



**RECOMMENDING
BEST
PRACTICES**

Fixation bias in healthcare

How to see the light at the end of the tunnel?

25 May 2023

What is it?

We live in a complex environment, with a vast amount of data to take on board and analyse, but we have limited cognitive capacities. Hence it is impossible to effectively and systematically reason in an analytical way in order to make decisions. We therefore use mental shortcuts, also known as heuristic, on a daily basis, saving us both time and energy and helping us to make quick and usually reliable decisions. These shortcuts are indispensable, but can sometimes be a source of error if used in the wrong situation: this results in cognitive bias.

These cognitive biases are numerous (nearly 250 have been described) and still little known in the medical world. And yet they can impact reasoning and impair clinical decision-making. As cognitive biases are very diverse, this patient safety solution (PSS) focuses more specifically on one of them, which is particularly poorly understood: fixation. This phenomenon, well known in the aeronautical industry under the name of “target fascination”, has still been little studied in the field of medicine. However, it can have serious consequences for patient safety and for the professionals involved.

In this PSS, fixation (or “tunnel vision”) is defined as being any situation in which a healthcare professional’s attention is so highly focused on a specific goal¹ that warning signs that should normally prompt a change in approach or even halting of the procedure before an adverse event can occur are entirely missed.

This fixation leads to a mental closure to other possibilities, with the disappearance of all critical thinking. This quasi-blockage is not perceived by the practitioner and may look like stubbornness from the outside. Pressure to achieve results, stress, alarms and noise only serve to reinforce this fixation. So, for example, the operator persists in wanting to perform a procedure on a patient despite repeated failures during iterative attempts, even though the patient’s clinical situation is deteriorating.

Other factors may contribute to fixation: inexperience, lack of concentration, a heavy workload, fatigue, overconfidence, conflicts within the team, etc.

This PSS is aimed at **all medical and paramedical, hospital and community-based healthcare professionals**. The objective is to raise their awareness of fixation and the cognitive mechanisms that can impair reasoning and clinical decision-making, and to suggest practical strategies to prevent it or minimise its impact.

1. Result expected for the patient, management of a complication (this objective may be immediate or delayed).

Underestimation of the difficulty of a procedure

A multidisciplinary team meeting (MDT) recommends surgical resection of a malignant kidney tumour in a patient temporarily lost to follow-up. The procedure is performed by a junior surgeon, at the end of the day. **Although the tumour may have progressed during the period when the patient was no longer being monitored, no new imaging tests are carried out for the MDT and no senior surgeon is scheduled in the event of a problem. During the surgery, the surgeon realises that the tumour is much more advanced than expected and has metastasised, but, concentrating on the procedure that is taking up all his attention, he does not change the planned treatment strategy,** although excision was subsequently deemed to have been impossible. The procedure was complicated by a venous wound and the patient died in the operating theatre.

Wrong side

A patient undergoes surgery for a left-side hernia repair. The surgeon checks the side in the patient's record before going off to prepare for the procedure. He and the rest of the operating theatre team receive some very bad news about one of their colleagues. The checklist is completed aloud **and the team members, very upset by this bad news which has been the focus of all their discussions, confirm that they will be working on the left, even though the operating field had been installed on the right. Nobody realises that it is the wrong side** and a small hernia is treated on the right. The surgeon realises the error when drafting the surgical report, and the hernia on the left side is repaired the same day.

Prolongation of a hip replacement procedure

A female patient undergoes hip replacement surgery. Stressed by the lack of experience of the scrub nurse and the circulating nurse, the surgeon installs the patient himself before the procedure. This is a little more difficult than usual because the patient is obese. The attempts to insert the head into the acetabular cup are unsatisfactory. **Focused on these failures following a complicated start to the operation, the surgeon persists in his attempts for several hours despite repeated femur fracture:** they try to use a deeper femoral stem, then a larger approach. Three hours into the operation, the anaesthetist alerts them to the time that has elapsed and asks them to finish up. This stops the surgeon, who asks for an amplifier check. They then realise that, in fact, they have not been using the correct head diameter and they are then able to complete the implant procedure. The postoperative period is complicated.

Lack of diagnosis of peritonitis

A female patient who has undergone a sleeve gastrectomy is readmitted to hospital on Day 4 for pain occurring during the night from Saturday to Sunday. The surgeon is not on duty and has a prior engagement on Sunday morning but, due to pressures within the team concerning on-call and repeat surgery duties, **they decide to perform the repeat surgery themselves, believing they have time to do it early in the morning. There is a delay in the patient's preparation (the surgeon only has 30 minutes left when they make the first incision), but they continue as planned. At the start of the revision surgery, they think they may have seen some dirty liquid. During their explorations, still under time pressure, they attribute what they have seen to a haematoma along the staple line.** They perform suction and wash out the area, although in hindsight they think they should have over-sutured the staple line. The patient deteriorates and repeat surgery performed on the Monday reveals a fistula, having resulted in peritonitis.

Lack of diagnosis of septic arthritis

A female patient with Parkinson's disease and cognitive problems undergoes surgery for a rotator cuff injury. She presents severe pain following the operation and is readmitted to hospital three months later, due to the persistence of her pain and the fatigue of her carers. The medical team also observes fever, poor oxygen saturation and increased cognitive impairment. Given the pandemic context, Covid-19-associated pneumonia is considered. **The tests are negative, but the surgeon remains focused on the idea of a respiratory problem and treats the patient for pneumonia.** The patient returns home. She consults another surgeon two months later, who finds septic arthritis in her shoulder. The patient is then treated but goes on to present major functional sequelae.

A patient safety solution...

The aim of a PSS is to reinforce preventive measures and make it possible to either eliminate the consequences of an adverse event in the making (recuperate), or to reduce their impact (mitigate), by providing professionals with a practical tool to implement in their day-to-day work.

The “Fixation in healthcare” PSS is the fruit of a collective multidisciplinary and multiprofessional project carried out with professional bodies approved for accreditation of physicians based on lessons drawn from an in-depth analysis of adverse events linked to fixation or ‘tunnel vision’ and reported by physicians in the accreditation feedback database. A literature search was also carried out.

