

# How much is not enough? Human resources requirements for primary health care: a case study from South Africa

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**Objective** To quantify staff requirements in primary health care facilities in South Africa through an adaptation of the WHO workload indicator of staff needs tool.

**Methods** We use a model to estimate staffing requirements at primary health care facilities. The model integrates several empirically-based assumptions including time and type of health worker required for each type of consultation, amount of management time required, amount of clinical support required and minimum staff requirements per type of facility. We also calculate the number of HIV-related consultations per district. The model incorporates type of facility, monthly travelling time for mobile clinics, opening hours per week, yearly activity and current staffing and calculates the expected staffing per category of staff per facility and compares it to the actual staffing.

**Findings** Across all the districts there is either an absence of doctors visiting clinics or too few doctors to cover the opening times of community health centres. Overall the number of doctors is only 7% of the required amount. There is 94% of the required number of professional nurses but with wide variations between districts, with a few districts having excesses while most have shortages. The number of enrolled nurses is 60% of what it should be. There are 17% too few enrolled nurse assistants. Across all districts there is wide variation in staffing levels between facilities leading to inefficient use of professional staff.

**Conclusion** The application of an adapted WHO workload tool identified important human resource planning issues.

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Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

## Introduction

The central role of human resources in the improvement of the health sector is increasingly recognized with a particular focus on planning, training, staff retention, scopes of practice of the staff and human resources management.<sup>1,2</sup> Staff costs typically represent around 70% of district health expenditure<sup>3</sup> and managers are under pressure to ensure optimum allocation of the right quantity of the right categories of staff to achieve maximum quality, efficiency and equity. Given changing patterns of population, burden of diseases, scope of practice and clinical practices this allocation needs to be reviewed at regular intervals. There are several approaches that could be used to assess appropriate allocation of staff.

The needs-based approach assesses the amount and scope of services to be delivered at each type of facility through a normative approach informed by experts' opinion. While very informative, this approach, when used alone, has several limitations. First, it equates needs

with demand. There is much published work on the impact of infrastructure, education, economic status, customs and beliefs on patterns of help seeking.<sup>4,5</sup> Needs are not always translated into demand for health services, and the needs-based approach may overestimate the level of health services to be delivered. Second, the needs-based approach is dependent on the package of services offered, and does not easily reflect changes in services offered. Third, there is an underlying assumption that health care resources will be deployed in accordance with relative levels of need. Human resources are often used to meet demands that do not coincide with needs, while the needs of many vulnerable and marginalised populations remain unmet. Finally, the needs-based approach does not adapt easily to changes in pattern of diseases or prevalence.<sup>6</sup>

The population-based approach defines ratios of health workers to population. These ratios are calculated from the target use rates built from the

needs-based approach. The population-based approach thus shares the same limitations as the needs-based approach. In addition, the population-based approach does not reflect rapid changes in population size well, nor does it reflect the impact of infrastructure or geographical access on use of health services.

A utilization-based approach takes the actual level of use over a year (i.e. the expressed demand) as the basis for calculation of staff requirements. However, this approach has often been used in a narrow fashion, and does not take into account variations in use of substitute health workers or the possibility of changing levels of productivity.<sup>7</sup>

In this paper we describe the adaptation of WHO's workload indicator of staff needs (WISN)<sup>8</sup> to reflect challenges and policy options in rural areas of South Africa.

## Methods

Inadequate numbers and poor distribution of health workers have been

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identified as crucial challenges for the South African health system, in particular in rural areas. The Primary Health Care Core Package for South Africa<sup>9</sup> defines clinics, satellites and mobile clinics as being nurse-based, with occasional sessions by doctors, and community health centres as being referral centres, requiring doctors on site. Nurses fall into three categories: professional nurses who have four years of training, enrolled nurses who have two years and enrolled nurse assistants who have one year.

