



CLINICAL REVIEW

12-h or 8-h shifts? It depends

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SUMMARY

Since 12-h shifts were first implemented, the question has been asked – are ‘twelves’ better than ‘eights’? People trying to answer this question invariably refer to the limited literature at their disposal, often piecemeal, small-scale studies comparing 8-h versus 12-h shifts in isolated groups of workers in which many other factors vary concurrently. The narrow perspective and sometimes ‘vested interests’ of the organizations, researchers, publishers and individual workers can influence both the choice of measures, the analysis of results and their interpretation. The current review suggests that it is not sufficient to evaluate a shift pattern on the basis of a single dimension of a working time arrangement, such as shift length. Numerous factors associated with the work practice influence the outcome of a shift pattern including start times, pattern of shifts and amount of overtime. Moreover, the type of work being done and the demographics or characteristics of the workforce are additional mediating factors. Finally, and perhaps most critically, the relative importance assigned to different outcome measures is an important consideration. There are situations where total sleep time might increase following a change to 12-h shifts, whereas domestic life for some workers may deteriorate. Additionally, safety measures may show improvements on 8-h shifts but physical or psychological health outcomes may be worse. The myriad combinations of work pattern, work task, worker and outcome measure under investigation mean that the best way to take account of these complexities may be to use an approach that manages ‘system’ risk. Given the non-linearities in the system, and the fact that current approaches either ignore, or privilege a subset of outcomes, it is perhaps more appropriate to conceptualize working time arrangements as an ‘ecosystem’ and to address the risks in the overall system as opposed to a single dimension such as shift length.

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Introduction

“Is it OK to work 12-h shifts?” is one of the most common questions asked by employers, employees and regulators involved in shift work. Despite the absence of a definitive answer, 12-h shift arrangements are widely used. In 1998, Lawrence Smith and colleagues authored a seminal review comparing 8- and 12-h shifts¹ concluding that findings were equivocal in relation to 12-h shifts and that longitudinal data were required. A decade later, it is timely to re-examine the way in which the question of 12-h shifts (or 12s) is asked, in order to provide more useful answers.

Historically, continuous shift operations were structured around a division of the 24-h day into 8-h blocks – day, afternoon and night shift. As economic incentives for capital intensification and competition for skilled labour increased, employers adopted modified working time arrangements while simultaneously

maintaining or reducing costs.² A major iteration of working time arrangements as a result of a desire for balance between economic competitiveness and employee participation was the compressed workweek.³ 12-h shifts became very popular with employers due to the requirement for fewer personnel.⁴ Inevitably, direct comparisons were made between 8- and 12-h systems, in an attempt to determine the ‘best’ option. The same questions about whether 12-h shifts are ‘better’ or ‘worse’ are still being asked today. The relationship between the question and answer is often oversimplified such that a single shift characteristic is the independent variable in the equation, intervening variables are part of an often-unexplored black box and a single outcome is measured (represented by the schematic below).



The current review argues that it is not useful to examine a single characteristic of a work pattern such as shift duration in isolation. It is less useful to examine or generalize findings across work tasks, workforce or workplace because the diversity in each

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continues to increase. We will argue that the question of whether '12s' are 'better' is complex and that the answer depends on what is meant by 'better', for whom it is 'better', what the criteria for 'better' are in a given situation and who is asking the question. It is our belief that current paradigms require updating to embrace the complexity associated with divergent workplaces, workforces and work tasks before we can determine whether the 12-h shift, or indeed any type of shift, is actually 'better'.

Once upon a shift system the worker, work type and work pattern were similar

In Western workforces including Europe, Australia, and the United States, approximately 15–17% of employees are currently engaged in regular shift work.^{5–7} While various definitions of shift work exist, broadly the term relates to work that occurs outside the 'standard daylight hours (7/8 am–5/6 pm)'.⁸ Working outside daylight hours was once the primary domain of male factory workers. By and large they formed a homogeneous population working consistent shift patterns, and performing like work tasks. A second group of shift workers was found in healthcare, most particularly in the nursing profession. Again, this was essentially a homogenous group with relatively consistent demographic and work patterns. Increasingly however, the characteristics of both the work and worker associated with shift work have changed.