The work was initiated by five approved bodies: the French Urology Association (AFU; urological surgery), the French

Digestive Surgery Federation (FCVD; gastrointestinal surgery), Gynerisq (gynaecology-obstetrics), Orthorisq (orthopaedic and trauma surgery) and Plastirisq (plastic, reconstructive and cosmetic surgery).

As part of the follow-up of this PSS, any difficulties encountered during its implementation should be communicated directly to the *Haute Autorité de santé* (HAS, French national authority for health), which coordinated the work carried out by the working group, so that it can assess the need to revise or update it in collaboration with the approved bodies having developed it.

... derived from practice surveys and analysis of the feedback database

As fixation is still little known or studied in the medical sector, two surveys were carried out by Orthorisq and the working group among accredited physicians in order to raise awareness of the issue and get some initial feedback.

A **first survey** was sent out to 1,880 orthopaedic surgeons at the end of 2020: 1,113 of them responded. The majority of the respondents considered that they already experienced (61%) or witnessed (55%) fixation. Some respondents (n = 822) specified that the main factors contributing to fixation were operations going badly (27%), teams with poor concentration (17%) and stress affecting surgeons faced with an unusual situation (13%).

Fixation resulted in an incident in the majority of the cases reported (n = 514/845). Some respondents (n = 657) detailed the main actions put in place following the occurrence of a fixation bias: taking a break to think (28%), calling on another surgeon (17%) and deciding on a *No Go* (8%). In 40% of cases, no action was undertaken because the physician did not detect the fixation when it occurred.

A **second survey** was sent out in 2021 to 19,483 anaesthetists, surgeons and interventional specialists (possible duplicates) who had not been contacted during the first survey: 1,848 of them responded. The majority of the respondents indicated that they already experienced or witnessed fixation (80%). The respondents believe that fixation mainly occurs during surgery (68%) and after surgery (63%).

The main factors identified by respondents as contributing to fixation are a procedure going badly (79%), stress

linked to the procedure or an unusual situation (75%) and fatigue (68%). The free comments made by physicians cite other contributing factors, such as a “lack of experience”, “poor communication”, a “change of team” or an “unexpected complication”.

Three barriers that can be put in place to avoid fixation were favoured by respondents: debriefing (88%), better teamwork (86%), taking a break to call a colleague or consider alternative solutions (85%). Other barriers were suggested by the physicians in their comments, such as the use of health simulation, work on human factors and requesting a second opinion.

Among the physicians having experienced or witnessed fixation (n = 1,474), 86% state that they managed to get out, but only 66% before the incident occurred. It was primarily by calling on a colleague to help (n = 593/1,044) or thanks to the team in place (n = 279/1,044) that physicians were able to extricate themselves from the situation. These procedures were well or very well perceived by respondents (n = 820/872).

Almost half of the 1,848 respondents (46%) described a fixation bias that they had experienced or witnessed in the comments, demonstrating their interest in the subject. Some of them reported their distress in response to this phenomenon, particularly when the consequences were serious.

... and from analysis of adverse events in the physician accreditation system feedback database...

The working group experts² identified 76 adverse events related to fixation in the feedback database, in thirteen different specialties. Analysis of these adverse events shows that they can occur in any location (operating theatre, emergency department, inpatient unit, at home, etc.), both in particularly complicated situations involving complex patients (46%) requiring immediate emergency treatment (28%), and in routine situations involving non-complex patients (38%), with no emergency (45%) and scheduled treatment (58%).

On average, these adverse events involve four other cognitive biases³ associated with fixation, the main ones being anchoring bias (87%), cognitive miserliness (80%), confirmation bias (58%) and overconfidence bias (47%).

In a quarter of the adverse events (n = 19/76), the physician never got out of fixation.

In the other cases, the most effective measures to combat fixation were a reassessment of the situation by a “time out” (n = 40/76), a request for advice from a colleague (n = 27/76) or discussions within the team (n = 19/76). In 54 cases, extrication from fixation was driven by a third party. The third party involved is most often another physician in the team (n = 28/54) or a new player in the patient’s care (n = 23/54), following a transfer to another department or hospital, for example.

These adverse events have significant consequences: 8% led to the patient’s death, 29% to severe harm and 45% to moderate harm⁴. Furthermore, the vast majority of them were considered to have been avoidable by the physician reporting them (n = 71/76).

... leading to the development of the patient safety solution: “Fixation bias in healthcare. How to see the light at the end of the tunnel?”

This PSS is the fruit of collective work carried out with approved bodies based on two survey and analysis of the adverse events reported in the feedback database.

This work suggests that fixation:

- **is not particularly rare;**
- **concerns all healthcare professionals**, irrespective of their profession, their specialty or their experience;
- **can occur at any time**, before, during and after surgery, in situations with a high cognitive load as well as in routine situations;
- **can be responsible for the occurrence of adverse events** that are both serious and avoidable.

While certain situations involve a higher risk of fixation, these are not the only situations in which they can occur. That is why the key points proposed in this PSS have deliberately been kept very general, so that all healthcare

professionals can take them onboard and adapt them to their practice depending on their specialty and the situations they encounter.

The aim of this PSS is to raise awareness among healthcare professionals of fixation and to propose a list of key points developed below.

In particular, the analysis of adverse events and the results of the surveys have shown that it can be difficult to detect and extricate oneself from fixation. Hence, in the event of difficulties, the following recommendations are made:

- **express the difficulties verbally so that the team can intervene if necessary, and conversely, dare to intervene on behalf of a colleague;**
- **do not hesitate to seek advice from a colleague;**
- **take a break or at least slow down briefly to think.**

2. The list of working group members is available in the “Drafting methodology – Composition of the working group” section.

3. Definitions of cognitive biases are available in the “Illustrated definition of the main cognitive biases in medicine” section.

4. According to the WHO severity scale. Severe harm: severe symptoms, major permanent loss of function, shortening of life expectancy, major intervention (hospitalisation in an intensive care unit, major surgical/medical intervention). Moderate harm: moderate symptoms, temporary deficit of prolonged duration, requires more than minimal intervention (repeat surgery, invasive procedure, long-term drug treatment, prolonged hospitalisation).

What can be done to prevent fixation?

Raise awareness of cognitive function and its shortcomings

→ Provide training about the fixation bias (theory)

Raise awareness among healthcare professionals (via training, communication actions, conference sessions, etc.) of the existence of fixation and its potential impacts, and make sure they are aware of the cognitive mechanisms involved in the clinical decision-making process.