The following assumptions and inputs were formulated after initial desk work to identify previous studies, followed by consultation with the National Department of Health, districts and facilities:

- Allocation of types of consultation to categories of health workers was done in collaboration with the South African Nursing Council, to ensure that existing scopes of practice were respected.
- Community health centres were allocated a resident doctor in line with policy, while clinics have visiting doctors whose target frequency of visit was defined by the district.
- Average length of consultation by type: a review was undertaken of existing studies using both a normative approach and actual observation in rural and urban settings.<sup>10,11</sup> Average values were calculated to give an average time per type of consultation. Child consultations and antenatal visits were made slightly longer to take into consideration the impact of HIV/AIDS. Care was taken to ensure that times per consultation reflected the fact that in rural areas nurses have to dispense medicines as part of the consultation more commonly than they do in urban areas.
- Clinical support requirement: the “needs-norms” research was used. This research combined time and motion study with target quality and efficiency considerations and suggested an average of 0.57 clinical support full-time employees per clinician. This estimate was then divided in equal parts between enrolled nurses and enrolled nurse assistants.
- Management time: in the absence of adequate research, an informal evaluation of these tasks in the Western Cape was used, which estimates that one full-time management post is required for every 200 patients a day.

- Administrative and cleaning-staff requirements: an existing time and motion study was used,<sup>12</sup> which estimated that one full-time administrative officer is required for every 100 patients a day and one full-time general assistant for every 150.
- Minimum staff requirements per type of facility: minimum staff was put at one professional nurse, one enrolled nurse assistant and a half-time general assistant for a clinic. For a community health centre, a doctor and a clerk were added as staff needed on duty at any point during the opening hours.
- Time off duty: 12 weeks were taken out for annual leave, sick leave, public holidays and training. In addition, it was assumed that while on duty, nurses and doctors spend 62% (5 hours) and 80% of their time, respectively, in direct contact with patients.

Besides these overarching assumptions, two areas required specific focus: the impact of HIV/AIDS and the impact of extended opening in rural facilities. The following assumptions were made:

- Overall, the impact of HIV/AIDS is reflected in increased attendances for counselling, prevention of mother-to-child transmission (PMTCT), treatment of opportunistic infections and antiretroviral follow-up, thereby increasing staff requirements. Average time for all antenatal visits was extended to reflect PMTCT activities. Opportunistic infections and antiretroviral follow-up are treated like other curative or chronic visits.
- The number of counselling visits was extrapolated from the number of pretest counselling visits, which represented less than 1.5% of the attendances. However, counselling also includes post-test, bereavement and ongoing counselling. It was thus assumed that 8% of the attendances would need counselling, from which the number of counsellors needed was assessed.
- Workload-based calculation of staff requirements must take into consideration the fact that, in facilities with extended hours, the workload does not spread equally across all hours. A study in Cape Town, showed that in facilities open 168 hours a week, an average of 70% of the attendances took place during the core 40 hours,

with the remaining 30% happening in the other 128 hours.<sup>11</sup> The tool allocated workload across opening hours along these proportions.

Once the modified assumptions had been built into the model and actual utilization data of the districts had been entered, the resulting staff requirements were discussed in another round of consultation with the rural districts to further test the validity of the assumptions against reasonableness of results.

Six of the poorest districts across four of the nine provinces in the country were identified by the National Department of Health for inclusion in the study. All 340 facilities in these six districts were included.

As output, the tool provides the expected staffing (full-time employees) per category of staff per facility and compares it to the actual staffing to provide a table with “gaps and excesses” per category of staff per facility. A ratio of 0% shows there are no staff in this position, and the value “N/A” indicates that this category of staff is not required in that type of facility.

The tool was developed in Microsoft Excel, software available in all districts. To increase ease of use, it is formula-driven, but, keeping away from the black-box approach, all assumptions and calculations are clearly spelt out in order to increase understanding and transparency.

