

Ready or not? Perceptions of the strengths and weaknesses of newly qualified Medical Microbiologists entering practise in South Africa

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Thesis presented in partial fulfilment of the requirements for the degree of MPhil in the Faculty of Medicine and Health Sciences at Stellenbosch University

December 2012

Declaration:

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December 2012

Abstract:

Title: Ready or not? Perceptions of the strengths and weaknesses of newly qualified Medical Microbiologists entering practise in South Africa

Purpose of the Research:

To obtain more comprehensive data on the perceptions of strengths and weaknesses in Medical Microbiological Pathology training against the background of rapidly changing pathology services.

Methods:

On-line surveys were conducted of potential employers and recent graduates of Medical Microbiology and Clinical Pathology.

Results:

There were 15 employer respondents and 19 newly trained pathologist respondents out of the 88 pathologists that were identified to participate in the study. From the employers' standpoint, the majority expressed overall satisfaction with newly trained pathologists. Specific areas of deficiency were Administration, Management and Research. In addition, almost a half of employers agreed that the same amount of guidance and support for newly trained pathologists is needed now than was required a decade ago. Newly trained pathologists did not appear to be inappropriately overconfident in their abilities. In selecting new pathologists, employers perceived ability to work in a team, academic knowledge and interpersonal skills as the most important applicant characteristics. When newly trained pathologists were asked why they thought they were offered their position, the responses were very varied, ranging from academic background to contractual obligations.

Conclusion:

We believe that with this study some insights were obtained into the perceived strengths and weaknesses of newly trained pathologists entering Microbiology Pathology Services and that the results of the study can be used as input for further discussions and training of pathology registrars.

Opsomming:

Titel: Gereed of nie? Indrukke van die graad van gereedheid van nuut gekwalifiseerde Mediese Mikrobioloë om te praktiseer in Suid-Afrika

Doel van die Navorsing:

Om meer omvattende data te bekom oor die tekortkominge en sterk punte in Mediese Mikrobiologiese Patologie opleiding in ag genome huidige vinnig veranderende patologie dienste.

Metodes:

Internet-gebaseerde vraeboë is gerig aan potensiële werkgewers van patologie asook nuut gekwalifiseerde graduanti van Mediese Mikrobiologie en Kliniese Patologie.

Resultate:

Van die 88 patologie wat uitgenooi is om deel te neem aan die studie het 15 werkgewers en 19 nuut gekwalifiseerde patologie deelgeneem. Die meerderheid van die werkgewers was oor die algemeen tevrede met nuwe aanstellings. Spesifieke areas waaraan meer aandag behoort te gee word, is Administrasie, Bestuur en Navorsing. Bykans die helfde van die werknemers het saamgestem dat nuut gekwalifiseerde patologie nou dieselfde hoeveelheid bystand en ondersteuning benodig as patologie 'n dekade gelede. Dit wil voorkom asof die nuut gekwalifiseerde patologie nie oormatige selfvertroue in hulle eie vermoëns het nie. Werkgewers het die volgende eienskappe as die belangrikste ge-ag as hulle nuwe patologie aanstel: vermoë om in 'n span te werk, akademiese kennis en interpersoonlike vaardighede. Toe nuut gekwalifiseerde patologie gevra is hoekom hulle dink hulle is aangestel was die antwoorde baie uiteenlopend en het gewissel van akademiese prestasie tot kontraktuele verpligtinge.

Gevolgstreking:

Ons glo dat met die resultate van hierdie studie ons beter insigte bekom het oor die tekortkominge en sterk punte van nuut gekwalifiseerde patologie wat Mikrobiologiese Patologie Dienste betree. Hopelik sal hierdie studie 'n bydrae kan maak tot die toekomstige beplanning van nagraadse patologie opleiding.

