a bit tricky because there are many sub-boxes to click, etc ... many times the program tells you that the enrollment cannot be concluded because you have forgotten something around.... it slows the activity enough: is it really necessary? (cardiologist)*

- In addition, everything is made more complex by the IT aspect and by the fact that cardiologists and GPs have different program to record clinical data or have difficulty in accessing. All the operators involved feel the lack of a shared medical record or a single information system

*"I have the information system but is not the same for the GPs. The GPs have different systems that make everything even more tiring .. sometimes they don't access, sometimes they can't, some can't see them, they don't you know "(cardiologist)*

- Lack of adherence by some GPs to the clinical pathway and lack of information about the professionals involved and those not adhering



*"It then happens that maybe you explain the whole process to a patient and then you discover that he cannot be enrolled because his GP did not join: you know, it's not that they always come to the GP. The cardiologist can also make his own proposal for the clinical pathway" (cardiologist)*

- Some technical problems relating to the functioning of the information systems are experienced by all the GPs

*"On Arianna (note: the program for the clinical pathway) I find it hard to understand where I can go and get the information, because sometimes on it disconnects, or the password doesn't work, or I can't find the information I am looking for, etc ... (GP)*

- Lack of the compilation of Arianna by the GPs who adhere with a consequent poor passage of information

*"I have two patients enrolled for half a year so it is not a great experience but I also noticed that entering a program that you do not use every day and you have to enter twice a year is not very easy also because you risk to get lost, you have to remember everything, then maybe it doesn't work etc. (GP)*

- Poor communication between the various professionals who are part of the clinical pathway since there are no opportunities for meeting. The feeling is that it is quite fragmented, that not everyone knows what to do.

*"If the professionals involved are 10, then we have to talk to each other and say what to do and if there is a problem then we will call, we will speak, we will send each other an email since now we always go by email anyway, because otherwise if we don't talk we won't go anywhere (nurse)*

- Presence of inequalities of access to the pathway due both to the lack of autonomy of movement of some types of patients and to the lack of support figures such as family members or care givers.

*"Well certainly the intrasportability, because there are patients that can access, but there are other patients with pathologies which cannot access the service because they have not a family member accompanying them. (nurse)*

## **Suggestions**

With respect to the critical issues highlighted, the professionals have suggested some possible improvement actions:

- Simplification of the enrollment form and better sharing of inclusion and exclusion criteria to improve homogeneity;
- To provide training meetings because of the presence of new professionals and a lot of time has passed since the last trainings;
- Collection of information about the living conditions of patients, eg. if they live alone, if they have care givers, if they can move independently, etc....;
- Use of a single information system or a single file by all professionals to facilitate the exchange of information and continuity of care;
- Greater awareness and involvement of GPs within the clinical pathway, also because there are some new GPs needing of dedicated training;
- Regular meetings (1/2 times a year) of all the professionals involved in the clinical pathway;
- Sharing information on how the clinical pathway is organized in other districts.

## **Audit and feedback**

As regards to the audit and feedback process, the following results emerged in particular with respect to the areas investigated:

**a) what information to collect and return in the a&f process?**

- First of all, the operators highlighted the desire to know and understand how much being inside this path can benefit the patient and improve his health conditions and on the other hand how effective it is also for the organization

*"The thing that interests me most is whether the patient is well followed" (GP).*

*"In the medium and long term I would like to know, given that we are talking about management and budget, how much does this type of pathway really lead to an increase and improvement in management of the disease? (GP)*

- Data and indicators on both individual and core care outcomes:
  - Data on health outcomes (relapses (e.g. emergency room access numbers), exacerbations, etc ...)
  - Data on the degree of compliance and adherence of patients to therapies (eg how many visits the patients do, what tests they do, which specialist exams, how often, if they respect the schedule, etc ...).
- Another aspect underlined by several participants is the presence of an appropriate degree of compliance to therapy and lifestyles, which play an important role.

*"Patients must be followed on lifestyles, the role of the nurse in this case is very important because it is the person who sees the patient and his family most frequently: how much the nurses manage to affect this dynamic?"*

*"I would very much like to know, if at the beginning of 2020 there are 20 patients inside the clinical pathway, after one year, after two years how many are still inside? How many have left the clinical pathway? I would like a clear perception of this trend (nurse)*

*"For me it is essential not only to see my piece, but also to share what cardiologists see and think with me and viceversa. If I see something strange during a visit I would like to report it without having to pick up the phone every time, but simply by using a suitable program "(GP)*

- They would then like to receive more qualitative information about the patients' opinion, their satisfaction and perception of the path, how they find themselves, if they are happy to be within the clinical pathway, if they perceived differences, etc ...

*"I would like to to have more general data on how patients feel within this path, if they experienced benefits, and what really comes to the patient from this pathway. "(nurse)*

- Finally, in addition to the issue of adherence, there are some people who do not want to be included in this pathway. The operators would therefore like to know who these people are, what characteristics they have and what are the reasons for not joining. In addition, there is a non-adherence to the pathway even by some GPs and they would like to understand the reasons for this as well.

#### **b) who / how / when would they be returned?**

Professionals believe that it would be useful for the data and information collected to be returned to all professionals involved in the clinical pathway (GPs, cardiologists, nurses, dieticians, etc.).

Data should be returned to everyone in two ways:

- by whom who have managerial responsibilities in the pathway by sending a report. In the report there should be also the possibility to see the data of the other NCP and districts, to have a term of comparison;
- by the NCP coordinator during NCP meetings in which to discuss the data provided together with all the professionals involved.

*"The data must be presented during a meeting for the paper report. It should be useful to start from the reports and then talking about it without the presence of the managers of the clinical pathway. (GP)"*

It would also be important to be able to compare data at the District level with all the actors involved.

*“It may also be useful to share with other NCPs and with the whole District because there may be differences and by comparing them you could find suggestions for growing and improving (nurse)”.*

The frequency suggested by the professionals for these meetings (and therefore also for the reports) is six-monthly as regards to the sending of the report and meetings, while annual for the District meetings.

## *Patients*

### **Main results emerged from the focus group with patients involved in Chronic Heart Failure clinical pathway**

Patients involved in chronic heart failure clinical pathway were asked to share their experiences and their opinion regarding the integrated pathway in which they are involved, highlighting in particular positive aspects, critical issues and possible proposals for improvement.

The main results that emerged are presented below divided by positive aspects, critical issues and proposed improvement actions.

### **Positive aspects**

- Explanation of information in clear and understandable way, allowing patients to understand exactly when they were included in the clinical pathway and for which reason.

*"They explained to me well what was happening, what would happen, because I would have seen the cardiologist less ... at first this worried me but then I realized that maybe it means that I am not too bad"*

- The presence of the nurse who appears to be fundamental for them since the very beginning. The nurse provides information on the pathway and on different aspects (i.e. advice, doubts, reservations, etc..).

*"For me it is an important landmark, they are very kind, they give me all the information and answer all the questions: at the beginning they told me that for any need I can always call and they gave me the number"*

- The definition of a shared care plan for patients based on information not only about the disease, but also about their habits, lifestyles, social conditions, etc.

*"They asked us a bit of everything about our life, about our needs, I was able to talk about everything"*

- Information from the dietician regarding aspects related to nutrition that are considered valuable and fundamental and on which they feel the need for reinforcement (motivational as well as informative).

*"We did it once only in Montecchio all together and it was very useful to put the instructions into practice"*

- The convenience of having all the visits and exams booked by the health personnel without having to go to the booking desk: this makes the path more accessible and less difficult to follow.