## Results

All six districts had a drastic shortage of doctors, either seen as absence of doctors visiting clinics or too few, if any, doctors to cover the opening times of community health centres. Some districts had no doctors for primary health care. Overall the number of doctors was only 7% of the required number.

While the total number of professional nurses was 94% of the target, two districts had overall excesses and four had overall shortages. The numbers of enrolled nurses and enrolled nurse assistants were 60% and 83%, respectively, of what they should be. Counsellors were very unevenly spread, with the overall excess concealing their absence in many facilities. Administrative staff was 30% of the target and absent in many facilities. General workers seemed to be overall in greater number than required in many facilities.

Table 1. Distribution of health staff across 12 primary health care facilities in one subdistrict in South Africa

Type facility	Difference: actual–required							Percentage of staff (%)						
	Doctor	Professional nurse	Enrolled nurse	Enrolled nurse assistant	Counsellor	Administrator	General assistant/cleaner	Doctor	Professional nurse	Enrolled nurse	Enrolled nurse assistant	Counsellor	Administrator	General assistant/cleaner
C1	−0.04	−1.7	−0.8	0.2	−0.5	–	−0.7	No actual	−165	No actual	24	No actual	N/A	No actual
C2	−0.04	1.8	−0.6	0.3	−0.4	–	−0.7	No actual	44	No actual	33	No actual	N/A	No actual
C3	−0.04	0.7	−0.2	−0.1	−0.1	–	1.4	No actual	35	No actual	−9	No actual	N/A	68
C4	−0.04	−2.1	0.4	0.3	−0.4	–	−0.7	No actual	No actual	41	29	No actual	N/A	No actual
C5	−0.04	−2.5	−0.3	−1.3	−0.8	–	1.4	No actual	−125	−28	No actual	No actual	N/A	68
C6	−0.04	−3.6	−0.8	−2.3	−0.4	–	0.1	No actual	−355	No actual	−234	No actual	N/A	3
C7	−0.04	0.9	0.4	−0.4	−0.3	–	2.1	No actual	29	43	−36	No actual	N/A	70
C8	−0.04	3.4	−0.5	0.2	−0.3	–	1.3	No actual	68	No actual	16	No actual	N/A	67
C9	−0.04	−3.5	−0.5	−3.1	−0.2	–	−2.7	No actual	−173	No actual	−156	No actual	N/A	No actual
C10	−0.04	−2.2	−1.2	0.8	−0.8	–	−0.7	No actual	−109	No actual	40	No actual	N/A	No actual
C11	−0.04	1.8	−0.6	0.3	−0.4	–	1.4	No actual	45	No actual	33	No actual	N/A	68
C12	−0.04	1.7	−0.4	0.1	−0.2	–	1.4	No actual	57	No actual	5	No actual	N/A	68

N/A, not applicable.

Table 1 shows examples of imbalances between some facilities within the same subdistrict. Clinics C2, C8, C11 and C12 have an excess of professional nurses (positive number in the difference column) while most of the others have shortages. Some other facilities (e.g. C9 and C10) had shortages in all categories of staff.

Besides the very poor deployment between facilities, in clinics that have an excess of professional nurses there is a shortage of other health workers, such as enrolled nurses and counsellors, cancelling out the benefits of the excess in many facilities. The table shows the importance of assessing staff requirements not just in terms of professional nurses, but in terms of the whole team. Using the ratio of patients to professional nurses as an indicator of workload can be very misleading, as it does not reflect the presence or absence of sup-

porting staff who affect the workload of professional nurses.

Turning to the staff implications of extended hours opening in rural areas, the model showed that the minimum number of professional nurses (using professional nurses as an indicator) is 1.3 full-time employees for the core 40 hours per week and 4.2 full-time employees for the additional 128 hours, over three-times that of the core hours. This significant increase in staff requirements is not matched by a parallel increase in workload. In these rural districts, in facilities opened for 168 hours, the workload during the non-core hours was low: there were typically eight times more patients per hour during the core hours than during the non-core hours. As a consequence, the number of staff required defined by workload would have been significantly lower than that prescribed by the minimum staffing level.