Acknowledgements:

1. Prof. E Wasserman for her supervision, guidance, support and inspiration of medical educational research
2. Prof. J Bezuidenhout for assistance with the internet-based survey instrument
3. Pathologists at NHLS, Pathcare, Ampath and Lancet Laboratories for participating in the study

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Ready or not? Perceptions of the strengths and weaknesses of newly qualified Medical Microbiologists entering practise in South Africa

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INTRODUCTION

Medical Microbiology is one of the clinical pathology disciplines concerned mainly with the prevention, diagnosis, and treatment of infectious diseases caused by bacteria, fungi and parasites. The profession of Medical Microbiology consist of the following major spheres of activity:

- Scientific and administrative direction of a clinical microbiology laboratory
- Provision of clinical consultations on the diagnosis and management of patients with infectious diseases
- The establishment and direction of hospital infection prevention and control programs
- Public health and communicable disease prevention and epidemiology¹

Medical Microbiologists, especially those in South Africa affiliated with academic hospitals, are responsible for teaching of undergraduate medical students, students in other health disciplines, post-graduate science students and registrars in their own and related fields. Medical Microbiologists also provide continuing education to medical practitioners and other health care professionals. Many are involved in medical research and in the supervision of research projects of post graduate students.

A medical doctor is considered qualified to practise Microbiological Pathology in South Africa if he or she has obtained a degree in Microbiological or Clinical Pathology and is registered as a Microbiologist or Clinical Pathologist with the Health Professions Council of South Africa (HPCSA). For the purpose of this article I will refer to Medical Microbiologist and Clinical Pathologist as 'pathologists'. Pathologists in South Africa can only be trained in a National Health Services Laboratory (NHLS) affiliated with an academic hospital. Since 2010 there is one national exit examination which a registrar must complete in order to register as a pathologist at the HPCSA. The exit examination is conducted by the Colleges of Medicine of South Africa (CMSA). The CMSA has on-line syllabi available that serve as guides for training institutions to compile Medical Microbiology and Clinical Pathology curricula.²

The main conditions stipulated by the CMSA in order to qualify for admission to the College examinations are as follows: for a registrar in Medical Microbiology the candidate must have completed a minimum of three and a half years of accredited training in a Department of Medical Microbiology of which at least six months is spent in an accredited Medical Virology laboratory. To qualify for admission for the Clinical Pathology examination a registrar must have completed a minimum of three and a half years of accredited training in pathology. These three and a half years must include a minimum of one year in each of Chemical Pathology, Laboratory Haematology and Medical

Microbiology. In addition registrars in Medical Microbiology and Clinical Pathology must submit a CRITICAL Portfolio (Certified Record of In-Service Training Including Continuous Assessment and Learning) to the CMSA to gain entrance to the exams, as well as a report on an original research project completed during the course of their training.²

In South Africa, as is the case abroad, the training of pathologists are facing many challenges. The rapid advances in technologies for pathology services have placed a spotlight on the adequacy of pathology training. In particular, perceived deficiencies in training have been declared in editorial opinions published in medical educational journals.^{3,4,5} Pathologists from the USA have confirmed these opinions with data obtained from surveys of community hospital pathologist employers and employees conducted in 1998, 2003, and 2005.^{6,7} These surveys were conducted because of recent changes in accreditation requirements from 5 to 4 years for anatomical pathology and clinical pathology training in the USA.⁷

To obtain more comprehensive data on the perceptions of strengths and weaknesses in Anatomic and Clinical Pathology training programmes in the light of abovementioned changes, the College of American Pathologists conducted a survey in 2005 of potential pathology employers (senior College of American Pathologist members, members designated as head of groups, and members of the Association of Directors of Anatomic and Surgical Pathology). Also surveyed were recent graduates of pathology residency programmes, who were identified as being junior members of the College of American Pathologists, were recent recipients of certification from the American Board of Pathology, or were contacted through their directors of pathology residency programs. There were 559 employer respondents and 247 recent graduates that participated in the study. From the employers' standpoint, the majority expressed overall satisfaction with recent graduates, but almost one third of employers indicated that new hires had a major deficiency in a critical area. Specific areas of deficiency were clinical laboratory management and judgment in ordering special stains and studies. One half of employers agreed that more guidance and support for newly trained pathologists were needed now than required 10 years ago. Academic employers were more satisfied than private sector employers. Newly trained pathologists did not appear to be overconfident in their abilities. Their perceptions of those areas in which they were most and least prepared were very similar to the rating provided by employers. Newly trained pathologists' ratings of their own preparedness were highest for specific aspects of general pathology and anatomic pathology, and lowest for specific aspects of clinical pathology and administration. In selecting new pathologists, employers perceived medical knowledge and interpersonal skills as the most important discriminating applicant characteristics.⁶