*"We don't even have to go to the GP because the nurses make reservations for us right away"*

## Critical issues

With regard to the critical issues, two aspects emerged above all:

- the feeling of being less followed and controlled because the visits with the cardiologist have reduced in intensity. On the one hand, they know that this is due to the fact that their situation is not "very serious" and that the path involves different cadences, but on the other hand they unconsciously have the feeling of being more "neglected" by the specialist.

*"When they told me that I had to go to the cardiologist now only once a year, it almost seemed to me that the LHA wanted to do a spending review".*

- the presence of few nursing staff dedicated to this pathway. Patients claim that they are not always able to satisfy all requests, all the questions, to keep all the patients "monitored", etc ...

*"The nurse is very important but it is also present in other services and does a thousand things, and before there were three while now I only see one ... in my opinion it should have a more central role and could coordinate additional visits or a more personalized pathway"*

- the meetings with the dietician are very infrequent and only with groups of patients

*"We did it once only in Montecchio all together a year ago: it was very useful but he was so far away in time that he got lost but at the time we put it into practice"*

*"The dietician gave me the diet to follow, but I can't follow it. In reality I eat a lot less but I tend to gain a lot of weight, perhaps because I also have diabetes: I don't know how to tell them"*

- the GP is not always involved in the process, it depends a lot on the doctor. For the most part, the points of reference are the cardiologist and the nurse. If the GP is part of the "Casa della Comunità", it is easier for him to be updated and in communication with other professionals. Some patients feel to be poorly followed by the cardiologist because they see him very little.

- Having also other pathologies, the waiting times for other visits do not always match the needs of the pathology: they must therefore contact private clinics, but this is not fair from an economic point of view.

*"I don't just have a heart problem: now I have to have hip surgery and I'm going to be next year, but if I undergo with a payment intervention I'm already there..even if it's the same structure, same people, etc ... I'm not happy with this"*

## Suggestions

As a possible improvement, the patients therefore suggested:

- Greater presence of the nurse or a greater number of nurses present in the clinical pathway. To them, they are reference figures and are a reference point to turn to when they have questions, doubts or any need. They are perceived as the first interlocutor and the constant reference point.
- Greater communication with the figure of the dietician both for individual meetings and for more frequent group meetings.
- To be able to see the cardiologist more or to strengthen the relationship between the cardiologist and the GP.
- To provide for a nursing figure who can "coordinate" visits, checks, etc ... for the various diseases that patients are suffering (not just heart failure), trying to put the patient at the center.

*"If a nurse could connect and put everything together, because we are not only a cardiological patient, we are not 20 years old, we have a number of pathologies... I would like them to put everything in the cauldron with a nurse who had a look at everything together and on the person ... but I know that it is difficult and a lot is already being done today "*

*"The nurse almost replaced the GP who runs out of time, and you go to her and tell everyone".*

- To be able to have greater benefits for disabilities, especially from an economic point of view
- To provide a physiotherapist to be able to give advice when needed

*"Every now and then we have other pains and they are more and more, it would be useful to have advice linked to our problems"*

- To provide the possibility of psychological support when there are various critical conditions that also strongly influence the ability to adhere to therapies and take care of one's illness.

*"The disease itself easily leads to the need for someone who understands what you are going through, in some periods you really need to be supported".*



## *Conclusions*

Numerous valuable information emerged from the FGs with professionals and patients.

There are many data and indicators that professionals would like to include in an audit and feedback intervention. Among the most desirable information, the trend in the number of patients involved in the clinical pathway over time, n. of complications and exacerbations, accesses to the ED and hospitalizations for specific causes are listed to evaluate the effectiveness of this path, the volumes and to be able to bring out the areas in which improvement plans can be envisaged.

Alongside these aspects, information relating to the patient's living conditions or social and family data emerge as important in all the contexts (i.e. if they live in solitude, if they have care givers, the quality of their life,...).

Professionals are also strongly interested in knowing what the degree of compliance of patients is, how much they are able to follow the stages of the pathway, to respect the scheduled visits and the given indications (regarding especially diet and physical activity). They are also interested in knowing the reasons of non adherence to the pathway to understand what the barriers are and how to overcome them. Related to this aspect, the interest in the patient's point of view and his degree of satisfaction emerges in the awareness that what the patient can provide very valuable and informative issues.

Many information useful to improve the management of the clinical pathways were collected regarding the most critical issues. Among them:

- the lack of some professional figures (which also cause an increase in waiting times);
- the lack of a single and shared information system that can be used by all professionals involved in the clinical pathway;
- the lack of communication and exchange of information between the different professionals involved and between the hospital and the territory.

The issue of inequity of access also emerges in almost all territorial situations, albeit for different reasons ranging from the difficulty in reaching the services to the discretion of the operator present, to the lack of adherence to the pathways of some GPs. Regarding the methods of returning information, the need of being involved in the returning of information emerged by professionals involved in the pathways. In some cases, sharing some information also with patients associations was considered useful. The sharing methods proposed are above all team meetings and paper reports to be used as a basis for discussion, as well as shared and searchable databases. On average, the frequency proposed for receiving feedback is semi-annual or annual depending on the methods used (paper report and core meeting every 6 months while district meeting once a year) or on the recipients (once a year with patients while at least every 6 months with professionals).

From patients' point of view, regarding the positive aspects of the considered clinical pathways, patients declare that especially at the beginning of the path (enrollment phase), they have received clear and

understandable explanations and information, having the feeling of being well followed and accompanied. The presence of reference figures (the nurse in some cases, while in others the GP) can help them. Patients declared also that they received clear explanations about the course of the pathology and that they have met friendly, helpful and qualified staff. In addition, almost everyone is satisfied with the organization of the course and the convenience of having all the visits, checks and exams booked by the health staff (for HF), which therefore facilitates their ability to join. Furthermore, the patients felt involved in the therapeutic choices and in the various steps of the process, reinforcing their feeling of having been adequately taken care of. On the other hand, the lack of information received in the following stages of the clinical pathway is considered a critical point, leaving the patients feeling gradually less followed, "controlled" and poorly informed about the progress of their pathology. Moreover, the poor communication and coordination between different professionals from whom they sometimes receive different and uncoordinated information are listed, making it more difficult for patients to join and be compliant to the pathway. The long waiting times between one visit and another and the lack of some figures (i.e. dietician or psychologist or the podiatrist) are also highlighted. For DM they asked for more informative meetings on various topics such as nutrition, lifestyles but also moments of sharing on experiences, advice, etc. between patients up to the proposal to "invent" a diabetic cooking. Furthermore, the participants suggest the possibility of having economic support for expenses and the availability of figures such as the podiatrist in order not to have to resort to private visits that can again raise a question of inequity of access. For HF, patients asked to be able to have shorter waiting times, the more frequent presence of the nurse (considered a very important figure), the presence of other figures such as the physiotherapist, the psychologist, the dietician or to be able to have access to all the documentation relating to the clinical pathway, the possibility of being able to see the cardiologist and to make contact with the GP more frequently.

In conclusion, the results of this research phase highlight critical issues that can be traced back to different levels. At an individual level, the skills of individuals as the ability to communicate and the predisposition for team work strongly emerged and revealed the implications that this aspects can have on health services.

At an organizational level, shared information systems, waiting times, location of services, availability of professional resources can deeply impact the efficacy of clinical pathways.

In the same way, the improvement actions identified also refer both to the level of individual practice and to that of the organization of services, both of which are highly interconnected factors.

