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## Background Paper

# Patient safety and the control of time in primary care: A review of the French tempos framework by the LINNEAUS collaboration on patient safety in primary care

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### KEY MESSAGE:

- The 'tempos' framework specifies five timescales—patient, doctor, office, disease, and system—for analysis of errors and adverse events.
- It complements existing classifications on patient safety and is intuitive and easy to use.
- Further research is required before it can be more widely used.

### ABSTRACT

**Background:** The tempos framework provides GPs with a flexible and practical guide to reflect on their organization and practices in the analysis of adverse events and supplement existing classification systems. The tempos framework specifies five timescales that need to be managed by physicians: the disease's tempo (unexpected rapid changes, slow reaction to treatment); the office's tempo (day-to-day agenda and interruptions); the patient's tempo (time to express symptoms, compliance, and emotion); the system's tempo (time for appointments, exams, and feedback); and the time to access to knowledge.

**Objective:** This paper reviews the tempos framework and two studies that underpin its conceptual development.

**Methods:** Two databases were used.

**Results:** The use of the framework as a mechanism for analysing insurance claims is described. A comparison of using the tempos framework and standard patient safety classifications for analysing insurance claims is also described and showed that the concordance among coders was better for the tempos framework. The tempos framework fits closely with key principles of general practice and has potentially high relevance for analysing a patient's journey and continuity of care. The tempos framework seems most useful for GPs when analysing adverse events in their practice.

**Conclusion:** Further work needs to be done to assess its generalizability and to formally assess its validity and reliability.

**Keywords:** Time management, patient safety, primary care, LINNEAUS collaboration

### INTRODUCTION

The LINNEAUS Euro-PC project has enhanced thinking and debate on patient safety in primary care. Among other things, it has provided a classification system for patient safety incidents in general practice (1). Whilst this classification system is useful for analysis, it requires extensive training and time, which may not be feasible for physicians working in busy daily practice settings. There is a need for a complementary guide for analysing incidents, which is

intuitively logical for general practitioners, convenient to use, and focused on adapting organization or practice routines. The ALARM protocol for analysing incidents in hospitals is an example of such a guide (2).

The aim of this paper is to present the development and content of the tempos framework, which was tested in general practice in France. We will first elaborate a framework for time in relation to patient safety in general practice.

*Time control as a central focus in the analysis of errors*

In industry, particularly in the aviation and nuclear industry, time control is considered a major contributor to the success or failure of patient safety initiatives (3–5). The teams of workers and managers are trained to take the role of time into account and recommendations have been developed within these organizations to enhance control of time. In the industrial literature, especially in aviation, management by anticipation of events is well known and is considered essential for process control and effective safety. The operator must be able to effectively master situations with different timescales. There is never only one time to manage, but many, each with a specific clock (time of the process, time of interruptions for competitive tasks, time of costumers, time of maintenance, etc.) (6). Each of these time management practices must fit its objective, but at the same time the different practices are related. Deadlines and milestones are often used to coordinate activities, which involve multiple tasks and individuals.

In contrast to industry, hardly any research has been conducted in primary care (and probably healthcare generally) to clarify the role of time as a main input for the analysis of errors or adverse events even though there are many similarities in terms of how time is construed and used. For medical care, the disease is the process to control and the various times to manage this process are both key tools for success and sources of errors. For example, in the clinical setting, time does not run in the same manner depending on what people do and most GPs will be comfortable with the notion of

using parallel timescales to perform their professional tasks.

The importance of time has been recognized for a long time in academic general practice and, for instance, led to the development of the concept ‘episode of care’. Time is obviously at the heart of delayed diagnosis (7,8). For example, some diseases have a rapid progression so that the physician’s attempt to diagnose and manage the condition may be limited; in contrast, other diseases are so slow in their evolution so that time transforms symptoms into familiar routines and leads to delays in diagnoses. Alternatively, time induces changes and a problem encountered at one given time will not be the same at any other point in time. Taking more time may solve many health problems in general practice, because many of these have a favourable outcome, regardless of the diagnosis or intervention. In a significant number of cases, the best way to deal with a situation is just to monitor its development and refrain from clinical interventions.

Time is also central to the physician’s routines and practice management (9–11). For example, GPs must simultaneously manage time to listen to patient’s concerns with empathy, and sort out the problems, which have priority or need attention. The coordination of tests, further investigations and appointments are also time dependent and raise issues related to patient safety. Medical work is often subject to interruptions and may thus distract the GP. In addition, increasingly a patient care team rather than a specific GP is involved in an episode of patient care and can compromise continuity of care

Box 1. A description of the tempos framework with examples of practical situations that relate to specific dimensions of the framework.

