

# Using the Workload Indicators of Staffing Need (WISN) – method to assess HR requirements and optimize processes in health care

Regina Thum<sup>1</sup>, Cornelia Wehner<sup>1</sup>, and Olav Goetz<sup>2</sup>

<sup>1</sup>Dresden International University (DIU), Dresden, Germany

<sup>2</sup>APOLLON University of Applied Science GmbH, Bremen, Germany

**Abstract.** Changing market conditions and increasingly scarce human resources require health care providers to analyze, review, and constantly adjust their processes within their healthcare facilities. A personnel requirement assessment based on the WISN method has proven to be a useful instrument for personnel planning, but also for identifying potential for improvement and process optimization. Based on a mixed method approach, using a systematic literature review, focus group-based experts discussions and interviews the WISN – method was applied to calculate human resource needs for a neurology team of therapists in a general hospital in Germany. Furthermore, the study intended to identify concrete measures for optimization. The results show that it is possible to calculate the required personal resources using the WISN-Method. Additionally, three support activities (daily documentation, weekly documentation, and scheduling) which, at 5.5 hours/week per therapist, tie up considerable working time could be identified. After implementing the optimization measures, a maximum of 1.36 full-time equivalents (FTE) therapists out of a team of 9.51 FTEs therapists could be saved or used for value-adding other health activities. It can be concluded that WISN is a good way to calculate Human Resource (HR) requirements and can help to increase transparency and efficiency in health care.

**Key words:** Workload Indicator of Staffing Need (WISN), Human Resources (HR), HR Management, HR Calculation, Optimization of health care services.

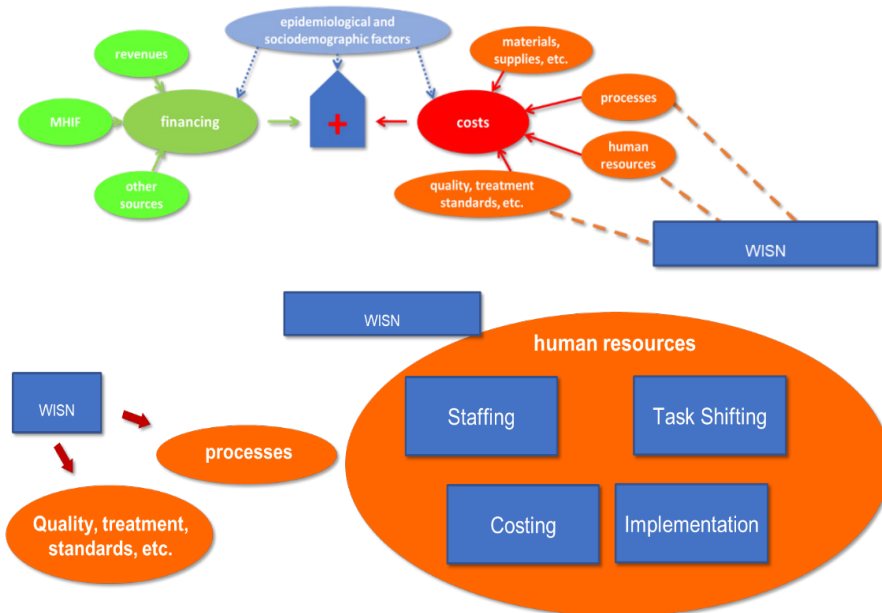
## 1 Introduction

Health Care Systems are facing several challenges. Changing market conditions and increasingly scarce human resources require health care providers to analyze, review and constantly adjust their processes within their healthcare facilities. A personnel requirement assessment based on the Workload Indicators of Staffing Need – Method (WISN) has proven to be a useful instrument for personnel planning, but also for identifying potential for improvement and process optimization [1-4].

The aims of this research is to assess and analyze the status quo processes of a team of neurologists in a hospital using the WISN method, and to calculate personnel requirements

and to identify possible weaknesses in the therapists' areas of activity as well as finding concrete measures for optimization.

Regarding the different challenges in health care mentioned above, WISN is a suitable tool and might help in several ways. WISN as a HR-Management Tool is especially useful regarding staffing, task shifting, or costing [4]. Additionally, due to WISN's structured approach [1], it can help to improve processes and support process management as well as improving quality and support the definition of treatment standards [4]. The following Fig. 1 indicates where WISN might fit in.