Furthermore, the current context, characterized by a demographic, epidemiological and social transition to which the pandemic added, imposes the need for an approach that is not limited to the provision of services aimed only at taking care of the diseases but to operate on the social determinants of health to counteract their onset with a multidisciplinary and multisectoral perspective. To do this, it seems important to identify a set of organizational and assistance elements to support the coordination of activities with a view to horizontal integration. The collaboration, the participation, the sharing of information and objectives among all the protagonists who contribute to the design and implementation of the clinical pathways, in compliance with the specific skills of each, seems to be a determining factor. For future steps, it is recommended to provide a

moment for returning these results with the patients and above all with the professionals involved in the pathways in order to be able to build, with their involvement and their contribution, improvement strategies and audit & feedback systems that can be effective and usable in daily practice.

**Aim 2: To compare different approaches towards the implementation of A&F interventions.**

In Italy, the Ministry of Health launched in 2019 a national research program (EASY-NET), aimed at exploring the worth of A&F interventions, with participating Institutions in seven regions (Lazio, Friuli-Venezia Giulia, Piedmont, Emilia-Romagna, Lombardy, Calabria) conducting projects applying A&F initiatives in different settings (Table 15). In this aim, I describe how those A&F interventions have been designed at a very-early stage, in order to explore to what extent current recommendations on desirable characteristics of an “ideal” A&F procedure are actually adopted.

**Table 15. List of EASYNET regional projects (Work Packages, WPs)**

Region	Project title
Lazio	Comparative evaluation of the effectiveness of Audit and Feedback (A&F) strategies to improve integrated care pathways for chronic conditions
Lazio	Comparative evaluation of the effectiveness of Audit and Feedback (A&F) strategies to improve integrated care pathways for acute conditions
Friuli-Venezia Giulia	Prospective Audit and Feedback Approach: effectiveness in improving clinical care and in reducing avoidable health differences in Emergency
Piedmont	Clustered randomized controlled study - stepped wedge - on the implementation of the ERAS protocol supported by an A&F strategy
Piedmont	Regional Audit on Ovarian Cancer Treatment in Piedmont
Emilia-Romagna	Effectiveness of Audit and Feedback interventions for the improvement of health care in Type 2 Diabetes mellitus and Chronic Heart Failure
Lombardy	Effectiveness of audit and feedback strategies to improve health practice and equity in patients with heart disease
Calabria	Evaluation of the effectiveness of a prospective Audit and Feedback approach to improve health practice and reduce the rate of caesarean sections
Sicily	Effectiveness of a new clinical audit and clinical model as part of a pathway of high reliability in health care

**Materials and methods**

In the framework of the EASY-NET national research program a template was developed with the aim of collecting information on how the different A&F interventions were designed in order to meet the specific needs of each project. The template (Appendix 1) was divided into six sections addressing the following components of the A&F intervention to be developed :

- description of the working group composition (i.e. competencies, skills and clinical and organizational responsibilities represented in the team in charge of designing the A&F intervention);
- targeted clinical behavior(s) (i.e. the clinical behaviour(s) to be changed through the A&F intervention);
- selected indicators and their informative sources;

- the feedback procedures to be adopted (i.e. timing and frequency of the reports, as well as their structure);
- actions (if any) expected from the targeted health professionals (i.e. what health professionals were supposed to do or act on after feedback delivery);
- other intervention(s) if any, to be carried out along with the A&F procedure to sustain / reinforce its impact.

Information gathered through the template was then classified into four main topics (nature of the desired action (i.e. the targeted behaviour), type of data available for feedback, feedback display and feedback delivery), in line with the categorisation used by Brehaut et al. 2016 for their recommendations (Brehaut, Colquhoun et al. 2016)

## **Results**

Overall, nine A&F procedures were available for the analysis, as two regional projects included the design and implementation of two different A&F interventions.

In all the projects, the composition of the team in charge of designing the intervention included clinicians, nurses, epidemiologists, public health professionals and statisticians. Health professionals with organizational and managerial responsibilities in the participating organization were included in 7 initiatives, while experts in Information & Communication Technology (ICT) were included in 4 projects only.

### **Nature of the desired action**

Only in two of the 9 projects the A&F procedure was explicitly aimed at changing a specific, clearly identifiable clinical behaviour, concerning the adoption of ERAS guidelines for the management of patients undergoing surgery and the use of cesarean section for delivery, respectively. In all the other circumstances A&F was generally aimed at stimulating a broad attention to the quality of care provided to specific categories of patients. Consistently, with this relatively untargeted approach, the type of actions that intervention designers expected from the recipients as a consequences of the A&F procedure were equally generic, being reported as “dialogue among colleagues” or “promotion of comparison among peers”. All the projects identified clinicians (GPs and/or specialists) as the recipients of the information. Managers and other professionals with organizational responsibilities were explicitly considered in 8 projects.

### **Nature of the data available for feedback**

In all the projects indicators were drawn from administrative databases. Moreover, in some cases ad hoc data collection was expected, through the use of self-completed questionnaires (1 study) and interviews (2 studies).

Overall, the mean number of process/outcomes indicators considered in the A&F projects was 27 range (9 – 61). Most of them (75%) were process indicators, such as measures of adherence to therapies and to clinical

examinations. Indicators designed to describe the volume of activity (i.e. the number of patients/interventions included in the pathway/study, hospital ward or ED patient stay and their characteristics) were included in all the studies. Outcome measures (i.e. access to ED, hospitalizations, mortality and complications rates) were relatively less considered, being included in 5 projects, and accounting for 25% of the whole number of indicators used.

The comparators, which can be drawn, according to the suggestions, from recipient performance (changes over time), formal guidance or a peer group (mean performance of similar persons or organizations), are identified in all the projects with reference standards drawn from scientific literature or with different territorial realities (i.e. international standards, average regional data, comparison with professionals of the same Primary Care Department, standard derived from national law, International Standard for Equity in Healthcare from HPH).

In 3 projects the provision of feedback was scheduled half yearly, but other frequency are reported: annually (1 project), every 3 months (2 projects), on demand (2 projects). One project did not indicate the feedback frequency.

The reference time varies from 2 months (1 project) to 6 months (2 projects), 12 months (4 projects) in the collected projects. In the other projects the reference time was not explicitly reported.

### **Feedback display and delivery**

All the feedback strategies analysed, according to the different frequency and timelines chosen for each project, allow access to aggregated data (in 2 cases also single data) that can be displayed through graphs and tables, comparable with reference standards drawn from scientific literature or with different territorial realities.

Among the different feedback sending options, the projects mainly focused on the use of web platforms with access credentials (4 projects) or e-mails (2 projects), after sharing the reporting layout with the professionals involved in all the projects. In the other cases workshop or individual meeting were reported. While in 3 initiatives the use of economic incentives to encourage clinicians' participation was mentioned, no additional intervention to be implemented along with the A&F procedure was mentioned in the remaining projects.

### **Discussion**

In this paper, we describe how health care organizations in Italy adopted A&F in the framework of a national program aimed at promoting the diffusion of these quality improvement strategy and assess its impact on quality of care. The information collected through the survey carried out on the 9 regional projects gave us the opportunity to explore how these type of interventions are actually designed when applied in the context of health care organizations.

A few relevant issues emerge from how the A&F interventions were designed in the original version of the regional projects .