Although the duration of training of Medical Microbiologist and Clinical Pathologists in South Africa have not changed, the current HIV epidemic with its scourge of opportunistic infections including tuberculosis as well as the rapid advances in technology are drastically affecting our diagnostic services. It has not been established whether our current training programmes are addressing all the challenges facing newly qualified pathologists entering practise in Medical Microbiology in South Africa today. One of the biggest challenges is the rapid progress of research into practice and translating this to improved and affordable patient care. New technologies, including molecular diagnostics, no longer only belong in research laboratories. Newly trained graduates are expected to be knowledgeable in various molecular diagnostic techniques and have some experience in molecular work. Factors hampering the implementation of new technology are costs or cost-effectiveness in smaller

laboratories. Today, newly graduated pathologists are expected to be able to introduce new technologies while keeping cost and impact on clinical management in mind.^{8,9,10,11,12}

There is a movement towards diagnostic tests that can be done closer to the patient (so-called 'point-of-care' tests). There is an increasing demand for these tests because of the ease and flexibility to perform and interpret them. These tests are not without their problems and many of them do not meet the standards expected of validated laboratory tests and the results can be misleading, resulting in misdiagnoses and inappropriate patient management. The goal of the pathologist in conjunction with the manufacturers should be to improve the diagnostic accuracy of these tests. Therefore, pathologists have to be trained in many management issues relating to the evaluation, deployment and quality assurance of these test.^{7,8}

One of the most pressing problems facing Microbiologists, especially those in management, centres on the laboratory workforce. A number of studies performed in the USA have shown that there are more laboratory workers today leaving the workplace than are entering the workplace. These studies have shown that the average age of laboratory workers has increased to almost 50 years and when they retire, there are not enough newly educated replacements to take their places.^{8,9,10} It will be up to the pathologist of the future to find solutions for these problems. One of the first steps in tackling these workforce-related problems would be to ensure that the curricula for training pathologists are relevant and current in order to train them adequately in staff management and budget related issues.

As we are extending our laboratory services to cover more peripheral areas, the newly qualified pathologist may increasingly be expected to enter practise without the availability of close supervision. Examples would be newly qualified pathologists heading a community-based hospital laboratory or a small private laboratory. This new shift in service delivery will no doubt impact on pathology training.

The main aim of this study was to obtain more comprehensive data on the perceptions of pathologists practising in the field of Medical Microbiology of strengths and weaknesses in current training, which can be used as points of further discussion and recommendations for training in Medical Microbiology.

MATERIALS AND METHODS

We conducted a survey of potential pathology employers (Medical Microbiologists or Clinical pathologist in management positions). Also surveyed were recent graduates of Medical Microbiology and Clinical Pathology training programmes, who qualified as practitioners since 2000. To do this, two corresponding surveys were designed to ascertain whether a set of skills are sufficiently developed upon graduation. In order to examine this question in more depth, the following four major skills sets that a newly trained pathologist have to be competent in, were categorised as:

1. administration/management
2. service delivery
3. research
4. teaching

Due to the ease of administration, relative low cost and possibility to standardize the two surveys' questions and to reach the target population over the shortest time period, it was decided that on-line surveys would be conducted using an internet-based survey tool.^{13,4,15,16,17} We modelled most of the content and format of the general pathology questions in our study on the 2005 College of America study⁶, described in the introduction, and added some questions relating specifically to the practise of Microbiology and Clinical Pathology in South Africa..