The work pattern

The last 25 years saw a rapid proliferation and variegation of shift patterns. In addition to increased competitive pressure, use of shift work in service industries has also contributed to the variety of patterns. While factory-based organizations generally have a stable demand for labour across time (due to the use of capital intensive machinery), service industries use work patterns that allow the provision of services across a narrower span of the day and/or management of variations in demand across time. For example in Australia, high numbers of employees in the professions, sales, clerical and administrative roles are now working shift work (more than 10%).⁹ Schedules variously involve fewer hours (e.g., part-time); more hours (e.g., work and income intensification); longer blocks of hours (e.g., to enable extended periods away from work) or more attractive patterns of hours (e.g., non-peak hour start times, more overtime etc.).

The variety in working time arrangements in today's western world now ranges from regular Monday to Friday day work, to 12-h shift systems involving two or more weeks of consecutive shifts (e.g., offshore and fly-in, fly-out (FIFO) operations). Thousands of working time arrangements are in use,¹ and often, multiple schedules exist within organizations (e.g.,^{10,11}). Further, within a given roster 'type' (i.e., day work, 8-h or 12-h shifts), there can be significant variation associated with start times, number of consecutive shifts, the structure and frequency of the rotation, commute length and residential circumstances during work and non-work days. All of these factors play a role in mediating the effects of a specific shift pattern and need to be taken into account when examining outcome measures.

The work

Several factors have contributed to the diversification of occupations in which shift work occurs. Advancements in communications technology mean that many businesses are open all hours of every day. Technology both requires and facilitates 24-h access to information, people, goods and services. Societies now expect such access, partly because it is possible. The different types of work, the tasks within each job and the environment in which the work

happens have changed in line with shifting expectations. Examples of the diversity in work types, tasks and environments include fly-in/fly-out operations (e.g., remote mining or offshore drilling), technical operations involving monitoring functions and information services (e.g., call centres), traditional healthcare and emergency services, goods delivery and availability (e.g., supermarkets and food outlets open 24/7) and hospitality. The diversification of work tasks and types means that early findings from shift work research (often focused in industrial plants) may no longer be widely generalizable. As mentioned, service industries have expanded working hours windows and there has been a strong trend in recent years towards increasing out of hours work in many 'white-collar' professions such as finance, information technology, education and the public sector. Expansion of shift work into different domains has meant a diversification in the physical and cognitive demands on workers working shifts. The influence of the work environment and task is essentially unknown in these industries, making generalizations practically impossible.

The worker

The changes in work and work pattern have (intuitively) coincided with a shift in the demographics of the 'shift worker'. Where once shift work was restricted to a relatively narrow demographic (e.g., blue collar males and predominantly female healthcare professionals), the diversity of the workforce in many countries is now much greater. In part, this is related to the change in participation patterns and the removal of barriers based on gender, age and ethnicity.^{7,12,13} Women are now routinely working in roles that were the province of male workers.^{7,12} Individuals are working later into their lives for financial or social reasons, resulting in an ageing shift workforce.¹² In developed Western countries the increasingly multi-cultural nature of societies and communities is reflected in the demographics of the workforces.^{7,12,13} For all of these reasons, early shift work research may not be generalizable to today's 'shift workers'.

Summary

General conclusions from early shift work studies were broadly applicable to the shift work workforce at the time - due to the homogeneity in the work pattern, the work task and the workforce demographics. However, the increasing diversity means that past conclusions may no longer apply for a range of reasons:

- 1) Women working in traditionally male-dominated environments.
- 2) The workforce continues to age as people work longer before retirement (or death).
- 3) Many women working while managing their families.
- 4) Men are taking a more active role in parenting and domestic activities.
- 5) The characteristics of families are changing.
- 6) Many Western workforces are becoming increasingly multi-cultural.
- 7) Shift work patterns are now used in industries once confined to day work.
- 8) Working time arrangements allow for varied living arrangements.

The question about suitability of 12-h shifts must go beyond a simple comparison of 'shift length' to take account of the disparate nature of the work, and address both the workplace and workforce. Thus, a number of additional considerations are required.

What is the work pattern?
 What is the work task?
 Who is working?

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