The first, concern the specific goal of the intervention itself. According to Brehaut, intervention's designers should recommend actions that are consistent with established goals and priorities. Therefore, these should be explicit, specific, time-bound, recipient-defined, challenging but also attainable, with room for improvement and over which the recipient has control. Moreover, specific rather than general actions should be recommended in order to be more effective. Of course, compliance with these recommendations implies clear identification of a clinical behaviour to be targeted and hopefully changed through the A&F intervention.

However, with a couple of exceptions, in the individual projects considered the goal of the A&F intervention was rather unspecific, aimed at promoting increased attention paid to quality of care in clinical area. In particular, it was assumed that A&F, providing a broad description of the quality of care through a set of indicators, could have a general positive impact offering opportunity for discussion to the multidisciplinary clinical communities involved in the provision of care. In such a context, A&F is implicitly seen more as a "clue" keeping together through the information provided the different clinical stakeholder, than a tool aimed at changing a specific behaviour.

The high number of process and outcomes indicators used in the regional projects described seems to be consistent with this broad, unfocused approach. If the goal is to provide information on the whole patterns of care in a clinical area, rather than changing a targeted behaviour, several indicators are required. Of course this raises a number of issues concerning the extent to which recipients of reports based upon such a high number of indicators could be overwhelmed, rather than guided, by the amount of information received.

As far as indicators are concerned, it is worth noting the almost exclusive reliance on administrative databases. It is well known that administrative database are indeed a valuable tool when it comes at assessing quality of care, however there are relevant dimensions of quality that cannot be fully explored using that source of information only. Assessment of the appropriateness of use of health care interventions requires detailed clinical information on individual patients characteristics typically missing in administrative databases. Reliance on administrative database limits also the timeliness and frequency of the feedback, being the reporting system conditioned on the actual availability of the data.

Overall, such an exclusive reliance on administrative databases is at odd with the extensive penetration of ITC technologies in health care organisations. Electronic medical records, available in all health care settings nowadays, seem to be a tool whose potential is still far from being fully exploited for quality improvement purposes. Electronic medical records are indeed much richer than administrative databases of detailed clinical information on the actual clinical circumstances in which health care interventions have been used, and that information can be made available to recipients much more frequently and timely. The relative underrepresentation in our sample of ICT experts in the teams responsible for the design of the A&F interventions is another indicator pointing out the extent to which this aspect seems to be still overlooked.

When choosing how to show the feedback to the recipients in an A&F intervention, the designers should keep in mind that feedback is more effective if a summary message and a visual display are both included and linked

both conceptually and visually. Moreover, providing feedback in more than one way (for example, combining spoken words and picture) and minimizing extraneous cognitive load (without overly complex information) for feedback recipients can positively affect the efficacy of the intervention.

When deciding on how to deliver a feedback intervention, according to the 15 suggestions, the A&F designers should consider different actions. Among these, addressing barriers to feedback use to reach the intended target, providing short and actionable messages with optional information available for interested recipients, addressing credibility of the information for example with the help of supervisor or colleague, preventing defensive reactions to feedback and constructing feedback through social interaction, rather than passively received, are the actions worth considering. Little correspondance of these suggestions is found in the projects analyzed.

There are of course limits in our account on how health care organization in Italy take up the challenge of designing and implementing audit and feedback interventions. Firstly, we provide a description on how A&F interventions have been conceived and planned at a very early stage. It is reasonable to assume some changes in their structure might occur over time when entering in the actual implementation phase. In addition, these projects are still ongoing, and therefore we do not have yet information on their actual impact on clinical practice. More importantly, while health care organisations from seven regions in North, South and Central Italy are involved in our survey and its findings can be claimed to be representative of the Italian context, the extent to which they can be deemed generalizable to other countries is questionable.

## **Conclusions**

From the description of the projects designed in the different regional contexts involved in the Italian A&F National Program, it is possible to conclude that these interventions are mostly intended as a "generic reminder" to pay attention to quality of care, rather than as a tool aimed at changing specific clinical behaviours, in line with the prevailing research literature and with experts' recommendations. It has to be seen whether this also is a valuable approach to the use of A&F, rather than an inappropriate use of a quality improvement intervention.



### **Aim 3: Development and Implementation of a clinical dashboard for Diabetes Mellitus Type 2 clinical pathway**

#### **Introduction**

Since 2004, a new model of care called integrated care (IC) was introduced in the Local Health Authority-IRCCS of Reggio Emilia for the management of patients with Type 2 Diabetes Mellitus. IC for DM2 patients is a shared care pathway model involving both GPs and Diabetid outpatient Clinic (DC) professionals. The implementation started in 2004 as a pilot project, then was gradually extended to all the districts of the province. Implementation took place over time and across GPs due to organizational and logistical factors and to GPs' and patients' attitudes. From updated data, in the year 2021 13.206 patients of our Province had at least one day of staying in the IC pathway.

The IC model targets low risk T2D patients. The required criteria in brief are good glycaemic control, no rapid insulin, no kidney failure and no diabetes complications. The IC model is consistent with the WHO recommendations regarding the management of chronic diseases and the care plan is defined according also to regional guidelines criteria. It envisages visit every two years at the DC, as well as quarterly check-ups performed by a GP. Participation in IC is voluntary for both patients and physicians. (Ballotari, Venturelli et al. 2018, Ballotari, Venturelli et al. 2019)

The development and implementation of this pathway requires a strong clinical and managerial responsibility in constantly monitoring the processes and results of care.

#### **Audit & Feedback" (A&F) intervention**

The "Audit & Feedback" (A&F) interventions allow the measurement and comparison of a specific clinical practice and its outcomes with professional standards or objectives. Being able to provide healthcare professionals with structured reports capable of highlighting relevant dimensions of care can stimulate quality improvement.

#### **Informative needs and communication among professionals**

In our LHA, focus groups were conducted to explore the informative needs of the operators involved in the IC for the monitoring of patients included in the DM2 pathway and to investigate the dynamics that regulate hospital-territory continuity of care in our territory. The intervention is more detailed in Aim 1.

From the conclusions emerged from the FGs, the need of improving ways of communication has emerged as one of the most important issue. Among the different facets of the term communication, in this case the most

proper meaning of the issue concerns the condivision of data or “data sharing”. Ameliorating data sharing among the different figures involved in the managemement of a chronic disesase can be important to facilitate the management of patients and to improve the quality of care.

In this section, the design, development and implementation of an extensible clinical dashboard framework for DM2 IC pathway is detailed.

## **Matherials and methods**

### **Working group composition**

Different professional figures were included in the working group encharged of the project. The components were selected among different Department of the Local Health Authority (LHA)-IRCCS of Reggio Emilia (Department of Primary Care, Clinical Governance Unit, Information and Technology Department). Representatives of local GP were also included. The professional role included were: physicians, nurses, statisticians, IT technicians and engineers. Following the creation of the multidisciplinary working group coordinated by the Department of Primary Care of the AUSL-IRCCS of Reggio Emilia and by the Clinical Government together with the "EASYNET network program", the protocol for the development of a clinical dashboard was developed.

