Work-Related Stress Prevention in Clinical Laboratories: A Technical Manager–Led Organizational Model Based on the INAIL Methodology and SWOT Analysis

Ilaria Pucillo1,*, Roberto Pirozzi1, Antonio Fiorella2, Vincenzo Palumbieri3 and Raffaele Ascione4

1. *UOC di Patologia Clinica, Ospedale San Giovanni di Dio, Frattamaggiore (NA), ASL Napoli 2 Nord, Italy;*
2. *U.O.C. Ematologia, Policlinico Riuniti, Foggia, Italy;*
3. *Patologia Clinica, ASReM, P.O. San Timoteo, Termoli, Italy;*
4. *UOC Anatomia Patologica, Azienda Ospedaliera Universitaria Federico II, Naples, Italy;*

* Corresponding author: ila.p_90@hotmail.it

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Abstract

Work-related stress is a relevant occupational risk in healthcare laboratories, where continuous diagnostic activity, shift work, urgent testing, interprofessional coordination, and evolving technologies may generate psychosocial demands. Objective: To translate the Italian National Institute for Insurance against Accidents at Work (INAIL) framework and organizational management principles into an operational prevention plan for a clinical laboratory, highlighting the coordinating role of the technical manager. Methods: A non-empirical project-design approach was adopted. The source thesis examined the legal and conceptual framework, described a hypothetical medium-to-high complexity hospital laboratory, conducted a qualitative SWOT (strengths, weaknesses, opportunities, threats) analysis, and defined strategic objectives, proposed actions, responsibilities, implementation timeframes, and monitoring indicators. Results: Five priority domains were identified: communication, workload management, professional development, technical coordination, and prevention-oriented organizational culture. The proposed plan comprises interdisciplinary briefings, periodic workload reviews, multidisciplinary coordination meetings, targeted training, and organizational climate monitoring. Implementation horizons range from three to twelve months. Process and outcome indicators are proposed for longitudinal assessment. Conclusions: The framework offers a structured, adaptable organizational proposal, but its feasibility, effectiveness, and effects on worker wellbeing have not yet been tested in practice. Prospective implementation and evaluation are needed before claims of effectiveness can be made.

Introduction

Clinical laboratories operate within increasingly complex healthcare systems, where demands for timely, reliable diagnostic information coexist with workforce constraints, changing technologies, emergency workloads, and shared responsibilities across professional groups. Recent studies of medical laboratory personnel have examined work stress and functioning in relation to workload, working hours, shift arrangements, job satisfaction, and occupational climate [1–3]. More broadly, psychosocial hazards may arise when job demands exceed available resources or when communication, scheduling, and role clarity are inadequate [4].

Work-related stress should be distinguished from burnout: the former refers to a work-related risk arising from the interaction between individuals and organizational demands, whereas burnout is an occupational phenomenon associated with chronic workplace stress that has not been successfully managed [5,6]. This distinction is relevant because organizational risk assessment must not be reduced to identifying individual distress or to treating symptoms alone.

In Italy, Legislative Decree No. 81/2008 establishes the employer's obligation to evaluate occupational risks, including work-related stress. The INAIL methodology provides a structured and participatory pathway integrating preliminary evaluation of sentinel events, work-content factors and work-context factors, followed where appropriate by more detailed assessment and preventive measures [7,8]. Within this governance framework, the technical manager can contribute operational knowledge and facilitate corrective actions without replacing the statutory responsibilities of the employer, prevention and protection service, occupational physician, or worker safety representatives.

This article describes a project-based organizational model derived from a 2025–2026 master's thesis by Ilaria Pucillo [9]. Its objective is to provide a practical framework for planning interventions within clinical laboratories while making clear that implementation and efficacy remain to be evaluated.

Materials and Methods

Study design and source

This work is a descriptive methodological project and proposed operational protocol, not an observational or experimental study. The source material was an academic thesis entitled "Gestione dello stress lavoro-correlato nelle fasce a rischio: ruolo del Dirigente Tecnico nella valutazione del rischio e nella pianificazione degli interventi di prevenzione" (academic year 2025–2026). No healthcare workers were recruited, no questionnaires were administered for research purposes, and not before–after outcome measurements were collected as part of the project [9].