**Figure 1.** Where does WISN fit? Source: based on Goetz et al. (2022) [4].

## 2 Material and methods

### 2.1 Methods – Workload Indicator of Staffing Need (WISN)

Calculating HR and workforce requirements can be done using several different methods. Five commonly used methods for nurses are the professional judgement approach, the nurses per occupied bed method, acuity-quality method, timed-task/activity approach and regression-based systems [4-7]. All of these methods have their advantages and disadvantages and a systematic way to support staffing decisions would be highly valuable [4-6]. The Workload Indicators of Staffing Need (WISN) – method can be such a HR management calculation tool and might support HR management in health care.

The main idea of the WISN – method is to use activity analysis (activity standards) and measures of utilization and workload to determine staffing requirements [1, 4]. Based on that WISN calculates how many health workers of a particular type are required to cope with the workload of a given healthcare facility [1, 4]. Moreover, the workload pressure of healthcare personnel in the facility is evaluated using this method. The benefit of WISN lies in its consideration of variations in services provided and the complexity of care across different facilities [1, 4]. For a comprehensive explanation of WISN, please refer to the

WISN User Manual [1]. WISN has been developed by the WHO [1, 3] and is widely used [2, 4, 8-11].

WISN uses several steps to calculate the HR requirement. There are 8 steps to be followed [1, 4]:

- determining priority cadre(s) and health facility type(s)
- estimating available working time
- defining workload components
- setting activity standards
- establishing standard workloads
- calculating allowance factors ((Category Allowance Standard (CAS), Individual Allowance Standard (IAS))
- determining staff requirements based on WISN
- analysing and interpreting WISN results.

To utilize these steps effectively within the framework of a WISN study, additional analysis and, in certain instances, extensive data collection is necessary. For a comprehensive outline of the procedure, please see the manual, which provides a detailed description [1].

## 2.2 Materials

Based on a mixed method approach, using a systematic literature review, focus group-based experts discussions and interviews the WISN – method was applied to calculate human resource needs for a neurology team of therapists in a general hospital in Germany. Additionally, the study intended to identify concrete measures for optimization.

The data basis used for statistical calculation was 2019 to avoid any biases resulting from the Covid Pandemic in the following years.

The relevant Input data for the WISN calculation, especially the available working time and the workload components can be found in the following Tables 1 and 2. That corresponds with the WISN steps 2 and 3. The Input data for the other WISN steps can be seen in Table 3 in the results section of this paper.

**Table 1.** Estimating available working time (AWT). Source: own based on [1].

Description	Value
Available working hours/Day	8
Available working days/Week	5
Available working hours/Week	40 (40 = 8*5)
Available working days/Year	205 (205 = 260-55)
Available working hours/Year	1,640 (1,640 = 8*205=

**Table 2.** Setting activity standards. Source: own based on [1].

Health Activities	Unit Time
Individual Therapy	30 min/patient
Ergometre Training	30 min/patient
Physical Therapy (Fango/Electrical Stimulation)	30 min/patient
Group Therapy (Stationary Gymnastics)	45 min/group
Group Therapy (Spine Stabilization/Relaxation)	30 min/group

### 3 Results

The results of the analysis show that it is possible to calculate the required personal resources using the WISN-Method. Table 3 combines the calculations based on the first seven steps of a WISN HR resource calculation. It can be seen that, based on the assumptions made during the focus group discussions with experts and statistical input values a total number of **9.51 full-time equivalents (FTEs)** would be needed. The total number of the required staff for health activities sum up to **6.85 FTEs**. An additional **1.29 FTEs** would be needed to cover the Category Allowance Factor and another **0.68 FTEs** need to be added as an Individual Allowance Factor.