### **Elements of the intervention**

The working group had to define the elements of the intervention. The article “Practice Feedback Interventions: 15 Suggestions for Optimizing Effectiveness” was considered as an initial guidance to better define the main elements. In the following figures, the 15 suggestions are represented with examples of implementation strategy. (Brehaut, Colquhoun et al. 2016)

**Figure 1 . 15 suggestions for Designers of Practice Feedback (Brehaut, Colquhoun et al. 2016)**

**Table. 15 Suggestions for Designers of Practice Feedback and Examples of Implementation Strategies**

Suggestion for Designers of Practice Feedback	Examples of Implementation Strategy
<b>Nature of the desired action</b>	
1. Recommend actions that are consistent with established goals and priorities	Consider feedback interventions that are consistent with existing priorities, investigate perceived need and salience of actions before providing feedback
2. Recommend actions that can improve and are under the recipient's control	Measure baseline performance before providing feedback, establish that the action is under the recipient's control
3. Recommend specific actions	Include functionality for corrective actions along with feedback, require recipient-generated if-then plans to overcome barriers to target action
<b>Nature of the data available for feedback</b>	
4. Provide multiple instances of feedback	Replace one-off feedback with regular feedback
5. Provide feedback as soon as possible and at a frequency informed by the number of new patient cases	Increase frequency/decrease interval of feedback for outcomes with many patient cases
6. Provide individual rather than general data	Provide practitioner-specific rather than hospital-specific data
7. Choose comparators that reinforce desired behavior change	Choose 1 comparator rather than several
<b>Feedback display</b>	
8. Closely link the visual display and summary message	Put summary message in close proximity to the graphical or numerical data supporting it
9. Provide feedback in more than 1 way	Present key messages textually and numerically, provide graphic elements that mirror key recommendations
10. Minimize extraneous cognitive load for feedback recipients	Eliminate unnecessary 3-dimensional graphical elements, increase white space, clarify instructions, target fewer outcomes
<b>Delivering the feedback intervention</b>	
11. Address barriers to feedback use	Assess barriers before feedback provision, incorporate feedback into care pathway rather than providing it outside of care
12. Provide short, actionable messages followed by optional detail	Put key messages/variables on front page, make additional detail available for users to explore
13. Address credibility of the information	Ensure that feedback comes from a trusted local champion or colleague rather than the research team, increase transparency of data sources, disclose conflicts of interest
14. Prevent defensive reactions to feedback	Guide reflection, include positive messaging along with negative, conduct "feedforward" discussions
15. Construct feedback through social interaction	Encourage self-assessment around target behaviors before receiving feedback, allow user to respond to feedback, engage in dialogue with peers as feedback is provided, engage in facilitated conversations/coaching about the feedback

- **Development of the characteristics of the clinical dashboard**

The main aim of the project was to provide the most useful information to professionals involved in clinical activities with patients enrolled in the IC DM2 pathway. Among the possible display options (e-mail, paper report, presentation of data during meetings, dynamic clinical dashboard), the working group considered the clinical dashboard as the most suitable way to provide them reliable information, with access to updated data.

Moreover, according to the different professionals role included with various role in the pathway, one visualization was not considered suitable enough for the purpose. The working group therefore decided to develop different types of reports due to the different information needs emerged. The structuring of the clinical dashboard was divided into different display options (reports). The visualisation of individual or aggregated data was considered according to the different use of the reports.

The aggregation level took into account the various level of aggregation for possible benchmarking. In our LHA the levels considered were:

-Local Health Authority of Reggio Emilia

- Districts (Reggio Emilia, Guastalla, Correggio, Montecchio Emilia, Scandiano, Castelnovo ne' Monti)
- Nucleus of Primary Care (NCP)
- Single GPs.

- **Definition of the recipients of the intervention**

The clinical figures involved in the management and care of patients in the Integrated Care Pathway of the LHA of Reggio Emilia are presented in Table 16. These professionals were selected as the recipients of the intervention. The provision of selected data through the use of electronic reports was the chosen way of communication. This was made possible because all of the recipients (including GPs who are not dependent personnel) have access to the intranet.

**Table 16 . Professionals included in the IC care pathways for Type 2 Diabetes patients in the Local Health Authority of Reggio Emilia.**

<b>Professionals included in the IC care pathways for Type 2 Diabetes patients in the Local Health Authority of Reggio Emilia.</b>
GPs working in the Province of Reggio Emilia and nurses working with them
Diabetologists, Nurses, Dieticians, Podiatrists, Psychologists
Epidemiology service
Primary Care department
ITS

- **Selection of the information to be included in the clinical dashboard**

The results of the FGs conducted between groups of professionals and patients involved in the DM2 clinical pathway were analysed and discussed, in order to collect useful information for the structuring of the A&F intervention. Therefore, the working group considered these results, as well the roles and responsibilities of the pathway. The protocols currently in use at the LHA of Reggio Emilia declines in detail the roles and responsibilities of each professional in every step of the pathway. Moreover, other information derived from the experience of the DM2 clinical pathway already implemented in the LHA of Reggio Emilia and from the available data sources were collected. The working group discussed the available information through a series of meetings (online and in person) which lead to the definition of a list of indicators (process and outcomes indicators).

- **Indicators**

The working group carried out a review of the indicators already present in the IC DM2 protocol, by selectioning and adding indicators according to the informative needs emerged from the FG.

The selected indicators are represented in Table 17.

**Table 17 . Selected indicators and description**

<b>Indicators</b>	<b>Description</b>
Prevalence of patients in DM2 CP (clinical pathway)	N. of patients in charge in the DM2 CP in the selected period
New patients enrolled in the DM2 CP (clinical pathway) (incidence)	N. of new patients enrolled in in the DM2 CP in the selected period
Percentage of new patients enrolled in DM2 CP (clinical pathway) in the selected year out of the total of patients in the DM2 CP	Percentage of new patients enrolled in DM2 CP (clinical pathway) in the selected year/ out of the total of patients in the DM2 CP
Drop-out	Percentage of patients who left the course (excluding deceased) in the reference period out of the total number of patients in DM2 CP
Deaths	Percentage of patients who died in the reference period out of the total number of patients in the DM2 CP
HbA1c request	Percentage of patients who have at least 2 HbA1c dosages at least 3 months apart in the reference period
Inappropriate HbA1c request	Percentage of patients having 2 doses of HbA1c after less than 3 months in the reporting period
Request for MAU test	Percentage of patients with at least 1 microalbumin urine dosage in the reference period
Creatinine demand	Percentage of patients with at least 1 creatinine dosage in the reference period
Lipid profile request	Percentage of patients of patients who dosed at least 3 of total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides in the reference period. Note: For the correct prescription of the lipid profile it is sufficient to perform the dosage of 3 tests between total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides, as the fourth value can be calculated with a formula
ECG request	Percentage of patients who had at least 1 ECG in the reference period (Source SDC)
Fundus oculi request	Percentage of patients who performed at least 1 fundus oculi examination in the 24 months prior to the end date of the reference period
Follow-up visit at the DC	Percentage of patients who had at least 1 visit at the DC department in the 24 months prior to the end date of the reference period
Adherence to CP (laboratory tests)	Percentage of patients who have performed at least 1 dose of all the laboratory tests required by the CP in the reference period (HbA1c, MAU, Creatinine and lipid profile)
Adherence to instrumental examinations	Percentage of patients who had ECGs in the reporting period and a FOO in the 24 months prior to the end date of the reporting period
<b>Outcome indicators</b>	
HbA1c in range	Percentage of patients with mean HbA1c in range * over the reporting period. * range: mean HbA1c $\leq 7\%$ ( $\leq 53$ mmol / mol) in patients $< 75$ years of age; Mean HbA1c $\leq 8\%$ ( $\leq 64$ mmol / mol) in patients $\geq 75$ years of age

Creatinine in range	% of patients with mean creatinine in range ** in the reference period
Patient adequately followed	Percentage of patients who have performed all the laboratory and instrumental tests required by the CP protocol, who have performed a DC visit in the last 24 months and who have mean HbA1c values in range (

- **Data handling**

Various biomedical and healthcare data, including disease and procedure indexes, were included. The data sources were clinical and administrative database. For diabetes, on Smart Digital Clinic (SDC), the IT application use by diabetologist, the patient's entry or exit from the GI is highlighted by a flag, with the relative activation / deactivation date. The enrollement of patients refer to these dates. There will therefore be patients with an entry date and an exit date and others with an entry date only (which means they are still in IC). The extraction in the reference period include all patients who have at least one day of presence in the IC in that period.