## Discussion

The results from the use of the tool and assumptions showed misalignments between expected and actual staff, with significant variations between facilities within the same subdistrict, between subdistricts and between districts. While there is an absolute shortage of staff (especially doctors), this is substantially exacerbated by inequitable deployment. This leads to problems in both quality (when lower categories of staff are expected to perform functions of higher categories of staff) and efficiency (when higher categories of staff are expected to perform functions of lower categories of staff). This study also found that the present proposal of increasing access to health care in rural areas by extending opening hours would entail a significant increase in staff requirement.

There are some study limitations. First, the allocation of tasks per category of staff is probably conservative. We allocate all consultations to professional nurses when, in practice, some consultations are delivered by enrolled nurses, in particular in rural areas, even if not in accordance with the current scope of practice. This approach raises the issue of whether assumptions should be closer to a target picture in line with policy or closer to what is happening on the ground, resulting in different norms for urban and rural areas, thereby entrenching inequities further. Secondly, the assumptions do not sufficiently recognize the lack of referral support in rural areas and the concomitant need for comparatively better-qualified, mainly multipurpose cadres. Finally, the establishment of the norms have been built upon several studies using different methodologies. However, the size of the problems quantified show that even a 10% margin of error would not greatly affect the results or the type of issues they highlight.

The utilization-based approach to assessing staff needs has clear advantages for management and short-term planning purposes. However, sole reliance on a workload-based model may lead to an entrenchment of inequities: well-equipped and well-staffed facilities will attract many patients, and hence will receive additional staff and resources, while poorly staffed, poorly equipped and poorly managed facilities will see fewer patients as they bypass these facilities to go where they will receive better service. Thus the utilization-based approach cannot fully assist in the promotion of a more equitable system. However, a combination of this with a population-based approach may prove beneficial for medium-term planning. Taking the population as a reference it will be possible to assess the expected utiliza-

tion and compare it with the actual level. This would highlight possible issues around access (location), scope of services, quality of service (staff, availability of drugs and equipment), and opening hours. On this basis a reshaping, hence reallocation of utilization, exercise could be carried out.

### Policy consequences

Policy-makers in South Africa are aware of the shortage of public-sector doctors and nurses, especially in rural areas. Policy responses have ranged from community service to increasing monetary incentives.<sup>13</sup> Community service for doctors in underserved areas for a period of one year after their internship has increased the number of doctors serving in rural areas. However, only about 25% of eligible doctors were placed in district settings.<sup>14</sup> Our results also show that these policies, by themselves, have been insufficient to address the gap in the supply of these categories of staff. Evidence of continuing severe imbalances in the distribution of health personnel between urban and rural settings suggests that additional measures may be required in conjunction with the monetary incentives.<sup>15</sup> Thailand has successfully managed to combine monetary incentives with nonmonetary incentives to retain skilled health workers in rural areas. Nonmonetary incentives ranged from providing accommodation to introducing a system of peer review and recognition.<sup>16</sup>

Studies have shown that in Mozambique outcomes of interventions by surgical technicians are effectively identical to those of interventions by doctors in terms of complication rates<sup>17</sup> and surgical interventions associated with caesarean delivery did not differ in the two groups.<sup>18</sup> One South African policy has been to develop a cadre of mid-level workers. However, resistance

from local professional associations has hampered the introduction of cadres of mid-level pharmacists and psychologists.<sup>19</sup> Thousands of non-professional health workers are being contracted by the Department of Health to take on various responsibilities, including voluntary counselling for HIV, and adherence support for HIV and tuberculosis treatments. Innovative clinical guidelines and support approaches have also been developed to enable nurses to medically manage patients who would otherwise be seen by doctors.<sup>20</sup>

The shortage of nurses across South Africa is taking place in a context of a decreasing number of nurses being trained in the country.<sup>21</sup> This is partly a consequence of the fact that training for nurses, unlike that for doctors and other health workers, is financed from the provincial health budget and as such tends to be curtailed when other immediately more pressing demands are made on the budget. There is an urgent need to expand the training of nurses, perhaps by making it a national prerogative.