Employer Survey

The target population of the employer survey was Medical Microbiologist/Clinical Pathologist who hire and employ newly qualified Medical Microbiologist/Clinical pathologist. The survey was designed to assess employer satisfaction with the quality of applicants for pathology positions and employer perceptions of the strengths and weaknesses of new employees. In addition the survey included a question on the hiring process to ascertain what qualifications and characteristics employers are searching for in newly trained pathologists.

Newly Trained Pathologists Survey

The target population of the newly trained pathologist survey was Medical Microbiologist/Clinical Pathologists who had completed their specialist training and begun employment during the last eleven years (graduated in 2000 or after). The survey was designed to assess the perceptions of these new pathologists regarding the extent to which they were prepared by their registrar training for their new role as pathologists. An additional question was included that asked newly trained pathologists why they thought they were offered their position.

In order to ensure as representative a sample as possible, potential respondents were identified using the electronic mailing lists of the National Health Laboratory Service (46 pathologists) and three of South Africa's biggest private laboratory practice groups (42 pathologists) [n=88]. An e-mail was send to all the potential participants (employers and new hires) in April 2011, containing links to the two Web-based surveys. The survey instrument can be viewed in Textbox A.

Textbox A: The survey instrument

Dear Colleague

You are kindly invited to participate in an on-line survey. The survey forms part of a research project for a MPhil degree in Health Science Education at the University of Stellenbosch, Tygerberg Hospital. If you agree and qualify to participate you will be asked to complete either one of two surveys (or both), namely an employer survey or a newly trained microbiologist/clinical pathologist survey.

The EMPLOYER survey is designed to assess employer satisfaction with the quality of applicants for medical microbiological pathologist/clinical pathologists positions and employer perceptions of the strengths and weaknesses of new hires.

The NEWLY HIRED medical microbiological pathologist/clinical pathologists survey is designed to assess new pathologists' perceptions of the extent to which they are prepared by their registrar training years for their new role and job requirements.

The research project has passed ethical review from the Research Committee of the Faculty of Health Sciences, Stellenbosch University. The data of the survey can be published in a local or international medical education or pathology journal. The surveys will be conducted anonymously and the researcher will be blind to the identities of the respondents nor will the names of the respondents be published.

To summarise:

If you are currently involved in any way in the hiring process of newly qualified microbiologist/clinical pathologist, please complete the on-line EMPLOYER survey at the following link:

<http://www.surveymonkey.com/s/9R7DY3G>

If you have qualified as a microbiologist or clinical pathologist during the last eleven years (graduated in 2000 or after) please complete the NEWLY HIRED microbiologist/clinical pathologist on-line survey at the following link:

<http://www.surveymonkey.com/s/9RHJ5V6>

Your participation in the survey is strongly encouraged in order to identify possible gaps in our current microbiology registrar training programmes. Kindly submit the survey within 2 weeks.

Kind regards

Dr. Rena Hoffmann
Researcher
Medical Microbiologist
NHLS Medical Microbiology
Tygerberg Hospital

Each survey consisted out of 14 similar questions, formulated differently for the two groups of respondents. The survey listed some of the more important things that registrars are taught in the core training programmes. The CMSA recommends the core training essentials as scientific knowledge of microbiological pathology, knowledge of infectious diseases, laboratory safety, sterilization and disinfection, handling of specimens, antimicrobial investigations, new and emerging technologies, data handling, clinical experience, infection control, laboratory quality control, laboratory audit and accreditation and laboratory management, including budget control, personnel management and administration.² Employers and employees were asked to score their perceptions of how prepared and skilled newly qualified pathologists were in applying some of these core essentials in their new workplace. The options of scoring included *Very much so*, *For the most part*, *Somewhat*, *Only slightly*, *Not at all* or *Not applicable*. A few open-ended questions were included with space provided for free text comments.

According to the e-mail instructions, respondents that qualified to participate had to click on either the link to the employers survey or the newly trained pathologists survey. The surveys were not designed to give an opportunity for feedback if a recipient did not qualify to participate. Due to an initial low response rate, the survey had to be circulated several times.