## **Results**

In 2022, a reporting system was made available on the intranet of the LHA-IRCCS of Reggio Emilia. The working group had identified the process and outcome indicators, the related information sources available, the methods of viewing and accessing the data, providing different types of dynamic reports responding to the various informative needs (clinical, organizational, management).

### **Access to data**

The access to LHA intranet is regulated by credentials available for dependent personnels and GPs of the Province of Reggio Emilia. The visualisation of the reports is regulated by further authorizations. Different types of reports have been developed, depending on the type of use (clinical, organizational management). All professionals involved in the management of the IC for DM2 of the AUSL-IRCCS of Reggio Emilia have been enabled to have access to selected reports.

The use of the dashboard allows the display of individual or aggregated data at different levels (LHA, District, NCP, GP) depending on the type of report.

### **Reports visualisation**

A set of reports was created on the IT application of the LHA "Report Manager". Following the different informative needs of the recipients identified, three types of electronic health reports were identified. The reports will allow the monitoring of patients in IC, integrating parameters of incidence and prevalence, dates and values of laboratory tests, and execution of instrumental tests.

The selected reports are:

- one Dashboard of Indicators, with description, value, numerator and denominator and values for different levels of aggregation for each indicator;
- one Report for GPs, in which each General Practitioner can extract the updated list of its patients in IC. Moreover, for each patient, data of admission in IC and data and value of the laboratory or instrumental tests are included.
- one Raw Data Table, accessible only to those who analyze the data.

**Table 18. Type of reports selected**

<b>Report</b>	<b>Recipients</b>	<b>Content</b>	<b>Aggregated/individual data</b>
GP's report	GPs, chronicity nurses	Updated list of patients in IC, data of admission in IC, data and values of the laboratory or instrumental tests required by the IC	Individual data
Pathway Dashboard	GPs, diabetologists, physicians of the Primary Care department involved in the management of the clinical pathways, chronicity nurses	Selected indicators Levels: LHA, district, NCP (nucleus of Primary Care), GPs	Aggregated data
Raw Data Table	Statisticians, physicians of the Primary Care department involved in the management of the clinical pathways	Raw data used for the calculation of the indicators	Individual data

### **GP's report**

This report provide an updated list of the patients enrolled in IC for each GPs. Every GP is allowed to the visualisation of its patients. The report includes all the patients who, during the reference period, have at least one day of presence in the IC on the application dedicated. Individual data are visible, each line is dedicated to one patient. All the GPs involved in the IC at the provincial level can, through the reports, consult at any time the updated list of patients, with entry/exit date, their set of clinical and laboratory tests (eg. HbA1c, recourse to visits or exams) and the available indicators (eg . ED accesses, hospitalizations), allowing comparison with the results of other provincial realities (districts, NPCs).



Figure 2 . GP's report visualisation

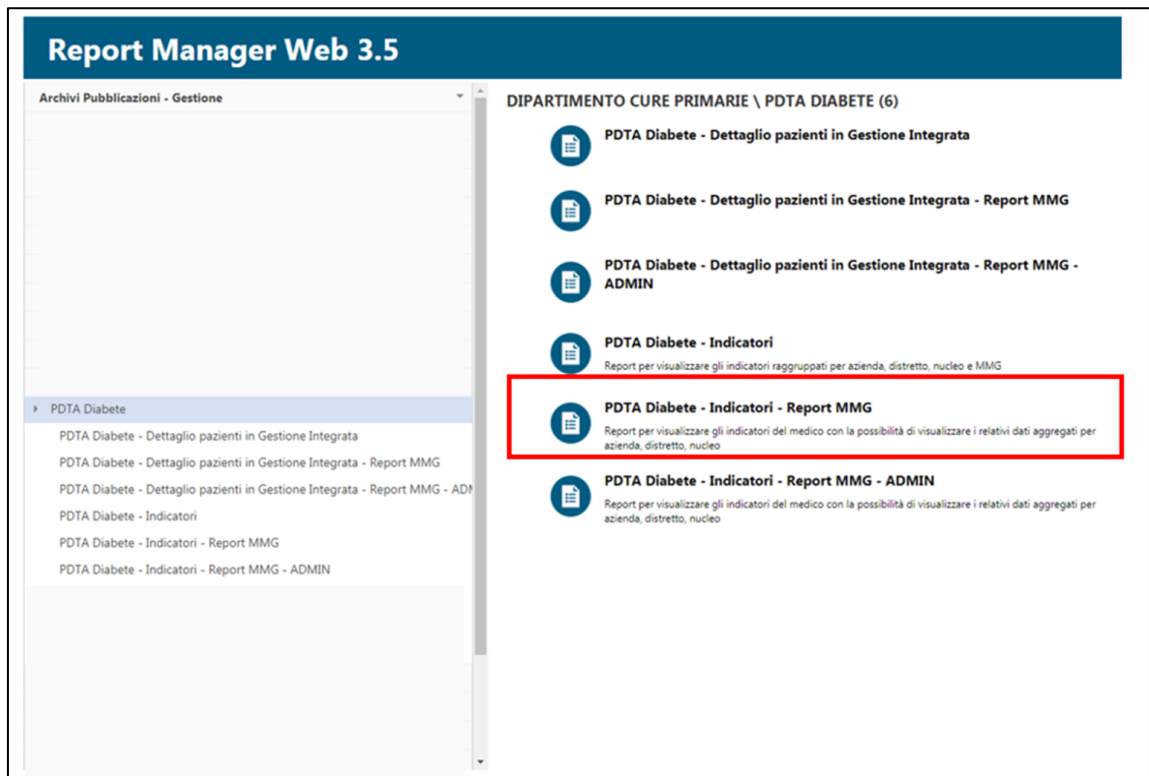


Figure 3. GP's report visualisation

**PDTO Diabete - Dettaglio pazienti in Gestione Integrata - Report MMG - ADMIN**

Da: (DataInizio) >= 01/01/2022  
 A: (DataFine + 1GG) < 01/03/2022  
 Utente - Inserire Login Medico Per Simulazione Report (Es. OSPEDALE|Pincop) = [REDACTED]