→ Provide training in the fixation bias (practical), particularly via health simulation

Teach healthcare professionals to detect a fixation via targeted training sessions, enable them to learn best practices and adopt effective tools in their routine practice to combat the risks associated with fixation and other cognitive biases, on both an individual and collective level. Organise health simulation sessions (conventional or digital),⁵ with the educational aim of encouraging a fixation bias to occur, for example.

→ Provide training in metacognition⁶

Know how to accurately assess the quality of your perception, reasoning and decision-making, in order to understand the mechanisms involved in the development of fixation. For example, being aware of having reached a decision more quickly than usual can lead a professional to think again about a diagnosis at greater length, or to ask a colleague for help, and thereby avoid fixation.

With the exception of metacognition, there is currently little evidence in the literature relating to the effectiveness of the awareness-raising measures proposed above, mainly due to a lack of specific studies in healthcare situations. Nevertheless, knowing and understanding fixation is an essential first step in order to be able to implement appropriate measures to avoid or limit its occurrence.

Ensure a favourable organisational and human context

→ Improve the working environment (sufficient human resources, functional technical equipment, etc.)

Put in place a favourable working environment to limit the occurrence and consequences of fixation. High workloads, stress, time pressure, fatigue and sleep deprivation are all well-known factors that can lead to a decline in attention mechanisms and the possible onset of a fixation bias.

A useful tool to prevent the occurrence of fixation consists of the use of the HALT model (2): if you are *Hungry, Angry, Late or Lonely, Tired*, then you should stop what you are doing. This tool enables professionals to be alerted when their emotional state is unfavourable, so that, if possible, they can stop what they are doing to improve this state or, at the very least, be more vigilant and take preventive measures.

5. Health simulation: www.has-sante.fr/jcms/c_930641

6. Metacognition is the capacity to evaluate and monitor our own thinking (1).

→ Improve teamwork (safety culture,⁷ training in soft skills, etc.)

Allow each member of the team to feel that they have a legitimate role to play in the collective decision-making process, to ask for help if they have any doubts or need it, but also to draw the attention of their colleagues to a risk or an error in progress. This is what is known as “speaking up” (3). This involves improving teamwork and, in particular, ensuring a good safety culture within the team. There are programmes for working on this theme, such as the continuous teamwork improvement programme (Pacte),⁸ the team accreditation programme⁹ or training in human and organisational factors.

Not all adverse events are associated with fixation or cognitive biases, and work organisation remains one of the main root causes of adverse events. Acting on the environment is therefore essential, not only to reduce the risk of fixation, but also, and above all, to reduce the risk of a larger number of other adverse events.

Identify risky situations

→ Enrich collective analysis of adverse events with a “cognitive autopsy”¹⁰

During the collective analysis of adverse events, such as a morbidity and mortality review (MMR), the responsibility of cognitive biases in the occurrence of an adverse event should be addressed. This enables situations involving a cognitive risk to be identified and solutions to be put in place in order to prevent, recuperate or mitigate the effects of fixation.

→ Identify risks specific to your working environment

Every working environment has its own specific risks, which professionals have to deal with every day. Agreeing to work in a given context implies being aware of the risks involved in order to be able to manage them more effectively.

→ Be doubly vigilant and seek support from the team when a situation involving a particularly high risk of fixation is identified (briefing)

Identify risky situations, i.e. those particularly likely to lead to fixation, and alert the team. Having been given this information, professionals should be encouraged to intervene if one of the members of the team begins to develop fixation. For example, a preoperative briefing ensures that all the team members have the same level of information and also enables them to validate emergency solutions if a complication arises.

Mobilise the available tools

→ Audio and visual alarms

Put in place audio and visual signals that become stronger and more differentiated as the attention fixation continues: high-contrast alarms, images adapted to the visual environment. This is already the case for an audio alarm in the event of desaturation, for example.

→ Protocolised care

Providing an alternative to relying on intuition and memory, and guiding thinking using a variety of tools, can improve diagnostic performance and the therapeutic choices made by professionals throughout the patient's care pathway. Easy-to-implement solutions exist, such as:

7. Safety culture: www.has-sante.fr/jcms/r_1497866.

8. Committing to the continuous teamwork improvement programme, Pacte: www.has-sante.fr/jcms/c_2831393.

9. Accreditation of physicians and medical teams: www.has-sante.fr/jcms/c_428381.

10. A “cognitive autopsy” consists in having a cognitive approach when analysing root causes of adverse events (4).

- simplified decision trees (5), which eliminate the need to consider all the data in a situation, and can therefore be particularly useful for improving complex decision-making in the face of uncertainty;
- clinical pathways,¹¹
- memory aids;
- checklists. While the “patient safety in the operating theatre” checklist¹² is now well known, numerous others also exist. For example, to limit the risk of diagnostic errors, general checklists,¹³ differential diagnosis checklists¹⁴ or cognitive forcing checklists¹⁵ can be used (6);
- medical decision-making support systems. There are numerous computer programmes available today to help with diagnosis or therapeutic choices (reading mammograms or ECGs, mobile application for cognitive assistance in complex situations, prescribing antibiotics, etc.). With the development of artificial intelligence, these systems are bound to proliferate.

What can be done to detect a fixation bias in progress (recuperate)?

Put into practice the metacognition approach to detect fixation

Slowing down and taking the time to think while reasoning or making a decision enables healthcare professionals to switch their thinking to analytical mode, to consider the data more critically and, ultimately, to make fewer errors: this is what is known as “slowing down”. The aim is to encourage professionals to ask themselves why they are persisting in a diagnosis, an attitude or a choice, and to envisage alternative scenarios, asking themselves questions such as:

- “Was the diagnosis suggested to me by the patient, a colleague or the nurse?”
- “Have I accepted this patient as a ‘transfer’ from another caregiver?”
- “Have I considered other plausible explanations in addition to the ‘obvious’ one? What else could it be?”
- “Was I interrupted or distracted during the care?”
- “Have I stereotyped the patient or the presentation?”
- “Is this a patient I don't like or like too much?”
- “Am I cognitively overloaded at the moment?”
- “Am I overconfident? Am I in a position of authority in relation to the team?”
- “Am I listening?”