The data was captured by an internet-based survey tool, which provided limited statistical analysis.¹⁷ The surveys were not meant to be a statistically or scientifically precise instrument, but rather was intended to give a “reflection” of the accomplishments and training needs of Microbiologists. The web-based instrument collected responses to the survey in an anonymous manner and the study received ethical clearance from the Research Committee of the Faculty of Health Sciences, University of Stellenbosch (Ethics reference no: N10/03/100).

RESULTS

The response rates of the surveys are shown in Table 1.

Table 1: Employer and Newly Trained Pathologists Survey Response Rates

Total No. of Survey Recipients	Total No. of Completed Surveys	No of Employers Surveys Completed	No of Newly Trained Medical Microbiologist Surveys Completed	Survey Response Rate %
88	34	15	19	38

Respondent Demographics

Employers. Current Position and Practice Setting: A total number of 15 pathologists out of the total number of 88 pathologists on the mailing list selected to complete the employer survey which indicated that they are involved in the process of hiring other pathologists. Of these, seven described their current position as a *Head of a Division/Department in the NHLS*, three as *pathologist in Academic Hospitals in the NHLS*, and the remaining five identified themselves as *Pathologists in Private Practice*.

The largest number of employer respondents (eight) indicated that their practice setting is an *Academic Hospital in the NHLS*. The remaining respondents reported that they worked in *Private Laboratories* (five) or *Other Laboratories* (two), which included the National Institute of Communicable Diseases (NICD). Figure 1 depicts the percentage of employers who fell into each practice setting category included on the survey.

Newly Trained Pathologists. Practice Setting: A total number of 19 pathologists out of the total number of 88 pathologists on the mailing list completed the newly trained pathologist survey. As shown in Figure 2, the largest group (eleven) of newly trained pathologists indicated they were employed with an *Academic Hospital in the NHLS*. Six pathologist indicated that they were employed by a *Private Pathology Group*, one with a *Smaller Laboratory in the NHLS* and one with the *NICD*.

Figure 1: Responses to the question “Which of the following best describes your practice setting?” on the Employer questionnaire

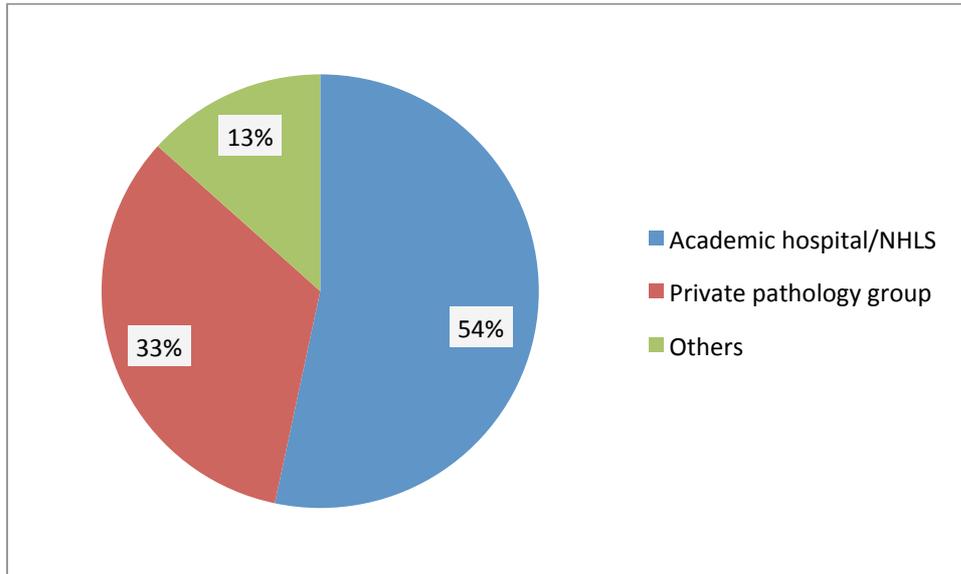
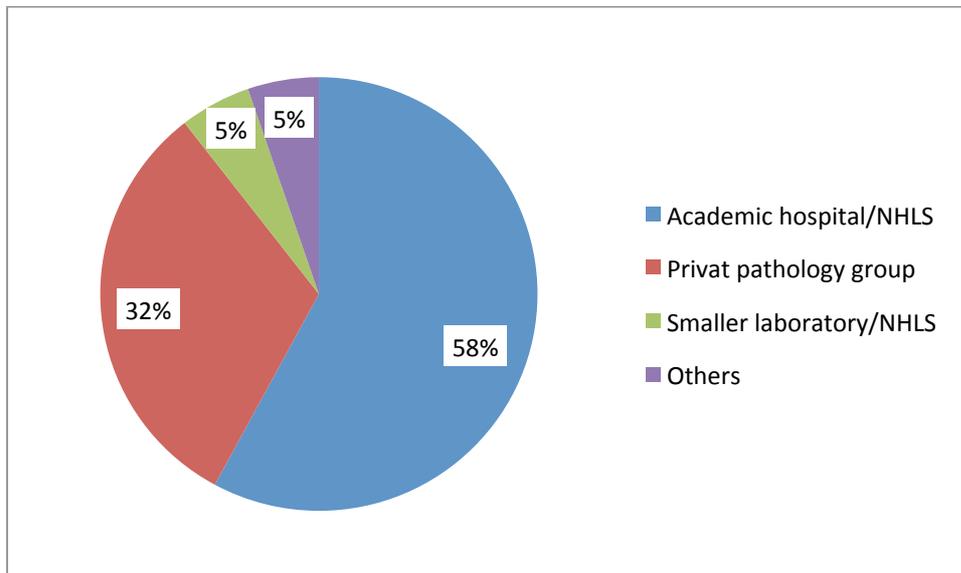