Nome	Cognome	CodFiscale	DataNascita	DataInizioGI	DataFineGI	DataDecesso	Distretto	NUCLEO	DataInizioMMG	DataFineMMG
			15/07/1942 00:00	12/10/2010 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	02/11/2017 00:00	
			28/06/1951 00:00	18/01/2022 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	13/11/2017 00:00	
			11/07/1941 00:00	26/03/2019 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			02/05/1940 00:00	13/06/2013 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	18/11/2017 00:00	
			20/04/1940 00:00	30/09/2014 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			27/08/1948 00:00	17/03/2017 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			14/02/1969 00:00	05/10/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	14/11/2017 00:00	
			29/06/1943 00:00	08/06/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	10/11/2017 00:00	
			04/06/1960 00:00	27/01/2012 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	04/03/2019 00:00	
			10/12/1973 00:00	06/07/2018 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	09/02/2018 00:00	
			24/07/1939 00:00	07/03/2019 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	10/11/2017 00:00	
			16/04/1946 00:00	17/06/2008 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	14/11/2017 00:00	
			28/11/1942 00:00	12/12/2014 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	18/11/2017 00:00	
			09/12/1941 00:00	23/04/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			29/02/1944 00:00	02/09/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	02/11/2017 00:00	
			11/03/1937 00:00	10/06/2016 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	02/11/2017 00:00	
			08/07/1929 00:00	10/12/2010 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			12/06/1932 00:00	14/06/2012 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			18/06/1947 00:00	23/11/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	13/11/2017 00:00	
			26/10/1973 00:00	13/06/2020 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	02/11/2017 00:00	
			14/08/1962 00:00	12/10/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	13/11/2017 00:00	
			24/10/1949 00:00	01/09/2010 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	10/11/2017 00:00	
			03/06/1946 00:00	09/10/2015 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			10/04/1941 00:00	17/07/2014 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	10/11/2017 00:00	
			14/08/1954 00:00	09/07/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	06/11/2017 00:00	
			29/02/1956 00:00	22/09/2011 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	02/11/2017 00:00	
			14/11/1938 00:00	16/04/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			09/02/1943 00:00	24/07/2009 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	11/05/2020 00:00	
			16/12/1946 00:00	16/04/2010 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	26/01/2018 00:00	
			29/11/1934 00:00	21/04/2009 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			13/08/1932 00:00	13/07/2015 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			22/05/1954 00:00	02/09/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	17/11/2017 00:00	
			02/03/1956 00:00	14/07/2015 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			17/02/1950 00:00	18/08/2015 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			06/06/1951 00:00	02/01/2009 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	13/11/2017 00:00	
			31/01/1950 00:00	26/06/2020 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			28/03/1944 00:00	16/12/2008 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			26/04/1961 00:00	07/02/2020 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	10/11/2017 00:00	
			25/11/1943 00:00	16/03/2012 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	11/03/2019 00:00	
			02/01/1938 00:00	15/09/2009 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			29/10/1952 00:00	01/09/2020 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			26/11/1944 00:00	16/01/2009 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	17/11/2017 00:00	
			18/04/1967 00:00	26/10/2021 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			07/02/1927 00:00	24/04/2009 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	
			21/02/1937 00:00	23/09/2009 00:00			9	2 - 7 - ALBINEA VEZZANO S/CROSTOLO QUATTRO CASTELLA	01/11/2017 00:00	

Tot. Records: 45

## **Pathway Clinical Dashboard**

The report is a dynamic dashboard with various degree of data aggregation. The authorized profiles are GPs, diabetologists, physicians of the Primary Care Department of the LHA of Reggio Emilia involved in the management of the clinical pathways, chronicity nurses.

The indicators (presented in Table 17 “Selected indicators and description”) are represented for:

- Local Health Authority of Reggio Emilia
- Districts (Reggio Emilia, Guastalla, Correggio, Montecchio Emilia, Scandiano, Castelnovo ne’ Monti)
- Nucleus of Primary Care (NCP)
- Single GP.

At every level, it is possible to “explode” the details regarding the lower level of data aggregation. At first, the table shows the value of indicators (aggregated data) for the LHA, then data are available for all the six Districts composing the LHA. For each District, data are presented for each NPC composing the District. Finally, in each NPC the values for each GP are presented.

At last, exploding the GP’s list of patients is possible to see an updated list of the patients enrolled in IC. Individual data are visible, each line is dedicated to one patient. Every GP is allowed to the visualisation of individual data only for its patients. The report includes all patients who, during the reference period, have at least one day of presence in the IC on the application dedicated.

All the GPs involved in the IC at the provincial level can, through the reports, consult at any time the updated list of patients, with entry / exit date, their set of clinical and laboratory tests (eg. HbA1c, recourse to visits or exams) and the available indicators (eg. PS accesses, hospitalizations), allowing comparison with the results of other provincial realities (districts, NPCs), as reported in the following Figures.

Figure 4. Pathway CLinical Dashboard visualisation

AUSL RE		Prevalenza pz in GI	Nuovi pz arruolati	Incidenza	Pazienti Usciti dal percorso	Drop-out	Pazienti Deceduti	Decessi	Pazienti con 2 HbA1c a distanza di almeno 3 mesi	Pazienti seguiti per l'intero periodo di riferimento	Pazienti con 2 HbA1c a distanza di almeno 3 mesi
		% pz con almeno un giorno in GI nel periodo di riferimento	% pz entrati nel percorso nel periodo di riferimento	% pz arruolati nel periodo di riferimento sul totale dei pz in GI	Numero di pazienti usciti dal percorso esclusi i deceduti	% di pazienti usciti dal percorso (esclusi i deceduti) sul totale dei pazienti in GI	Numero di pazienti deceduti nel periodo di riferimento	% di pazienti usciti deceduti sul totale dei pazienti in GI	Numero di pazienti con almeno 2 dosaggi di HbA1c a distanza di almeno 3 mesi	Numero di pazienti in GI seguiti per l'intero periodo di riferimento	% di dose di riferimento
		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6
CASTELNOVO NE MONTI		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6
CORREGGIO		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6
4 - 1 - CORREGGIO S.MARTINO IN RIO		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6
4 - 2 - CAMPAGNOLA FABBRICO RIO SALICETO ROLO		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6
GUASTALLA		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6
MONTECCHIO EMILIA		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6
REGGIO EMILIA		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5	DEN 5	IND 6

Figure 5. Pathway CLinical Dashboard visualisation

AUSL RE		Prevalenza pz in GI	Nuovi pz arruolati	Incidenza	Pazienti Usciti dal percorso	Drop-out	Pazienti Deceduti	Decessi	Pazienti con 2 HbA1c a distanza di almeno 3 mesi
		% pz con almeno un giorno in GI nel periodo di riferimento	% pz entrati nel percorso nel periodo di riferimento	% pz arruolati nel periodo di riferimento sul totale dei pz in GI	Numero di pazienti usciti dal percorso esclusi i deceduti	% di pazienti usciti dal percorso (esclusi i deceduti) sul totale dei pazienti in GI	Numero di pazienti deceduti nel periodo di riferimento	% di pazienti usciti deceduti sul totale dei pazienti in GI	Numero di pazienti con almeno 2 dosaggi di HbA1c a distanza di almeno 3 mesi
		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5
CASTELNOVO NE MONTI		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5
CORREGGIO		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5
4 - 1 - CORREGGIO S.MARTINO IN RIO		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5
4 - 2 - CAMPAGNOLA FABBRICO RIO SALICETO ROLO		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5
GUASTALLA		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5
MONTECCHIO EMILIA		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5
REGGIO EMILIA		IND 1	NUR1 2	IND 2	NUR1 3	IND 3	NUR1 4	IND 4	NUR1 5

Raw Data Table

The report provide Raw data used for the calculation of the indicators. The recipients are Statisticians, physicians of the Primary Care department involved in the management of the clinical pathways.

**Reference period**

For each type of report, the users need to type in the reference period the reference period from which they want to extract the data. They can choose shorter periods (for example: a quarter), longer (for example: 3 years) or for specific periods, according to their informative need (for example, a picture of the current situation can be selected or a comparison).

**Presentation to the recipients**

The methods of accessing and consulting the reporting system were subsequently presented to all interested operators through interactive webinars and in person meetings. Moreover, a guide to the use of the dashboard was developed and made available on the intranet in the Primary Care section. The meetings were also the occasion to discuss with the personnel involved the implemented Clinical Dashboard. Periodic meeting are scheduled to discuss the data.