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Reference organizational setting

The reference context was a hypothetical medium-to-high complexity hospital laboratory with continuous diagnostic activity, routine and urgent testing, specialist sectors, automated platforms, shift-based staffing, and multidisciplinary teams including biomedical laboratory technicians, biologists, physicians, and support personnel. Descriptors were used to structure the proposed intervention; they are not observations from a specifically identified hospital [9].

Planning framework

The project was developed through four connected steps: (i) contextualization of the regulatory and INAIL methodological framework; (ii) qualitative SWOT analysis of the reference laboratory; (iii) definition of five strategic objectives and corresponding actions; and (iv) specification of implementation horizons, operational responsibilities, and process/outcome indicators. The SWOT was a planning exercise rather than an instrument validated on worker responses or measured organizational data [8,9].

Roles and governance

The technical manager was identified as the operational facilitator of communication, scheduling, professional development, and feedback cycles. Formal work-related stress risk assessment and any amendment of the risk assessment document remain within the responsibilities and consultation arrangements defined by Italian occupational-safety legislation. Proposed actions should therefore be aligned with the employer, occupational safety professionals, occupational physician where applicable, worker safety representatives, and the relevant unit managers [7,8].

Results: Proposed Organizational Model

Qualitative SWOT analysis (Tab.1)

Table 1. *Qualitative SWOT analysis of the hypothetical clinical laboratory setting (adapted from the source thesis).*

Domain	Elements identified in the project
Strengths	Qualified and specialized staff; standard operating proce-dures; multidisciplinary collaboration; advanced automation.
Weaknesses	High or uneven workloads; demanding shifts; communication gaps between sectors; continuing training needs.
Opportunities	Technological innovation; continuing education; growing at-tention to organizational wellbeing.
Threats	Staff shortages; increasing diagnostic demand; constrained financial resources.

Strategic priorities

The SWOT was translated into five organizational priorities: (1) improve information flow and interprofessional communication; (2) better balance workloads and shift arrangements; (3) support technical, relational, and organizational skills; (4) strengthen coordination by the technical manager; and (5) embed prevention and continuous improvement in routine governance [9–11].

Operational prevention plan (Tab.2)

Table 2. *Proposed organizational actions and implementation targets (adapted from the source thesis).*

Priority	Proposed action	Timeframe	Suggested implementation indicator
Communication	Periodic interprofessional briefings	Within 3 months	Attendance and reports of communication issues
Workload management	Review allocation of activities and shift-related burdens	Within 6 months	Workload-related reports and review completion
Coordination	Scheduled multidisciplinary meetings	Within 3 months	Meeting regularity and attendance
Training	Dedicated professional and organizational learning activities	Within 12 months	Proportion of staff participating
Organizational well-being	Periodic monitoring of perceived work climate	Within 6 months	Completion of assessment and follow-up actions

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Monitoring and evaluation (Tab.3)

Table 3. *Proposed process and outcome monitoring indicators* (*adapted from the source thesis*).

Indicator	Type	Proposed frequency	Interpretive purpose
Participation in multidi-scipli-nary briefings	Process	Monthly	Implementation of com-mu-nication activities
Participation in profes-sional training	Process	Annually	Reach of training initia-tives
Coordination meetings held	Process	Quarterly	Continuity of managerial co-ordination
Reports of organizatio-nal criticalities	Outcome / surveillance	Every 6 months	Identification of persi-stent or emerging orga-nizational is-sues
Perceived organizational wellbeing index	Outcome	Annually	Evolution of work cli-mate; instrument must be specified before im-plementation
Nonconformities asso-ciated with organizatio-nal issues	Outcome	Every 6 months	Potential impact on or-ganiza-tional processes

Integration with an INAIL-aligned improvement cycle

The proposed actions should be embedded in an iterative risk-management process: define homogeneous worker groups; review objective organizational indicators and work-context/work-content domains; determine whether further assessment is required; co-design risk-reduction measures; assign responsibilities; monitor implementation; and reassess risks and effectiveness. Figure 1 summarizes this proposed operational sequence. A qualitative SWOT can support prioritization but does not replace the required INAIL-aligned occupational-risk assessment.