Figure 2: Responses to the question “Which of the following best describes your practice setting?” on the Newly Trained Pathologist questionnaire



Overall Perceptions of Registrar Training and Preparedness for Practice

In general, **Employers** were satisfied with the preparation of new hires that had recently completed their registrar training:

- A total of ten of the 15 employer respondents were *Satisfied* with their new employees and two were *Very Satisfied*, two indicated they were *Neutral*, and one was *Very Dissatisfied*.
- When asked to rate the extent to which newly trained pathologists they hired were prepared to enter practice, 11 employers reported that the newly hired were *Prepared*. None of the employers indicated that newly trained pathologists were *Very Prepared* to enter practice. Two reported that the newly hires were *Somewhat Prepared*, one reported that they were *Only Slightly Prepared* and one reported that they were *Not at all Prepared*.

Three out of the 15 **Employers** indicated that newly trained pathologists had major deficiencies in critical areas. Some of the responses of the employees when asked to describe what deficiencies they found among newly trained pathologists are indicated in Table 2.

Table 2: Free text responses of Employers to the question “Describe what deficiencies you have found among Newly Trained Pathologists”

Sample Responses
<ul style="list-style-type: none"> • “Deficiencies in laboratory management and research” • “Clinical skills and basic diagnostic technology” • “Epidemiology and statistics project management” • “Confidence to work independently is sometimes lacking, although this is understandable and should improve with time” • “A more comprehensive view of health care systems and the role of pathology and pathologists in patient management also take some experience to mature. ...it may help to expose registrars to different laboratories during their training”

Similarly, most **Newly Trained Pathologists** reported that they were confident in their skills as pathologists as a result of their registrar training.

- When asked to rate their confidence in their skills as a pathologist, only one out of the 19 newly trained pathologists indicated that he or she was *Extremely Confident*, fourteen indicated they were *Confident* and 4 were *Somewhat Confident*. None of the respondents answered *Not at all Confident*.
- When asked to rate their preparedness to enter practice, eleven felt *Prepared*, whereas one respondent felt *Very Prepared*, six *Somewhat Prepared*, one *Only Slightly Prepared* and none of the respondents indicated that they felt *Not at all Prepared*.

Thirteen out of the 19 **Newly Trained Pathologists** indicated that they felt they had major deficiencies in critical areas. Table 3 indicates some of the responses when they were asked to “Describe some of the major deficiencies that you experienced if any when you started your employment”.