### Conclusion

Even in a middle-income country such as South Africa, the health system is struggling to retain sufficient numbers of skilled health workers in the public sector. Poor monitoring and management of skill combinations exacerbate this problem. As such the use of a tool like WISN, when adapted to the local situation, can not only help to better deploy staff between facilities, a kind of optimum management of scarcity, but can also help quantify the gaps to inform planning, training and allocation decisions at local, provincial and national levels. ■

**Competing interests:** None declared.

## Résumé

### Combien en manque-t-il ? Besoins en ressources humaines pour les soins de santé primaire : étude de cas menée en Afrique du Sud

**Objectif** Quantifier les besoins en personnel des établissements de soins de santé primaire d'Afrique du Sud en adaptant l'indicateur de charge de travail de l'outil d'évaluation des besoins en personnel de l'OMS.

**Méthodes** Nous avons fait appel à un modèle pour estimer les besoins en personnel des établissements de soins de santé primaire. Ce modèle intégrait plusieurs hypothèses reposant sur des bases empiriques et portant notamment sur le temps

et la catégorie d'agent de santé nécessaires pour chaque type de consultation et sur le temps de gestion, l'appui clinique et les besoins minimum en personnel pour chaque type d'établissement. Nous avons également calculé le nombre de consultations en rapport avec le VIH par district. Le modèle prenait en compte le type d'établissement, le temps passé par mois en déplacements pour les dispensaires mobiles, les heures d'ouverture par semaine, l'activité annuelle et les effectifs actuels

du personnel pour calculer l'effectif attendu par catégorie de personnel et par établissement et le comparer à l'effectif actuel.

**Résultats** Sur l'ensemble des districts, on constate soit l'absence de médecins pour visiter les dispensaires, soit leur nombre insuffisant pour couvrir les heures d'ouverture des centres de santé communautaires. Globalement, le nombre de médecins n'atteint que 7 % de l'effectif requis. Le personnel infirmier professionnel représente 94 % de l'effectif nécessaire, mais il existe de grandes disparités d'un district à l'autre, quelques-uns disposant de trop d'infirmières, tandis que d'autres n'en ont

pas assez. Le nombre d'infirmières ayant suivi deux années de formation atteint 60 % des besoins. Il existe une pénurie d'infirmières-assistantes de 17 %. Dans l'ensemble des districts, on relève d'importantes variations d'effectifs entre les établissements, d'où un emploi inefficace des professionnels de santé.

**Conclusion** L'application d'un outil d'évaluation de la charge de travail de l'OMS a permis d'identifier d'importants problèmes de planification des ressources humaines.

## Resumen

### Cuantificar la escasez. Necesidades de recursos humanos en la atención primaria de salud: estudio de casos en Sudáfrica

**Objetivo** Cuantificar las necesidades de personal en establecimientos de atención primaria en Sudáfrica mediante una adaptación del indicador OMS de las necesidades de personal en función del volumen de trabajo.

**Métodos** Se utilizó un modelo para estimar las necesidades de personal en los establecimientos de atención primaria. El modelo integra varios supuestos con base empírica, incluidos el tiempo y el tipo de trabajador sanitario requerido para cada tipo de consulta, el tiempo de gestión requerido, el grado de apoyo clínico necesario y las necesidades mínimas de personal por tipo de centro. Calculamos también el número de consultas relacionadas con el VIH por distrito. El modelo tiene en cuenta el tipo de establecimiento, el tiempo de viaje mensual para los consultorios móviles, las horas de apertura semanales, la actividad anual y la dotación de personal del momento, y calcula a partir de esos factores el número de trabajadores a prever por categoría de personal por establecimiento, comparándolo con la dotación real.