In the operating theatre, slowing down and the concentration this requires may be manifested by the professional suspending their attention to distractions (discussions, music), asking for them to stop, or even temporarily halting the operation - this is taking a break (8). This switch to analytical mode may be made spontaneously when faced with a difficulty.

In an emergency situation, healthcare professionals cannot remain in analytical mode and must act automatically. In this case, if slowing down is required, it may take just a few seconds before switching to automatic mode.

11. For a given disease or condition, the clinical pathway describes all the elements of the care process that make up the patient's pathway. This is a document that is included in the patient record and completed by each person performing any of the procedures listed in it. www.has-sante.fr/jcms/c_2807716.

12. www.has-sante.fr/jcms/c_1518984.

13. General checklists, known as cognitive checklists, guide the practitioner through the diagnosis process, so that they do not forget the obvious: list the patient's medical history, carry out a structured clinical examination, make initial hypotheses and then perform a differential diagnosis (using additional information if necessary), take time to think things through before confirming the diagnosis, put an action plan in place and follow it up and revise it if necessary.

14. Differential diagnosis checklists are designed to help practitioners make a diagnosis in certain situations (anxiety, pain, fever, myocardial infarction, haemorrhage, pneumothorax, etc.) by encouraging them to consider all other possible diagnoses, particularly those most often overlooked.

15. Cognitive forcing checklists should be used in certain situations or diseases/conditions in order to avoid any omissions in the patient's care or treatment. This involves applying the Rule Out Worst-case Scenario (ROWS) rule.

For example, professionals may decide to use the **POuR – DÉCider (9)** cognitive aid, designed to provide a structured decision-making tool, in the event of an unexpected and urgent situation, if there are no pre-existing procedures or rules and when a poor decision may have serious consequences.

This cognitive aid consists of three parts:

- the “POuR” part concerns the cognitive process (reflection) that must be conducted;
- the hyphen – connecting POuR and DÉCider represents the essential team exchange time;
- the “DÉCider” part concerns the decision process and the implementation of the chosen solution.

P	Problem	What is the problem?
Ou	Useful options	What are the useful and possible options?
R	Risks	What are the risks and advantages of each option?
-	Exchange	Team exchanges and sharing
D	Decision	What should we do?
E	Execution	Who does what? When? How?
Cider	Check	Did everything go to plan?

An example of implementation of this tool is available in the “Cooperation between anaesthesia-intensive care specialists and surgeons” PSS¹⁶.

What can be done to get out of fixation (mitigate)?

Call for help

→ Turn to the team

Mobilising the expertise of the multidisciplinary and/or multi-professional team by consulting and combining the independent opinions of several professionals often leads to a better decision and minimises the risk of error (10).

To achieve this, each individual must resist certain social dynamics, such as the authority bias, which mainly values the opinion of people higher up in the hierarchy, the spectator effect, which encourages people not to intervene on their own initiative but to wait for someone else in the group to act, or the social conformity effect, which encourages people to express the same opinion as the rest of the group.

→ Seek a second opinion or “call a friend”

Asking a colleague for advice when faced with a tricky case or a difficult situation is common practice, but it is also a good idea to do so to extricate yourself from fixation: it is easier to see the cognitive biases of others than your own (11).

Care must be taken not to influence the opinion of other professionals with previous reasoning or conclusions, so as to avoid them adopting the same fixation, and the persistence of an initial incorrect diagnosis as the patient is passed on from one professional to another.

16. “Cooperation between anaesthesia-intensive care specialists and surgeons: working better as a team” PSS: www.has-sante.fr/jcms/c_2587220.

Put into practice the “slowing down” approach, or take a break

It may be necessary to slow down, take time to think or even halt the surgery or the reflection process to get out of fixation.¹⁷

Mobilise the available tools

Use the tools described in the “prevent” part to get out of fixation.

As with many adverse events, it is necessary to perform the following actions

- Hold an immediate and spontaneous debriefing session with the team whenever the patient is stabilised.
- Inform the patient about the occurrence of an adverse event and its consequences.
- Complete the patient record and indicate the information given to the patient, specifying the precise words used for this information.
- Report the adverse event in accordance with the procedure in force in the facility.
- Submit a vigilance report if the adverse event is concerned by a vigilance system.
- Perform an in-depth analysis of the incident in order to identify its causes [morbidity and mortality review (MMR), experience feedback committee, etc.], addressing the cognitive biases that contributed to it.
- Put in place corrective actions and measure their efficacy.

In the specific case of adverse events associated with fixation, it is important to support the healthcare professionals involved as “second victims”. In fact, this type of adverse event can lead to significant guilt because of the high level of avoidability coupled with potentially serious consequences. Resources exist to develop support actions¹⁸ (12).

17. These tools are described in the “What can be done to prevent fixation?” section.

18. www.soutien-seconde-victime.fr.

Implementation of the PSS

This PSS is a useful new tool for improving the quality and safety of care throughout the medical sector, and not just in the surgical and interventional sectors. Its aim is to raise awareness of fixation among medical and paramedical health-care professionals, including how to detect it more effectively and how to deal with it. Hospital managers and medical committee chairs should use it to formalise the implementation of the proposed actions.

The points set out in this PSS can be used as a tool for assessing organisational and professional practices. They help to assess existing elements, as well as deficiencies and gaps in relation to the proposed guidelines. The results of the assessment should be used to propose an appropriate improvement plan. This may involve training, improving teamwork, reinforcing existing measures or creating new alerts and actions to put in place additional safety barriers, modifying organisations, etc. Their implementation will be monitored and, if necessary, reassessed.

Steps in a team-based approach to improving professional practices

- Step 1: **organise your approach** (project group set-up, organisation and provisional schedule).
- Step 2: **assess the key points** of the PSS within your structure (e.g. the key point is implemented: “never”/“sometimes”/“regularly”/“routinely”).
- Step 3: **draw up an overview of the initial assessment** performed¹⁹ and jointly define the improvement actions to be implemented and monitored with the team.²⁰
- Step 4: **implement the improvement actions** and monitor them.
- Step 5: **assess** the results of the actions implemented.