Discussion

The principal contribution of this project is a practical translation of established occupational-health principles into the everyday governance of a clinical laboratory. Rather than addressing stress exclusively at the level of individual coping, the proposed interventions target modifiable features of work organization: communication, scheduling, coordination, professional development, and feedback. These are plausible intervention domains, but their effectiveness in the setting described has not been demonstrated. Recent evidence-based guidance and reviews support considering organizational-level prevention, while also emphasizing that the evidence varies by

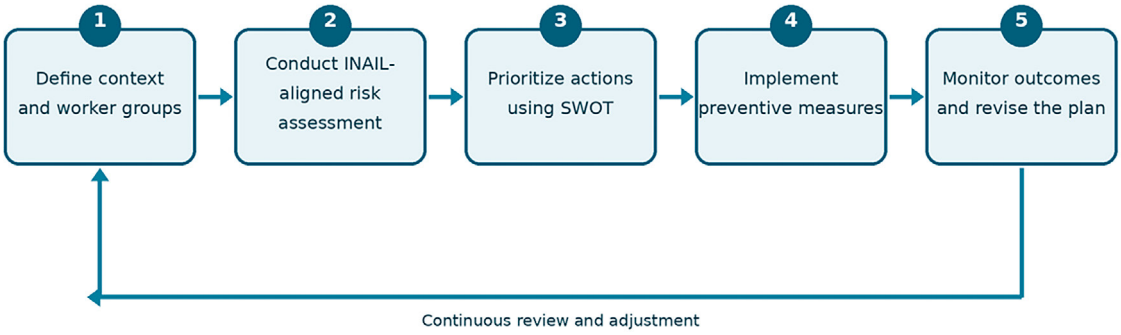


Figure 1. *Proposed iterative cycle integrating formal stress-risk assessment with organizational planning* (*conceptual illustration, not an evaluated intervention*).

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intervention type and worker group; the proposed plan should therefore be treated as a framework for local implementation and evaluation, not as an established effective intervention [4,10,11].

The role attributed to the technical manager is particularly relevant where laboratory processes require integration across professional groups and continuous alignment between urgency, staffing, equipment, and analytical quality. Briefings and coordination meetings may help identify operational bottlenecks earlier; workload review may reveal imbalances across shifts; and training initiatives may strengthen technical and relational capabilities. Nonetheless, interventions should be co-designed with staff and coordinated with the legally designated occupational health and safety actors [1–3,10,11].

A key methodological safeguard is to distinguish the SWOT exercise from a validated psychosocial risk assessment. Its categories are subjective planning hypotheses developed from an illustrative context. Before implementation, the organization would need to apply the appropriate INAIL framework, collect baseline indicators, specify worker groups and assessment periods, evaluate privacy requirements, and document decisions and responsibilities. Monitoring should also consider potential unintended consequences, including increased administrative burden or reporting reluctance [8,9,11].

Because the project contains no field implementation, it cannot establish reductions in perceived stress, burnout, absenteeism, error rates, or nonconformities. The proposed indicators provide a starting point for future evaluation but require explicit numerators, denominators, instruments, thresholds, and a realistic comparison strategy. For example, a rise in reports of organizational problems after introducing structured briefings could initially reflect improved reporting rather than deteriorating working conditions [10,11].

A prospective pilot evaluation could therefore employ repeated measures before and after implementation, combining INAIL-consistent assessment outputs, participation rates, staff perceptions using a validated tool, workload measures, and routine safety indicators. Any causal claim would require a design able to address temporal trends, staffing changes, organizational restructuring, and other potential confounders. Such evaluation is proposed here as future work, not presented as part of the thesis [10,11].

Limitations

This paper is derived from a single academic project and uses a hypothetical laboratory scenario. The SWOT analysis was not validated with local staff, no real-world implementation took place, no baseline or follow-up measures exist, and neither feasibility nor effectiveness has been assessed empirically. Regulatory and organizational arrangements may differ between institutions; therefore, the proposed actions are not a substitute for local risk assessment, legal compliance, or governance authorization.

Conclusions

A technical manager–led organizational plan can provide a structured way to translate psychosocial risk-prevention principles into actionable laboratory processes. The project developed five strategic priorities, five practical intervention streams, and a monitoring framework drawing on the INAIL methodology and qualitative SWOT analysis. Its value is methodological and operational rather than demonstrative: implementation, acceptability, and measurable impact remain untested. Future multicenter or prospective field studies should determine whether such a framework can improve organizational wellbeing while maintaining safe and efficient diagnostic services. The proposed approach is consistent with current prevention guidance and recent literature on psychosocial factors and organizational interventions [4,8,10,11].

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Conflicts of Interest: The authors declare no conflict of interest.

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