1. Disease’s tempo
  - a. Misleading pathology moving faster or slower than standard pathology of the same category.
  - b. Misleading therapeutic action, too slow, not efficient. Unfounded reassurance given to the patient on the basis of standard evolution.
  - c. Poor explanations/instructions given to the patient and relatives on what should occur, when, what makes an alerting pattern, and what to do.
2. Doctor’s tempo
  - a. Experiencing difficulties in accessing the right knowledge at the right time, due to misleading symptoms, fatigue, pressure, interruptions and more.
  - b. Technique required for medical act not applied with all usual rigor, due to poor practice, interruptions, fatigue, and more.
  - c. Medical case not detected as going beyond doctor’s competencies.
3. Office’s tempo
  - a. Excessively busy diaries, time pressure.
  - b. Interruptions managements, telephone, patients, secretary, and more.
  - c. Incomplete traceability of medical data, rushed medical history, writing style limited to the minimum.
4. Patient’s tempo
  - a. Failing to reveal symptoms, minimizing, or postponing the expression.
  - b. Poor doctor–patient relationship, conflicts, specific contexts.
5. System’s tempo
  - a. Delay in getting appointments for examinations (imagery) or with specialists.
  - b. Unexpected attitude of hospital emergency sending the patient home.
  - c. Lost information among carers, lost mail, lost message.

## Box 2. Illustration of the five tempos.

1. Disease's tempo: a 18-month-old child seen in the morning with symptoms suggesting rhinopharyngitis; reassurance is given to the parents with advice to come back only if the situation is not improving within two or three days; subsequently, the child is hospitalized in intensive care with pneumococcal infection.
2. Office's tempo: congested agenda at the office; a febrile patient is denied an appointment for three days later; subsequently, the case was diagnosed as an acute pyelonephritis.
3. Patient's tempo: urgent lab tests prescribed; the patient goes to the lab only three days later.
4. System's tempo: longer than expected delay to get an MRI.
5. Doctor's tempo: a doctor forgetting to prescribe a medication after an interruption by a phone call.

as exemplified in a study of patients with chronic heart failure (12).

### *The development of the tempos Framework*

The development of the tempos framework was conceptualized by two authors (JB and RA) using models developed from the literature of safety in process control in industrial settings (5,6). Five timescales—termed 'tempos'—requiring parallel processing by GPs were distinguished in the framework: (1) disease's Tempo (unexpected rapid evolutions, slow reaction to treatment); (2) office's Tempo (day-to-day agenda and interruptions); (3) patient's Tempo (time to express symptoms, compliance, emotion); (4) system's Tempo (time for appointments, exams, and feedback); and (5) physician's Tempo (time to access to knowledge) (9). Box 1 details the framework and Box 2 presents clinical examples that illustrate these timescales. Depending on the specificity of the tempo and the clinical problem, the five tempos can run in parallel.

The art of the doctor is to control all tempos and make them consistent and synchronous, optimizing them for the best benefits of the patient. In assigning a tempo when considering adverse events, it is important to consider both the local effects and cause of each tempo on the occurrence of errors as well as the global trade-off between the different tempos to prevent and recover errors.

In the following sections, we present the methodology and results of two studies that used and validated the tempos framework.

## METHODS

### *Database of malpractice claims*

Two studies have so far been conducted on the emerging concept of 'tempos'. The material used for the two studies are malpractice claims from one major French liability insurer (MACSF). This insurance company provides cover to about 60% of all French GPs. The authors used synthesis reports written by the medical staff of this insurance company. These reports are two-to-six pages long. They provide a detailed update of the medical history, exams, medical strategies, evolutions, and complications. A final section summarizes the results of external expertise by independent doctors (one or two, depending on the case) and indicates legal directions for the defence.

### *Studies*

In both studies, the reviews included independent assessments by two coders to determine whether the event was due to one or many tempo-related problems. Reviews lasted 15 min per file on average. Reviewers were not blinded to the litigation outcomes but were instructed to ignore them and rely on their clinical judgment in making decisions about errors.