Some examples of possible improvement actions

- Discussion within the operating theatre committee or with management about problems related to fixation: training of professionals, actions implemented on the subject, communication of data concerning adverse events, etc.
- Training of healthcare professionals in fixation and cognitive biases in general, as well as in metacognition techniques.
- Performance of simulation exercises involving situations where there is a particular risk of fixation.
- Improved teamwork, for example based on the “Cooperation between anaesthesia-intensive care specialists and surgeons: working better as a team” PSS.
- Implementation of checklists, alerts and reminders to help practitioners extricate themselves from fixation (checking operating time, desaturation alarms, operating theatre checklist, etc.).
- When faced with difficulties, dare to intervene, know how to call for help, slow down, or take a break.
- Systematically look for any cognitive biases that may have contributed to the occurrence of adverse events studied in MMRs.
- Analysis of practices by means of a grid drawn up from the PSS.
- Monitoring of indicators (number of fixation-related adverse events per year, number of fixation bias detected, etc.).

19. An “Assessment overview” sheet is proposed in this PSS.

20. An “Action sheet” is proposed in this PSS.

Assessment overview

To be completed jointly as a team to assess the implementation of the key points of the PSS within your organisation.

Date:

List of participants (last names, first names, positions, sector):

Analysis results, strong points, points to be improved:

Conclusion and action plan (to be completed by one or more action sheets):

Action sheet

Complete one sheet per action to be implemented.

Action implemented

Objective	
Description	
By whom?	
Calendar	
How?	
Monitoring and assessment procedures	

Progress status

Date:	<input type="checkbox"/> Planned	<input type="checkbox"/> In progress	<input type="checkbox"/> Done	<input type="checkbox"/> Assessed
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Illustrated definition of the main cognitive biases in medicine

This descriptive table of the main cognitive biases in medicine is based on data from the literature (4, 13, 14).

Name	Definition	Examples
<p>Fixation bias</p> <p><i>Target fascination</i></p> <p><i>Cognitive tunnel vision</i></p>	<p>Situation in which a practitioner's attention is so highly focused on a specific goal that warning signs that should normally prompt a change in approach or even halting of the procedure before an adverse event can occur are entirely missed.</p> <p>* Result expected for the patient, management of a complication (this objective may be immediate or delayed).</p>	<p>The administration of antibiotic prophylaxis, although systematically indicated, was omitted before a percutaneous endoscopic gastrostomy, because the team's attention was totally focused on the implementation of a new technique (Push technique).</p>
<p>Anchoring bias</p> <p><i>Adjustment bias</i></p> <p><i>Diagnosis momentum</i></p>	<p>Tendency to fixate on the information received/ perceived first when making an initial assessment of the situation and not to adjust this assessment in the light of subsequent information.</p> <p><u>Specific case</u></p> <p>Diagnostic momentum: in the frequent case whereby the diagnosis already made is not questioned, this diagnosis attached to the patient is passed on from professional to professional.</p>	<p>A post-intubation desaturation is attributed to severe bronchospasm, whereas in fact a tube was bent.</p> <p>A patient wrongly diagnosed with flexor tendon phlegmon consults several surgeons without the initial diagnosis and proposed treatment being questioned. The correct diagnosis of necrotising fasciitis is only made by the fourth surgeon consulted, after a surgical procedure has been performed.</p>
<p>Confirmation bias</p>	<p>Tendency to take into account and seek out information that supports a diagnosis or clinical assessment rather than information that refutes it.</p>	<p>A patient with headaches goes to the Emergency department and is diagnosed with migraine. The emergency physician's diagnosis is supported by the existence of a visual aura preceding the headache and the fact that the headache improves after a few hours' sleep. Following a CT scan, the patient is finally diagnosed with a subarachnoid haemorrhage and referred to the neurosurgery team for management of a ruptured aneurysm.</p>
<p>Premature closure</p> <p><i>Cognitive miserliness</i></p> <p><i>Search satisficing</i></p>	<p>Tendency to favour the "least cognitive effort" in problem solving, and to stop thinking and looking for information prematurely as soon as a satisfactory option has been identified.</p>	<p>A patient has several bullet hole wounds in the abdomen. In a state of shock, he undergoes emergency surgery and the abdominal injuries are treated. However, he dies from haemorrhagic shock due to uncontrolled bleeding caused by a gunshot wound to the hip.</p> <p>An HIV-positive homeless patient who is a heroin addict on methadone and has been hospitalised for investigation of walking difficulties, is discharged because his clinical, biological and radiological tests (brain scan) are normal. In the end, kept under observation because of persistent walking difficulties; a magnetic resonance imaging (MRI) scan of the spinal cord performed almost 20 hours later reveals a compressive spinal cord haematoma. Decompression surgery is carried out following a delay but enabling a subsequent good recovery.</p>

Name	Definition	Examples
<p>Expectation bias <i>Ascertainment bias</i> <i>Psych-out</i></p> <p><i>Gender bias</i></p>	<p>Tendency to perceive a situation based on what the professional expects to see (may be a stereotype).</p> <p><u>Specific cases</u></p> <ul style="list-style-type: none"> • Patient with a psychiatric illness: tendency to blame an organic condition on a psychiatric illness. • Gender bias (sexism): tendency to believe that gender is a determining factor in the diagnosis or treatment decision, with no pathophysiological basis. 	<p>There is a tendency to find signs of heart failure in a male patient who admits not taking his diuretics.</p> <ul style="list-style-type: none"> • A female patient who regularly goes to the Emergency department for anxiety attacks presents for the umpteenth time with chest tightness that is causing her anxiety. An “anxiety attack” is again diagnosed and the patient is made to wait. She goes on to die from a myocardial infarction. • It is sometimes considered that women overestimate their pain, whereas men assess it correctly, which has an impact on their therapeutic management.
<p>Inattentional blindness</p> <p><i>Rapid task switching</i></p>	<p>Human beings have limited attention capacities. This can hinder the perception of certain information even though it is within the professional's field of vision.</p> <p>Being busy with several activities at the same time can have an impact on the attention paid to each of them.</p>	<p>A bulky benign brain tumour, probably old, distracts the practitioner's attention from another CT slice showing intracranial bleeding.</p> <p>An experienced nurse, overwhelmed by a number of simultaneous tasks, administers an ampoule of neuromuscular blocking agent to a patient in the postoperative recovery room instead of the Debridat® (trimebutine maleate) prescribed following a colonoscopy.</p>
<p>Social dynamics (bias within the team)</p> <p><i>Groupthink</i> <i>Authority gradient effect</i> <i>False consensus effect</i></p>	<p>Tendency to want to maintain harmony within the team, by going along with what you think is the opinion of the majority or by avoiding contradicting an expert or hierarchical superior.</p>	<p>A 60% carotid stenosis is identified in a 45-year-old female patient presenting with a stroke. Despite a lower threshold than that recommended (70%), the indication for surgery was given by the head of department at the departmental meeting, in view of the patient's young age. Another academic agrees with the indication. During the procedure, the patient has another stroke. During the MMR that followed, it became apparent that many of the participants in the department meeting, including junior surgeons familiar with the recommendations, had doubts about the relevance of the indication, but had not dared to intervene.</p>
<p>Loss/risk aversion</p> <p><i>Omission bias</i> <i>Commission bias</i></p>	<p>The tendency, because of aversion to loss (of opportunity) or risk, to favour, in a given situation:</p> <ul style="list-style-type: none"> • either inaction (“first do no harm” or sometimes defensive medicine based on the assumption that harm caused by illness is more acceptable than harm caused by treatment); • or action (conviction that harm to the patient can only be avoided by intervening). 	<p>A physician does not adjust a hypertensive treatment despite the persistence of excessively high blood pressure because of therapeutic inertia.</p> <p>During a colonoscopy, a gastroenterologist chooses not to perform a difficult polypectomy and instead refers the patient to a surgeon, at the risk of a colectomy with potentially more complicated sequelae.</p> <p>A surgeon operates on an incidentaloma (for example, a meningioma) discovered during an investigation performed for another reason, or the case of over-prescription of antibiotics leading to resistance.</p>