**Resultados** Se observa en todos los distritos ya sea una falta de médicos en los consultorios o un número reducido de médicos para cubrir las horas de apertura de los centros de salud de la comunidad. Globalmente el número de médicos equivale sólo al 7% de la cantidad necesaria. Las enfermeras profesionales suponen el 94% de las necesarias, pero se dan grandes diferencias entre los distritos, pues unos cuantos presentan un número excesivo mientras que la mayoría sufren un problema de escasez. La cifra de enfermeras contratadas equivale al 60% de la deseable. Hay un déficit del 17% de auxiliares de enfermería. Considerando todos los distritos se observan grandes diferencias en la dotación de personal entre un establecimiento y otro, que se traducen en un uso ineficiente del personal profesional.

**Conclusión** La aplicación de un instrumento de la OMS adaptado relacionado con el volumen de trabajo ha permitido identificar importantes aspectos de la planificación de los recursos humanos.

## ملخص

### ما هو العدد الكافي؟ متطلبات مرافق الرعاية الصحية الأولية من الموارد البشرية: دراسة حالة من جنوب أفريقيا

**النتائج:** تبين أن هناك إمّا غياب لأطباء العيادات الزائرين، أو أن عدد الأطباء اللازمين لتوفير التغطية خلال ساعات العمل في المراكز الصحية المجتمعية قليل جداً، وذلك على مستوى المقاطعات. وتبلغ نسبة الأطباء، بصفة عامة، 7% فقط من الأعداد المطلوبة. وهناك نسبة 94% من العدد المطلوب من الممرضات المهنيات، إلا أن التفاوت كبير في هذا الشأن بين المقاطعات، حيث توجد زيادة في بعض المقاطعات بينما النقص هو السائد في معظمها. وتبلغ نسبة الممرضات المسجلات 60% مما ينبغي أن يكون، في حين أن نسبة الممرضات المسجلات قليل جداً لا تتجاوز 17%. وهناك تفاوت كبير بين المرافق في جميع المقاطعات من حيث معدلات العمالة، مما يؤدي إلى استفادة غير فعّالة من العمالة المهنية.

**الاستنتاج:** أمكن التعرف على عدد من القضايا المهمة في مجال تخطيط الموارد البشرية من خلال تطبيق إحدى أدوات منظمة الصحة العالمية المعدلة الخاصة بتحديد أعباء العمل.

**الهدف:** التحديد الكمي لمتطلبات العمالة في مرافق الرعاية الصحية في جنوب أفريقيا عن طريق تعديل مؤشر أداة منظمة الصحة العالمية الخاصة بتقدير أعباء العمل لتحديد المتطلبات من العاملين.

**الطريقة:** استخدم الباحثون نموذجاً لتقدير المتطلبات من العمالة في مرافق الرعاية الصحية الأولية. وتألّف هذا النموذج من عدة افتراضات تجريبية المُرْتَكزَ اشتملت على وقت ونوعية العامل الصحي المناسب لكل نوع من الاستشارات، والوقت اللازم لتقديم التدبير العلاجي، وكَم الدعم السريري (الإكلينيكي) المطلوب، والحد الأدنى من العمالة التي يحتاجها كل نوع من المرافق الصحية. كذلك، قام الباحثون بحساب عدد الاستشارات ذات الصلة بالإصابة بفيروس العوز المناعي البشري في كل مقاطعة. ويضم النموذج أيضاً معلومات عن نوع المرفق الصحي، وزمن السفر الشهري بالنسبة للعيادات الجوّالة، وساعات العمل الأسبوعية، والنشاط السنوي، وعدد العاملين الحاليين، وحساب حجم العمالة المتوقع في كل فئة من العاملين بكل مرفق صحي، ومقارنة ذلك بالعاملين الفعليين.

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