The first study was conducted in 2011 (13). The authors reviewed the total claims incurred in general practice in this insurance company for the period 2003 to 2006. Six hundred and twenty-three malpractice claims were analysed with the method of the tempos to identify the prevalence and characteristics of claims and related time-management errors. We analysed incidents

## Box 3. Assessment of the tempos framework.

Positive	Negative
<ul style="list-style-type: none"> <li>• Simple enough, limited number of categories</li> <li>• No forcing functions</li> </ul>	<ul style="list-style-type: none"> <li>• Limited finesse</li> <li>• More accurate with the presence of the physician who participated in the event (memory of the context)</li> </ul>
<ul style="list-style-type: none"> <li>• Proximity with practice, perception of immediate benefits</li> </ul>	<ul style="list-style-type: none"> <li>• Domino effects among tempos not acknowledged in the current version</li> </ul>
<ul style="list-style-type: none"> <li>• First designed for continuous auditing the safety of the medical office</li> <li>• Good for coding patient's journey</li> </ul>	<ul style="list-style-type: none"> <li>• Limited application to national data bases</li> </ul>

with a focus on identifying factors contributing to adverse events.

A second study was conducted in 2012 through two French dissertations in medicine (14,15). The authors reviewed the total claims incurred in general practice in this insurance company for 2010. The two junior GPs (blinded to the other) were asked to double code with Makeham's taxonomy, a classic taxonomy of medical error in family practice derived from the work made by the National Network for Family Practice and Primary Care Research in Australia (16). A total of 326 malpractice claims in 2010 from the same French liability insurer (MACSF) were analysed. The concordance among coders (kappa test), and the pros and cons of using each material were considered. Only one principal tempo per report was included for the test on the tempo classification.

## RESULTS

The first study showed that the framework was easy to use with a limited training (a half-day), stable enough (good inter-coder agreement), providing an intuitive reflexive vision on practice. The percentages of incidents in which we found that the tempos contributed to the emergence of adverse events were as follows: disease tempo contributed to 37.9% of adverse events; office tempo in 13.2%; patient tempo in 13.8%; out-of-office coordination tempo in 22.6%; and GP's access to knowledge tempo, in 33.2%.

This study also showed that the tempos framework was feasible and made sense for capturing how the failure in the control of parallel time constraints led to adverse events. The diseases and patient tempos, disregarded in other classifications, were key concepts for understanding patient safety in general practice.

The second study showed that the initial agreement between coders of adverse events was moderate for the Makeham classification of adverse events (Kappa 0.39), while it was slightly better for the tempo framework (Kappa: 0.54). The inter-coder agreement was lowest for the disease tempo and the doctor tempo, pointing to the remaining ambiguity of definitions of these two tempos. The absence of information from the physician to whom the problem occurred was clearly more problematic with the tempo framework compared to Makeham. Adequate coding of many tempos is facilitated by detailed information on the context, which is often only partially present in medical claims.

The two GPs who coded the claims considered the tempo classification easier to use and more heuristic for their practice, although they also indicated that a better guidance for coding was required. Box 3 summarizes the most important traits of the comparison among methods as they result from the two studies.

## DISCUSSION

We argue that using the framework of tempos as we have articulated it, can provide important insights to understanding and preventing patient safety incidents in general practice. The conceptualization of time through the tempos framework provides GPs with a new insight into pitfalls existing in their organization of care such as poor organization of the office space, incorrect evaluation of delays of actions and inadequate information when alerting the patients and relatives on the expected evolution of the disease. In our view, the tempos framework links the intuition of general practitioners and the way that they conceptualize errors with insights from safety management in industrial settings.

### *Continuity of care*

It may be noted that the newly developed concept of tempos is related (but not exactly the same) as the concept of continuity of care, which is often considered to be the hallmark of general practice. Continuity of care in general practice has been defined as a multidimensional concept, covering personal continuity (seeing the same doctor each time), team continuity (collaboration between care providers in a practice), and cross-boundary continuity (collaboration between general practice and hospital) (17). Problems in any of these aspects of continuity of care may result in adverse events although the empirical evidence for this is not overwhelming. The literature on continuity of care focuses largely on coordination of activities across healthcare providers while the concept of tempos focuses on the coordination of activities over time.

### *Position of the tempos framework*

It is obvious that the tempos framework needs to be elaborated to optimize its potential. The framework of tempos was only tested in two studies in France, and further studies are needed for further development and validation. However, the analysis of adverse events on the basis of the tempos framework appears to provide immediate feedback to the practice, whereas other classification systems may be more adapted for aggregating all causes of adverse events for the purpose of a regional or national database leading to regional or national analysis and policies.

## CONCLUSION

It seems to us that the use of the tempos framework may be well suited as a mechanism to help in learning for patient safety at a more local level.

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