Name	Definition	Examples
<p>Professional perspective</p> <p><i>Vertical line failure</i></p>	<p>Thinking “in silos” of the professional, who will automatically view the situation from the perspective of their specialty or professional routine.</p>	<p>In the context of a twin pregnancy, a patient presents with gradually worsening dyspnoea. The obstetrician diagnoses decompensation of twin-twin transfusion syndrome and decides to perform an emergency caesarean section, without seeking the advice of a cardiologist, respiratory specialist or anaesthetist. During the postoperative stay in intensive care, a diagnosis of dilated cardiomyopathy with an impaired left ventricular ejection fraction of 35% is finally made.</p> <p>A patient is admitted to the Emergency department with abdominal and pelvic pain and referred to the gynaecology department. There, a problem with the patient’s intrauterine device is diagnosed. The IUD is removed following two procedures. A few days later, a diagnosis of appendicitis-related peritonitis is made.</p>
<p>Overconfidence bias</p>	<p>Tendency to overestimate one’s knowledge, skills and performance. Overconfidence can lead people to act on incomplete information, intuition or hasty deductions.</p>	<p>A surgeon very confident in their experience in the open laparoscopic technique, which they have practised without incident for many years, diagnoses an abdominal aortic aneurysm with a possible fissure on a CT scan in the presence of postoperative abdominal pain. They transfer the patient to the cardiovascular surgery department. The following day, the patient undergoes emergency repeat surgery for peritonitis due to jejunal perforation. He goes on to spend eight days in the intensive care unit.</p>

Quiz – to find out more

Professionals are invited to practise identifying the cognitive biases present in examples of adverse events²¹. The aim is not to identify them with certainty, but to learn to question the possible role they may have played in the occurrence of events.

Table 1. Table to be completed by the professional

		Adverse events examples				
		Underestimation of the difficulty of a procedure	Wrong side	Prolongation of a hip replacement procedure	Lack of diagnosis of peritonitis	Lack of diagnosis of septic arthritis
Cognitive bias	Anchoring					
	Confirmation					
	Premature closure					
	Expectation					
	Attention limitation					
	Social dynamics					
	Loss/risk aversion					
	Professional perspective					
	Overconfidence					

Table 2. Proposed correction

		Adverse events examples				
		Underestimation of the difficulty of a procedure	Wrong side	Prolongation of a hip replacement procedure	Lack of diagnosis of peritonitis	Lack of diagnosis of septic arthritis
Cognitive bias	Anchoring	Yes	No	No	Possible	Yes
	Confirmation	No	No	No	Possible	Possible
	Premature closure	Possible	No	Yes	Yes	Possible
	Expectation	Possible	No	No	Possible	Yes
	Attention limitation	Possible	Yes	Yes	Possible	No
	Social dynamics	No	Possible	No	Possible	No
	Loss/risk aversion	No	No	No	No	No
	Professional perspective	No	No	No	No	No
	Overconfidence	Yes	No	No	No	No

21. CRAE examples are available in the "Examples of adverse events involving fixation" section, page 2.

Drafting methodology

Working group composition

A multi-professional and multidisciplinary working group (20 members) was formed, consisting of 10 bodies approved for accreditation, a medical examiner and radiologist, a health executive who trains state-qualified scrub nurses and a midwife.

- Jean-Charles Alimi, AFU (urological surgery approved body).
- Lydia Baude, health executive and scrub nurse trainer.
- Éric Benfrech, Orthorisq (orthopaedic and trauma surgery approved body).
- Denis Blazquez, FCVD (gastrointestinal surgery approved body).
- Philippe Boisselier, Gynerisq (gynaecology-obstetrics approved body).
- Jean Breaud, OA-Chirped (paediatric surgery approved body).
- Thierry Caus, SFCTCV (thoracic and cardiovascular surgery approved body).
- Luc Chadan, French College of Neurosurgery (approved body).
- Xavier Benoît D'Journo, SFCTCV (thoracic and cardiovascular surgery approved body).
- Fabrice Dedouit, Medical examiner and radiologist.
- Alain Deleuze, FCVD (gastrointestinal surgery approved body).
- Yves Hepner, Plastirisq (plastic, reconstructive and cosmetic surgery approved body).
- Patrick Jammet, Maxillorisq (maxillofacial surgery and stomatology approved body).
- Véronique Lejeune-Saada, Gynerisq (gynaecology-obstetrics approved body).
- Stéphane Mauger, Orthorisq (orthopaedic and trauma surgery approved body).
- Paul Michel Mertes, CFAR (anaesthesia approved body).
- Cécile Thiebaut, midwife.
- Jean Tourres, CFAR (anaesthesia approved body).
- Frédéric Vavdin, AFU (urological surgery approved body).
- Constantin Zaranis, FCVD (gastrointestinal surgery approved body).