**Table 3.** Calculating Staffing Requirements using WISN. Source: own based on [1].

AWT: 1,640 hours				
Health service activity of all therapists	Workload Components	Annual Workload	Standard Workload	Required Number of Staff
	Individual Therapy	15,000	3,280	4.57
	Ergometre Training	3,640	3,280	1.11
	Physical Therapy (Fango/Electrical Stimulation)	3,640	3,280	1.11
	Group Therapy (Stationary Gymnastics)	520	17,500	0.03
	Group Therapy (Spine Stabilization/Relaxation)	780	26,240	0.03
A. Total Required Staff for Health Activities				6.85
Support activities of all therapists	Workload Components	CAS (Actual Working Time)		CAS (Percentage of Working Time)
	Daily Documentation	30 minutes/day		6.25%
	Weekly Documentation	1 hour/week		2.50%
	Appointment Scheduling	2 hours/week		5%
	Team Meeting	1 hour/week		2.50%
	Department Meeting	30 minutes/day		6.25%
Total CAS				22.5%
B. Category Allowance Factor: $\{1 / [1 - (\text{Total CAS} / 100)]\}$				1.29
Additional activities for certain members	Workload Components	Number of Staff Performing Activity	IAS (Actual Working Time per Staff)	IAS (for all Staff Performing Activity)
	Management Duties	1	8.0 hours/week	416 hours
	Handover	1	2.5 hours/week	130 hours
	Pain Discussion	2	3.0 hours/week	312 hours
	Intern Supervision	1	4.0 hours/week	208 hours
	Staff Representation	1	1.0 hour/week	52 hours
Total IAS				1,118 hours
C. Individual Allowance Factor: (Total IAS / AWT)				0.68
Total Staff Requirement as per WISN: $[(A \times B) + C]$				<b>9.51</b>

Additionally, to the total number of required staff three support activities (daily documentation, weekly documentation and scheduling) which, at 5.5 hours/week per therapist, tie up considerable working time, could be identified during the focus group discussions as potential areas for optimization. The following Table 4 illustrates the modified calculation and the total number of required staff after the optimization of the process (modification of the documentation as part of the support activities, reducing the weekly and daily documentation). Table 5 presents the staff requirements after implementing a computer-based scheduling system reducing the support activity of all therapists for this task to 0 hours/week, which will result in a CAS (percentage of working time) of 0,00%.

**Table 4.** Modification of support activities (documentation). Source: own.

Support activities of all therapists	Workload Components	CAS (Actual Working Time)	CAS (Percentage of Working Time)
	Daily Documentation	---	0%
	Weekly Documentation	---	0%
	Appointment Scheduling	2 hours/week	5%
	Team Meeting	1 hour/week	2.50%
	Department Meeting	30 minutes/day	6.25%
Total CAS			13.75%
B. Category Allowance Factor: $\{1 / [1 - (\text{Total CAS} / 100)]\}$			1.16
Total Staff Requirement as per WISN: $[(A \times B) + C] = [(6.85 \times 1.16) + 0.68]$			8.63

**Table 5.** Modification of support activities (computer-based scheduling). Source: own.

Support activities of all therapists	Workload Components	CAS (Actual Working Time)	CAS (Percentage of Working Time)
	Daily Documentation	30 minutes/day	6.25%
	Weekly Documentation	1 hour/week	2.50%
	Appointment Scheduling	---	0%
	Team Meeting	1 hour/week	2.50%
	Department Meeting	30 minutes/day	6.25%
Total CAS			17.5%
B. Category Allowance Factor: $\{1 / [1 - (\text{Total CAS} / 100)]\}$			1.21
Total Staff Requirement as per WISN: $[(A \times B) + C] = [(6.85 \times 1.21) + 0.68]$			8.97

After implementing the two optimization measures together, a maximum of **1.36 full-time equivalents (FTE)** ( $1.36 = 9.51 - 8.15$ ) therapists out of a team of 9.51 FTEs therapists could be saved or used for other value-adding health activities (see Table 6).

**Table 6.** Modification of support activities (documentation, computer-based scheduling).  
 Source: own.

Support activities of all therapists	Workload Components	CAS (Actual Working Time)	CAS (Percentage of Working Time)
	Daily Documentation	---	0%
	Weekly Documentation	---	0%
	Appointment Scheduling	---	0%
	Team Meeting	1 hour/week	2.50%
	Department Meeting	30 minutes/day	6.25%
Total CAS			8.75%
B. Category Allowance Factor: $\{1 / [1 - (\text{Total CAS} / 100)]\}$			1.09
Total Staff Requirement as per WISN: $[(A \times B) + C] = [(6.85 \times 1.09) + 0.68]$			8.15

## 4 Discussion and Conclusions

It can be concluded that WISN is a good way to analyze the tasks and HR requirements of healthcare Workers, especially therapists. This might help to identify potential task-shifting activities, avoiding duplicate working processes, increase the utilization of scarce resources, and help to improve efficiency in health care institutions.

