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How Many Slides? Documented Cytotechnologist Workload

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■ With the increasing use of monolayer techniques and automated cytology, there has been much discussion lately about cytotechnologist workload limits.

■ The discussion about cytotechnologist workload is largely based on speculation because published accounts of actual workload numbers are lacking, despite the CLIA 88 regulations specifying a maximum of 100 slides per day for conventional Pap smears and 200 slides per day for monolayer slides.

■ When workloads are redefined, the physical limitations of the cytotechnologists should be taken into consideration as well as the actual time required to evaluate each slide.

This paper relays workload information obtained as part of an ergonomics survey.¹ Data were obtained on the number of slides evaluated daily, workplace setting, hours worked, and demographic information.

A survey designed to elicit information concerning demographic data and ergonomic-related musculoskeletal symptoms was sent to 500 randomly selected members of the American Society of Cytopathology (ASC). There were 244 (48.8%) valid responses.

The typical respondent:

- Evaluates 60 to 70 slides per day.
- Works 6 to 8 hours per day, 5 to 6 days per week.
- Is employed by a hospital or independent laboratory.
- Has been employed in the present position for more than 8 years.
- Has worked in the profession for more than 20 years.
- Is older than 50 years old.

It is hoped that this information may give some insight into actual workload numbers and help with possible restructuring of workload limits for cytotechnologists.

Background

Current workload limits were established through the Clinical Laboratory Improvement Act (CLIA) of 1988 as a means of improving the accuracy of the Pap smear. At the present time, CLIA restricts workload to a maximum of 100 conventional slides per day, or 200 slides per day if the specimen covers one-half or less of the slide surface.² The CLIA limits were mandated when it was suggested that excessive workloads might compromise accuracy. These limits have subsequently been incorporated into many state regulations.³ The CLIA workload limits are now being revisited due to increasing conversion to monolayer techniques and the addition of new, automated assisted screening technologies. The Cytopathology Education and Technology Consortium (CETC), representing all the major cytology organizations, has issued "Daily Guidelines for CTs" to address workload as a component in the evaluation of overall instrument performance.⁴ The discussion about appropriate workloads also continues on the Internet, with requests for laboratories to comment on the number of slides

each cytotechnologist evaluates. Despite the active interest in this subject, discussions are largely based on speculation, since published accounts of actual workload numbers are limited.^{5,6} The workload information presented below was obtained as part of an ergonomics study in which data were collected on the number of slides evaluated daily, as well as on workplace setting, hours worked, musculoskeletal discomfort, and demographic information.¹

Establishment of new workload limits should be based on the capabilities of the personnel, as well as on the time requirements of the technology. Any revision of workload limits should consider the physical limitations of cytotechnologists, a high percentage of whom already suffer from musculoskeletal disorders caused by the physical demands of microscopy and exacerbated by the poor ergonomic design of most microscope workstations.

Materials and Methods

The ergonomic survey questionnaire, from which workload data were derived, was mailed to 500 randomly selected cytotechnologist members of the ASC. Since the prime purpose of the survey was to discern the prevalence of ergonomically related musculoskeletal complaints among cytotechnologists, the survey included questions about frequency and severity of any discomfort in various body sites, as well as demographic data, information concerning workplace setting and the number of slides evaluated per day.

Following the first mailing, 244 (48.8%) valid responses were received and tabulated using SPSS 9 for Windows. Age and gender of the respondent, workplace setting, number of days worked per week, and average number of slides screened per day were among the questions answered. Each of these parameters was charted. A description of the "typical respondent" was compiled.

Results

The 244 practicing cytologists who responded to the study screened an average of 55.4 slides per day, with a median of 60

slides per day. The numbers of slides ranged from 1 to 100 per day. Using 50 slides per day as a dividing line, 97 respondents (42%) evaluated 50 or fewer slides and 134 respondents (58%) evaluated more than 50 slides per day. (Figure 1)

The age range was from 25 to older than 50 years, with 76.4% of responding cytotechnologists having more than 6 years experience in the field. There were 197 (80.7%) females and 47 (19.3%) males. The workplaces were divided into 4 categories with the independent laboratories and hospital laboratories almost equal in number. (Table 1, Figures 2 and 3)

In this survey, 85% of the respondents reported some degree of musculoskeletal discomfort. A high prevalence of musculoskeletal symptoms has been reported in all published studies addressing the ergonomics of microscopy.^{1,7,8,9} In the United Kingdom, where “cytoscreeners” are limited to approximately 32 slides per day, a study of all cytology staff (laboratory assistants to doctors) found that “77.7% reported experiencing muscular discomfort, with 52.2% only ever experiencing pain at work.”⁸ (Table 2)

Discussion/Conclusions

Because studies have consistently shown that a disproportionate number of microscopists suffer from musculoskeletal complaints, increased workload numbers may adversely affect cytotechnologists.^{1,7,8,9} This should be taken into consideration if workload limits are revised, since excessive workloads may compromise accuracy. The United Kingdom study states that “muscular discomfort was found to adversely affect the level of concentration ($r=-0.02, P<.01$)”.