## Conclusions

In the context of the general efforts to improve quality of care, a great deal of attention is currently paid nationally and internationally both on the implementation of chronic diseases clinical pathways and on the potential of A&F interventions able to drive health professionals to the adoption of effective and appropriate patterns of care. (World Health Organization. Regional Office for Europe 2010, Boyce, Browne et al. 2014) The development of a clinical dashboard can provide real-time snapshot of the patients involved in the IC pathway. Various experience of development of clinical dashboards has been reported in literature, with different solutions in presenting the results (Tuti, Nzinga et al. 2017, Khairat, Dukkupati et al. 2018, Kidd, Liu et al. 2022). A recent scoping review mapped 18 dashboards from 8 countries developed to support clinicians on reflecting on their practice based on routinely collected clinical indicator data. A diversity in the design of the dashboards and the evaluation emerged, as well as a lack of interface features to support clinicians. (Bucalon, Shaw et al. 2022)

The GI model of assistance in the Province of Reggio Emilia has been active since 2004 in some districts and in all the Province from 2005-2006. (Ballotari, Venturelli et al. 2018, Ballotari, Venturelli et al. 2019) The number of patients has progressively increased, reaching a total of 13,206 patients in IC as of 31/12/2021.

The development and implementation of clinical pathways requires the involvement of different health professionals (physicians and nurses, specialists both in and out the hospital and general practitioners) located in different settings of the territory. This dislocation and the variety of actors and actions demand strong clinical as well as managerial responsibility in constantly monitoring processes and outcomes of care. Thus, providing those responsible for the organisation and management of clinical pathways with timely and exhaustive information on relevant dimensions of the quality of care delivered is of utmost importance.

The focus groups conducted in our Province with professionals and patients helped to shed some light on the needs and the criticalities of the two considered pathways. From the perception and the experience of the healthcare personnel and of the people concerned by the disease (patients and their carers), informative and communication needs emerged as one of the most critical issues.

Trying to give an answer to this expressed need, the audit and feedback intervention has been structured taking into account the suggestions emerged.

Providing to GPs, diabetologists, cardiologists, “chronicity nurses”, physicians with managerial roles and other professional figures involved the updated list of patients in the care pathway and their clinical data, as well as indicators useful for their activities, with possible benchmarking with other colleagues, can facilitate the information sharing. This is required to provide an adequate provision of services distributed in different settings. In this work, we presented a feasible model for implementing audit and feedback intervention and to enhance the continuity of care in the field of chronic diseases.

Regarding our work, a main limitation is the lack of data to evaluate the impact of the dashboard visualisation on the quality of care, due to the recent start of the project. Future development of the project will include the evaluation of the impact of dashboards for diabetes and chronic heart failure on patients outcome. Moreover, the need to find data visualisation for patients involved in more than a clinical pathway is of great importance and will be explored.

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## **Easy Net**

# **Informazioni sulla progettazione degli interventi di audit&feedback**

**Informazioni sulla progettazione degli interventi di audit&feedback**

## **Sezione 1**

### **La composizione del team di progetto**



## **Sezione 2**

### **I principali comportamenti clinici su cui si interviene**

*In generale, si ritiene che le informazioni messe a disposizione attraverso un sistema di A&F possano influenzare un comportamento professionale e/o organizzativo, inducendo a cambiare. A questo proposito, è utile conoscere quale sia lo specifico comportamento che nell'ambito della vostra iniziativa intendete influenzare. Vi chiediamo di descriverlo in modo sintetico, ma sufficientemente esaustivo, in modo da rendere possibile comprendere quali decisioni/azioni cliniche e/o organizzative siano oggetto del vostro intervento. Nel caso ve ne fossero di molteplici, vi chiediamo di riportare quelli che ritenete più importanti (non più di tre).*

**Comportamento clinico-organizzativo 1**

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**Comportamento clinico-organizzativo 2**

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**Comportamento clinico-organizzativo 3**

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## **Sezione 3**

**Con quali indicatori ?**



Riportate gli indicatori che utilizzate, la fonte informativa da cui sono derivati, se sono rappresentati in forma comparativa (vale a dire se chi li riceve ha modo di confrontare la propria performance con quella di altri), se quest'ultima prevede un aggiustamento statistico per possibili confondenti e, infine, se viene esplicitato uno standard di riferimento

<b>Indicatore</b>	<b>Fonte informativa</b>	<b>In forma comparativa</b>	<b>Aggiustamento statistico</b>	<b>Standard di riferimento</b>
1		No SI	No SI	No SI
2		No SI	No SI	No SI
3		No SI	No SI	No SI
4		No SI	No SI	No SI
5		No SI	No SI	No SI
6		No SI	No SI	No SI
7		No SI	No SI	No SI
8		No SI	No SI	No SI
9		No SI	No SI	No SI
10		No SI	No SI	No SI

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## **Sezione 4**

**A chi è rivolto l'intervento ?**



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## **Sezione 5**

**Come ? (le caratteristiche della reportistica)**

Riportate se seguenti caratteristiche della reportistica che utilizzate

- Le informazioni contenute nella reportistica fanno/faranno riferimento a:
  - Dati di singoli pazienti
  - Dati aggregati
  - Entrambi
- Come è strutturata la reportistica? Sono presenti elementi grafici (tabelle, grafici)?
- Sono esplicitati comportamenti specifici che si intendono cambiare? Sono suggeriti interventi correttivi alla restituzione del feedback?
- E' previsto nella reportistica l'inserimento di standard di riferimento con cui confrontarsi? Se sì, quale?
- L'impostazione è stata condivisa con i professionisti?

***Modalità di restituzione/invio della reportistica***

- Quali sono le tempistiche di invio della reportistica previste? (con che frequenza viene fornita ?)
- Quale/i modalità di invio della reportistica sono state scelte/i?

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## **Sezione 6**

### **Azioni conseguenti**

Un sistema di audit&feedback può anche prevedere in modo esplicito ai suoi destinatari di intraprendere specifiche azioni sulla base della reportistica fornita. Ad esempio, indicare di organizzare ambiti di confronto e discussione con i colleghi . Alternativamente, l'invito può essere "implicito", non formalizzato in alcun modo, lasciando alla disponibilità/sensibilità dei soggetti coinvolti la decisione sul se e come attivarsi.

Nel caso aveste invece previsto azioni specifiche conseguenti alla messa a disposizione dei report, vi chiediamo di riportarle di seguito, in modo sintetico, ma sufficiente a comprendere chi dovrebbe fare cosa.

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## **Sezione 7**

### **Interventi ulteriori**



Un sistema di audit&feedback può essere accompagnato/integrato da altri interventi rivolti ai suoi destinatari, ritenendo che concorrano a promuovere il cambiamento desiderato. Ad esempio, iniziative di formazione sui temi/problemi di interesse, sistemi di incentivazione/penalizzazione, ecc.

Se nel vostro caso ve ne sono, vi chiediamo di riportarli di seguito

Formazione/ educazione    /\_\_/ NO    /\_\_/ Si

Se si specificare

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Sistema premiante/incentivazione    /\_\_/ NO    /\_\_/ Si

Se si specificare

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Penalizzazione/disincentivazione    /\_\_/ NO    /\_\_/ Si

Se si specificare

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Altri interventi    /\_\_/ NO    /\_\_/ Si

Se si specificare

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