Table 3: Free text responses of Newly Hired Pathologists to the question “Describe any major deficiencies that you experienced when you just started working”

Sample Responses
<ul style="list-style-type: none"> • ‘Managing laboratory personnel. Understanding the hierarchy of the NHLS. Understanding to utilize DISA for data management’ • “Infection control...clinical interface...” • “Infection control, laboratory management, epidemiology, outbreak investigation, laboratory information systems.” • “Understanding the administrative duties...issues involved with being a pathologist. I think one only realizes what this entails (and even that it exists) once you get placed as a pathologist.” • “Practical infection control knowledge. Antibiotic dosing and administration.” • “Independent decision making on policy changes, management of the laboratory...” • “Molecular advances in microbiology and research, drawing up protocols and writing papers.” • “Management, budget, research.” • “Infection control!” • “Administrative issues, management issues...” • “Virology queries...” • “No training in evaluating new tests...No training in management and billing issues..., Not enough exposure to clinical consultations.”

Key Drivers of Overall Perceptions of Registrar Training and Preparedness for Practice

To investigate which factors shape employer satisfaction with the overall preparedness of newly trained pathologists to enter practice, both survey groups were asked to rate the extent to which newly trained pathologists had been prepared to perform competently in specific areas of Medical Microbiology practice : Administration and Management, Service Delivery, Research/Academics and Teaching.

Across all ratings of preparedness, employers and newly trained pathologists were in agreement regarding those areas in which recent graduates were most and least prepared. As shown in Table 4 the pattern of ratings for each group from highest to lowest was very similar, with both groups indicating that newly trained pathologists were least prepared for aspects of Administration and Management and Research. Average preparedness rating (using a 6 point-rating scale) on Administration and Management ranged from 3.0 to 3.9 for employers and 2.3 to 3.5 for newly trained pathologists. Average preparedness rating on Research ranged from 2.9 to 3.4 for employers and 3.0 to 3.1 for newly trained pathologists. There was also some agreement that newly trained pathologists were most prepared for some specific aspects of Service Delivery as well as Teaching.

Table 4: Perceived Preparedness of Newly Trained Pathologists by Skill Set

Employers		Newly trained Pathologists	
Item	Mean Rating	Item	Mean Rating
Areas Receiving 5 Highest Preparedness Ratings			
Telephonic consultations with clinicians/clients	5.4	Telephonic consultations with clinicians/clients	5.3
Consultation on ward rounds	5.2	Undergraduate teaching and consultation on ward rounds	5.2
Advice on Infection control	5.0	Technologist/technician teaching	5.1
Meeting the expected turnaround time for reviewing laboratory results	4.9	Meeting the expected turnaround time for reviewing laboratory results	4.9
Technologist/technician teaching	4.7	Post-graduate teaching	4.8
Areas Receiving 5 Lowest Preparedness Ratings			
Understand regulatory and compliance issues related to the laboratory	3.9	Understand regulatory and compliance issues related to the laboratory	3.5
Understand and manage laboratory personnel	3.8	Write a grant application	3.3
Successfully write and publish a paper and supervise student research	3.4	Understand and manage laboratory personnel	3.1
Understand and manage billing issues	3.0	Supervise student research	3.0
Write a grant application	2.9	Understand and manage billing issues	2.3

The majority of employers indicated that they provided additional guidance and support to newly hired pathologists as part of the transition in their new roles as pathologists. When asked to compare this to a decade ago, seven out of 15 indicated that newly trained pathologists needed the same amount of guidance and support, whereas six indicated that newly trained pathologists needed more guidance and support compared to a decade ago. Six indicated that newly trained pathologists now need less guidance and one indicated that they need much more.

Hiring Practices

In selecting new pathologists, **Employers** perceived *Ability to Work in a Team*, *Academic Knowledge* and *Interpersonal Skills* as the most important applicant characteristics. A *Recommendation from the Head of the Training Program* was considered less important.

When **Newly Trained Pathologists** were asked why they think they were offered their position, the responses were very varied with responses that included academic background and training and contractual obligations. See Table 5 for some of the newly trained pathologists' comments.