For HAS, the Department for Assessment and Tools for the Quality and Safety of Care (SEvOQSS):

- Candice Legris, deputy head of department;
- Philippe Cabarrot, medical advisor;
- Marie Coniel, project manager;
- Camille Lakhli, PhD researcher within the Department for Good Clinical Practice.

Management of conflicts of interest

The members of the working group communicated their public declarations of interest to the HAS. They are available to view on the website dpi.sante.gouv.fr.

They were analysed according to the analysis grid of the HAS guidelines for the declaration of interests and management of conflicts of interest.

The interests declared by the members of the working group were deemed to be compatible with their involvement in this work.

Drafting the PSS

The working methodology was based on the PSS drafting guide approved by the HAS Board in May 2012²². It combines analysis of the literature, analysis of the accreditation feedback database and consultation of the multi-professional and multidisciplinary working group (WG) (see composition on previous page).

The WG met on 22 January and 9 April 2021, to discuss the scope of the PSS and validate the definition of fixation (see “What is it?” chapter). These meetings also enabled the WG to learn about:

- the results of a survey conducted by Orthorisq among its members to raise awareness of fixation;
- the results of an initial analysis carried out by the HAS on adverse events extracted from the feedback database, and in particular the cognitive biases most frequently found in these adverse events;
- a summary of the debiasing strategies identified in the literature review.

The WG decided to launch a second survey among accredited physicians and validated the questionnaire common to all specialties, with the procedures for sending them out being defined by each specialty. It was also planned that the members of the WG themselves would carry out a second analysis of the feedback database.

To carry out this second analysis, a workshop was organised on 24 September 2021 to present the analysis grid for the adverse events pre-selected by the HAS to the voluntary members of the WG and to ensure the homogeneity of future analyses. The procedures for analysing adverse events (double reading, analysis grid) have been validated by the developers.

A third WG meeting was held on 27 January 2022, at which the following were presented:

- the results of the second survey of accredited physicians;
- the results of the analysis of adverse events;
- an update of the summary of debiasing strategies.

The presentation plan and the solutions to be proposed in the PSS were also discussed.

Survey of orthopaedic and trauma surgeons

Orthorisq conducted an initial survey of accredited physicians in the specialty. A link to the survey (built on Limesurvey software) was sent by email on 5 and 28 December 2020²³. The main objective of this survey was to raise awareness of fixation, and its introduction therefore included an explanation of the phenomenon in the practice of orthopaedic and trauma surgeons.

The questionnaire, designed by Orthorisq on the basis of a preliminary analysis of adverse events reported in the specialty, included a definition and examples of the fixation in the introduction, seven questions to define the respondent's profile and 31 multiple-choice questions relating to description of a fixation bias experienced or witnessed by the respondent (context of occurrence, factors contributing to the occurrence, barriers which may or may not have worked, etc.), the respondent's usual reactions in the event of pre-, peri- or post-operative difficulties, use of the “patient safety in the operating theatre” checklist and knowledge of the FORDEC procedure²⁴. A free text field was used to record a description of a fixation bias experienced.

Survey of gastrointestinal surgeons, urologists, thoracic and cardiovascular surgeons, maxillo-facial surgeons and stomatologists, neurosurgeons, anaesthesiologists and gastrointestinal endoscopists

The content of the survey was designed by the WG on the basis of an initial questionnaire sent out by Orthorisq. The questionnaire was sent out by the HAS by e-mail on 4 and 28 May 2021 to physicians active in the accreditation system for urological surgery, gastrointestinal endoscopy, neurosurgery, maxillofacial surgery and stomatology, and thoracic and cardiovascular surgery specialties²⁵. In June 2021, it was also sent by the CFAR (anaesthesia approved body)²⁶ and the FCVD (gastrointestinal surgery approved body)²⁷ to their members.

In addition to collecting data on the respondents' characteristics, 12 questions proposed predefined answers to be selected in order to assess, firstly, whether the respondents had already experienced a fixation bias and, if so, how they felt about it and, secondly, the contribut-

22. www.has-sante.fr/jcms/c_1524026/fr/methode-d-elaboration-des-solutions-pour-la-securite-du-patient-ssp.

23. Questionnaire sent out to 1,880 physicians; 59% response rate in January 2021.

24. FORDEC is a memory aid for making decisions in an emergency. The acronym is broken down as follows: *Facts* (what are the Facts?) – *Option* (what are the available Options?) – *Risks* (what are the Risks of each option?) – *Decide* (what Decision is reached?) – *Execute* (execution) – *Check* (assessment, check the results obtained, does the solution need to be modified?)

25. Questionnaire sent out to 1,197 physicians; closed on 19 July 2021; 29% response rate.

26. Questionnaire sent out on 11 June 2021 to the 1,875 members of the CFAR and the 15,514 members of the SFAR (duplicates possible); closed on 7 July 2021; 5% response rate.

27. Questionnaire sent out on 2 June 2021 to 897 gastrointestinal surgery specialists; 87% response rate at end August 2021.

ing factors and barriers observed in the situations which they may have faced. Free text fields were used to collect qualitative responses (causes and barriers not suggested in the questionnaire, description of a fixation bias encountered).

Analysis of adverse events in the feedback database

In order to identify fixation-related adverse events in the feedback database, a semi-automatic identification was carried out using a classification tool based on textual analyses. A textual analysis is performed on variables (lemmatisation of lexical fields) entered in free text. A dictionary of key words had to be defined²⁸.

In October 2019, the feedback database did not include enough fixation-related adverse events to enable a relevant analysis. The approved bodies were therefore asked to prospectively identify adverse events on this subject, by raising awareness of the issue among their experts and encouraging their members to report events relating to this cognitive bias.

In 2021, a new keyword search of the adverse events recorded in the feedback database between 31 May 2016 and 15 June 2021 identified 325 adverse events that could be linked to fixation. After an initial reading of the summary of these adverse events and the exclusion of those that were irrelevant, adverse events potentially associated with fixation were retained. Each of these adverse event was then reviewed by two members of the WG, using an analysis grid. The members of the WG had to check whether fixation and nine other cognitive biases were indeed associated with the adverse event, identify the barriers and the person who enabled fixation to be overcome (if it was overcome), and rate the level of severity of the adverse event. Following this work, 76 adverse events were selected for the descriptive analysis presented in this PSS.