In recent years, the medical field has begun to share industry’s focus on increased productivity. Principles identified by industry are also applicable to the cytology laboratory. Frequently, these principles translate into achieving increased production with fewer employees. Industrial “lean manufacturing” methods integrate corporate strategy, structure and capabilities to create an organization that operates in the most efficient manner with the least waste. Safety professionals involved with “lean manufacturing” processes have noted a correlation between increased production “quotas” and increased ergonomic complaints.¹⁰

In order to sustain both accuracy and increased productivity, the implementation of new technologies should be paired with ergonomic training, the use of ergonomically designed microscopes, ergonomic aids, and ergonomic optimization of the entire workstation. Mini-breaks and other workpractice modifications will also help alleviate the problem. In the absence of such interventions, any production increase due to the new monolayer and automated-assisted screening cytology technologies may be offset by a concurrent decrease in productivity and accuracy due to discomfort and fatigue of the cytotechnologists.

It is hoped that this study may give some insight into actual workload numbers and will help with improved restructuring of the workload limits for cytotechnologists. Even though the average reported number of 55.4 slides per day is far below the maximum of 100 slides, the fact that 85% of these cytotechnologists have musculoskeletal discomfort should be a matter of concern. When workload limits are redefined, the physical limitations of the cytotechnologists, as well as the actual time required to evaluate a slide, should be taken into consideration. LM

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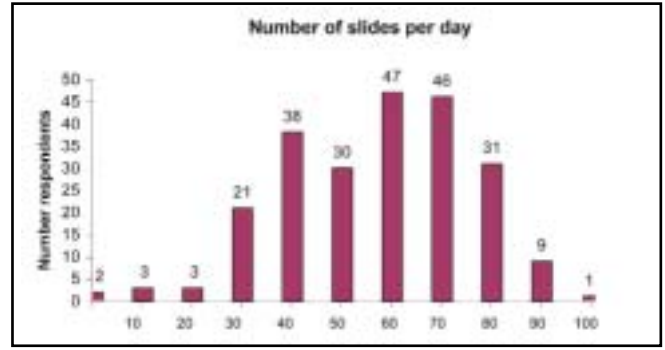


Figure 1_Number of slides.

Table 1_The Typical Respondent

- evaluates 60-70 slides per day
- is older than 50 years old
- works 6 to 8 hours per day, 5 to 6 days per week
- is employed by a hospital or independent laboratory
- has been employed in the present position for more than 8 years, and
- has worked in the profession for more than 20 years

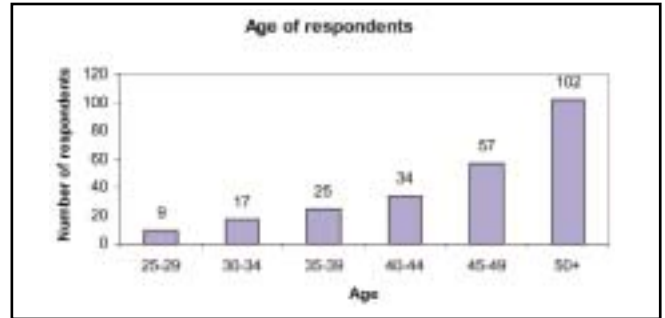


Figure 2_Age or respondents.

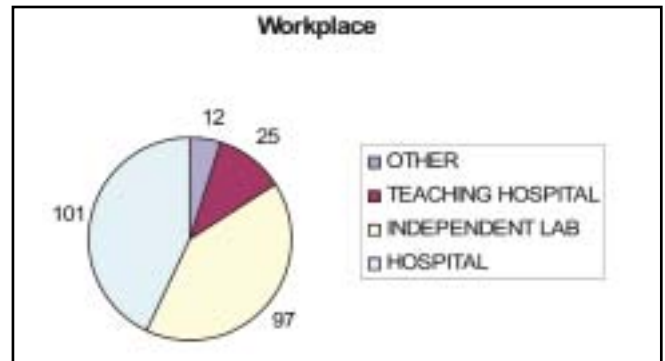


Figure 3_Workplace.

Table 2_Ergonomic Discomfort

Anatomical Location	Percentage Reporting Discomfort
Neck	58.5%
Lower back	56.9%
Wrist, right	55.1%
Headache	54.7%
Upper back	52.7%
Hands and fingers, right	47.5%
Hands and fingers, left	37.3%
Wrist, left	37.0%

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