The study and the results also show, that the current staff situation in the general hospital fits the HR requirements calculated based on the WISN method. Table 7 presents the results of the last step of a WISN – study, the analysis and interpretation of the WISN results [1, and chapter 2.1 in this paper]. It can be concluded that the current number of employees (9.51 FTEs) in the hospital is the same amount as the required number of employees based on the WISN calculation (9.51 FTEs). So there is neither a shortage nor a surplus and the staffing situation is in balance with a WISN ratio of 1.0 (WISN ratio = Current Number of Employees divided by Required Number of Employees (WISN calculation) [1]), which means that there is a normal work pressure in the hospital.

**Table 7.** Analysis and interpretation of WISN results. Source: own based on [1].

Therapy Team					
Current Number of Employees	Required Number of Employees (WISN Based)	Shortage or Surplus	Staffing Situation	WISN Ratio	Work Pressure
9.51 FTE	9.51 FTE	0	Balance	1.0	Normal

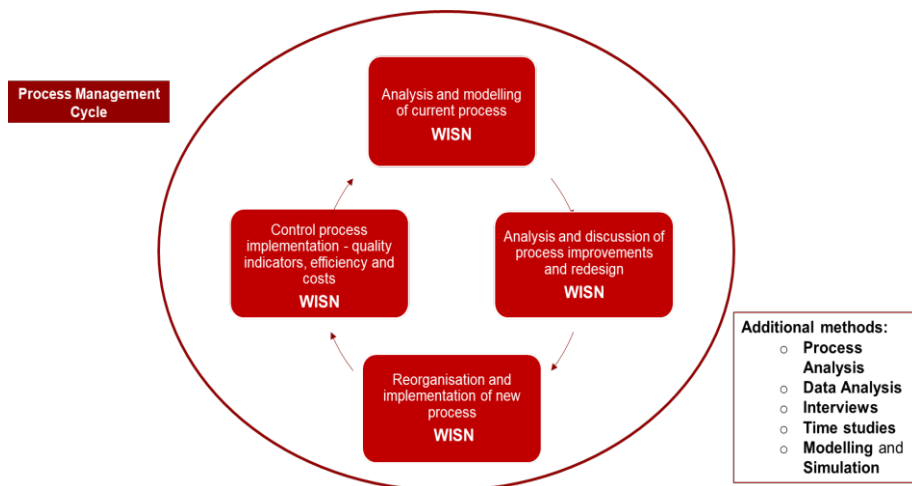
Although the presented study indicates that WISN is a good tool to calculate HR requirements it needs to be mentioned, that there are limitations of the used WISN method, too. The basis for calculating the staff requirements is based on the statistical data of 2019. Even if this avoids possible biases in the data due to e.g. a pandemic situation, it still was necessary to make assumptions due to a lack of available data. Additionally, it is highly recommended to update staff requirement calculations based on WISN regularly.

Nevertheless, WISN as a tool can improve transparency and efficiency in health care. Further research and a comprehensive WISN studies in healthcare facilities including

inpatient and outpatient facilities would be highly beneficial in Germany and many other countries.

Additionally, as the personnel costs are one of the main parts of costs in providing health care services using the WISN method in combination with cost accounting measures can be highly beneficial [4]. That is even more important if parts of the costs, which are currently often covered by lump sum payment and reimbursement systems, such as a Diagnosis Related Group (DRG) or the aG-DRG-System in Germany [12], are excluded from the lump sum payment and reimbursed based on cost and personnel data. These resource requirements could be calculated using WISN.

In addition to the advantageous aspects of utilizing WISN that have been highlighted earlier, there are also some valuable further benefits. Undertaking a WISN study involves a crucial and highly relevant process analysis. This analysis can serve as a tool to enhance quality within the framework of the process management cycle, leveraging additional methodologies like modeling and simulation. Figure 2 illustrates the potential enhancement of quality through the combined use of WISN and Process Management [4].



**Figure 2.** Improving Quality using WISN and Process Management. Source: Goetz et al. (2022) [4].

In summary, WISN serves as a valuable tool for evidence-based decision making and for guiding HR planning. Moreover, its simplicity and widespread use make it appropriate for diverse healthcare facilities across primary, secondary, and tertiary levels, including both inpatient and outpatient sectors. By generating data driven by need, demand, and processes, WISN can contribute significantly to cost calculations, thereby informing lump sum reimbursement systems (like DRG, aG-DRG) as well as quality and process management. The many capabilities of WISN are likely to be highly beneficial and of increasing importance in healthcare in the future.

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