PSS follow-up and updates

The PSS will initially be included in the annual accreditation programme in the form of a general recommendation. Its implementation will be a prerequisite for meeting the requirements of the accreditation system (individual or team). Each approved body concerned will be responsible for compiling notifications related to dysfunctions following application of the PSS.

It will then be possible to perform an assessment of practices based on the use of the key points and solutions 24 months after implementation.

This could take the form of a survey conducted by the approved bodies and submitted to the accredited physicians, in terms of satisfaction (legibility, PSS availability, suggested improvements, etc.), knowledge (is the content of the PSS known?), practices (improvements made, MMR, procedures) and results (number of adverse events reported). Updates will be considered in line with developments in equipment or changes in practice.

Bibliographic note

A specific context

In the inherently complex world around us, teeming with a multitude of different forms of information, most clinical reasoning and decision-making has to be performed in a particularly difficult environment. Uncertainty, urgency, stress, as well as the cognitive and emotional burdens placed on professionals are all common factors in a clinical setting that are likely to influence the results of these mental processes and hence impact the quality of care provided. These environmental factors are therefore likely to particularly increase the risk of fixation (15, 16).

Limited cognitive resources

Faced with this complexity, the cognitive capacities that we can mobilise to process this information in order to understand our environment are not infinite. Our limited attention and partial perception enable us to grasp only part of the available information, while our reasoning and decision-making processes do not systematically lead to the result that could be described as “correct” or “rational”. Our limitations in terms of memory, as well as communication deficiencies and collective dynamics, sometimes add to these individual cognitive limitations and can influence the choices we make and the actions we take.

The cognitive mechanisms at play

To compensate for these limited cognitive resources, and still manage to work in and interact with this environment, our cognitive system is equipped with mental shortcuts, known as heuristics. The advantage of these automatic cognitive mechanisms is that they require little time and energy to perceive, reason and decide in a complex and uncertain world.

For example, a physician faced with a young patient presenting with nausea, diarrhoea, abdominal pain and a low-grade fever at the onset of winter will almost automatically conclude that the diagnosis is gastroenteritis, which is prevalent at this time of year, and which is most likely (Bayesian reasoning) to be the correct one.

28. A search for the following words and starts of words was performed in the text fields of the adverse events recorded in the feedback database: “focalis” (focus), “entet” (stubborn), “obstin” (insist, obstinate), “persever” (persevere), “tunnel” and “tunel” (fixation).

Although effective in the majority of contexts, systematic and comfortable use of these heuristics in an inappropriate context can sometimes lead to erroneous decisions. In this case, these mechanisms are referred to as “cognitive biases”. In the previous illustration, the availability heuristic (the human tendency to reason on the basis of information that comes immediately to mind) can lead the doctor to wrongly conclude that the patient has gastroenteritis and fail to identify the signs of food poisoning, appendicitis or another diagnosis.

Cognitive biases therefore correspond to the few detectable failures of heuristic strategies, which are nevertheless very useful in most cases.

The two-speed thinking model

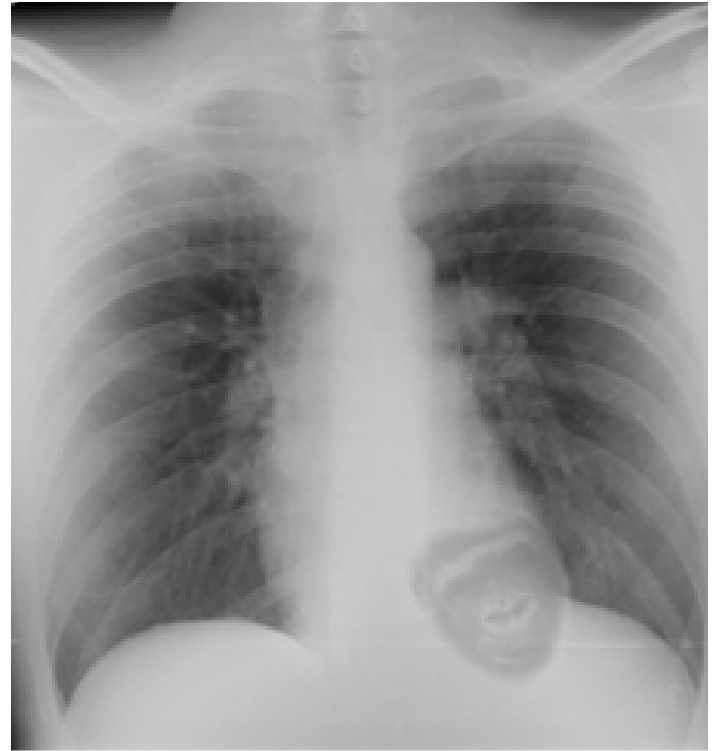
These cognitive mechanisms at work in perception, reasoning and decision-making in situations of uncertainty are incorporated into the so-called “two-speed” model, which aims to describe the way human thinking works (7). According to this theoretical model, our brain functions thanks to two systems: firstly, system 1, which gives the brain its capacity to reason and make decisions automatically, quickly and most often effectively on the basis of heuristics, but which is prone to errors when used inappropriately; and secondly, system 2, based on a more analytical and hence more accurate mode, but slower and more energy-intensive.

Experimental illustration of the fixation

Automatically focusing all our attention on one piece of information or one action can lead us to overlook unexpected and salient information, as shown by the results of this fun experiment (17), illustrating the phenomenon known as “inattention blindness”.

In this study, a series of images of preoperative checks were shown to almost 700 anaesthesiologists in different countries: caught in fixation, only one third of the anaesthesiologists identified the gorilla head that had been slipped onto one of the X-rays by the researchers, even though they had been looking at the location of this element (in the area of a possible hiatus hernia).

In some cases, however, this unexpected information may prove important, or even vital, in terms of patient safety.



© 2021 De Cassai *et al.* Inattention blindness in anesthesiology: a gorilla is worth one thousand words, fig.1, journals.plos.org/plosone/article/figure?id=10.1371/journal.pone.0257508.g001

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Developers of the patient safety solution
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