Table 5: Free text responses of Newly Trained Pathologists to the question “Why do you think you were offered the position?”

Sample Responses
<ul style="list-style-type: none"> • “Passed exams, hard working, committed, good interpersonal relations” • “Academically sound, the formal qualification” • “I was employed internally. There was essentially no competition for the post which I applied...” • “...determination...” • “To fulfill contractual obligations” • “Qualified and enthusiastic” • “Not applicable...on NHLS contract” • “Retention clause of contract...placement in current job was not subject to any free choice” • “Hard to say. I had been doing locum work as a pathologist for a while, which probably helped, and the fact that I was applying for a post in the unit where I trained, which meant they knew me already...” • “Clinical pathology...self explanatory. Perhaps academic record.” • “FC Path (SA) Micro...hard working,,,reliable” • “FC Path Micro and vacant posts had to be created” • “There was a paucity of micropaths at the time in the facility...I came from a recognized institution, I performed well at the interview to display my knowledge as a good microbiologist...” • “Good marks and strong CV” • “Competent in clinical liaison and in lab skills” • “Agreed to also do marketing and promote practice...” • “Degree” • “At least 5 years post-graduate experience” • “My head of department recommended me for the position”

DISCUSSION

Ratings of both overall satisfaction with newly trained pathologists and preparedness of new hires were similar, with the majority of employers being satisfied, but not very satisfied, with applicants and felt they were overall prepared, but not very prepared, for their new role as pathologists. Only a small portion of employers provided less favorable ratings. One fifth of employers indicated that new hires had a major deficiency in a critical area. Seven out of the 15 employers felt that newly trained pathologists now needed the same amount of guidance and support compared to a decade ago.

Employers perceived that newly trained pathologists generally are better prepared for the different duties of Service Delivery and Teaching than they are for responsibilities pertaining to Administration and Management and Research. On average, employers' ratings of preparedness in specific aspects of Service Delivery ranged from 4.3 to 5.4 on a 6-point scale. In contrast, their ratings in specific aspects of Administration and Management ranged from 3.0 to 4.5 on a 6-point scale. This finding is similar to the study conducted by the Future of Pathology Task Group in the USA where deficiency in clinical laboratory management was identified among Anatomic Pathology and Clinical Pathology graduates.⁶

A closer examination of newly trained pathologists' ratings of their abilities suggests that they do not appear to be overly confident in their abilities. Notably, their perceptions of those specific areas in which they are most and least prepared are similar to the pattern of ratings of employers of pathologists, apart from teaching, in which they feel themselves better prepared than their employers judge them to be.

These results are of interest particularly because no such study has been performed in the South Africa before, and this sets the ground for curriculum improvement and the standardization of training across the various training institutions. The weakness of the study reflects the limitation of survey studies in general, where it can be argued that there is a lack of depth and insider perspective that occur with survey studies.^{14,15,16} At the time that the surveys were conducted, there were 118 Medical Microbiologists and 68 Clinical Pathologists registered at the HPCSA. The small sample size (partly because of the small community of Microbiologists and Clinical Pathologists in South Africa and partly due to the relative low response rate to the surveys) made it difficult to perform statistical analysis on the data. This was a single survey set, but it is of our opinion that it might be valuable in repeating this survey of both employers and recent pathology graduates at regular intervals, especially when changes are made at a national level regarding curriculum standardization.

CONCLUSION

The current Medical Microbiology workplace in SA, whether it is in Private Practice, an Academic Hospital laboratory or a Community-based hospital, expects newly trained pathologists to know and understands the needs of their clients and to be able to guide clinicians in patient diagnosis and management. Some of the challenges facing pathology services today are incorporating new technologies with cost-effective pathology services, despite shrinking workforces and financial constraints. Our ability to train future pathologists will have a major influence on how successfully we fulfill these challenges.

We believe that with this study some insights were obtained into the perceived strengths and weaknesses of newly trained pathologists entering Microbiological pathology services. It is our hope that the results of these surveys can be used as input for discussions and possibly recommendations for the future training of Microbiology and Clinical pathology registrars.

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