

## 0. Introduction

This analysis is part of final exam for *EPA1124 Policy Analysis of Multi-Actor Systems* course at TU Delft.

The context of the analysis is the worsening nurse shortages in the healthcare sector in Highland. The cause of this worrying trend can be traced to the increasing job demand and responsibilities from demographic trends while facing a decline in working benefits and conditions (WHO, n.d.). The problem is likely to be a reinforcing loop - as working conditions become increasingly unideal, it disincentivises nurses from entering the industry, and as a result, further aggravates the situation where existing healthcare workers must deal with increasing workloads (Reyes, 2019).

The declining capacity of the healthcare sector has a direct impact on the health and well-being of a nation/region and policy interventions are needed to respond to this threat. The goal of the analysis is to aid the Highland's<sup>12</sup> Ministry of Health in forming a robust policy response which adequately tackles the shortage of nurses both in the short-term and long-term.

---

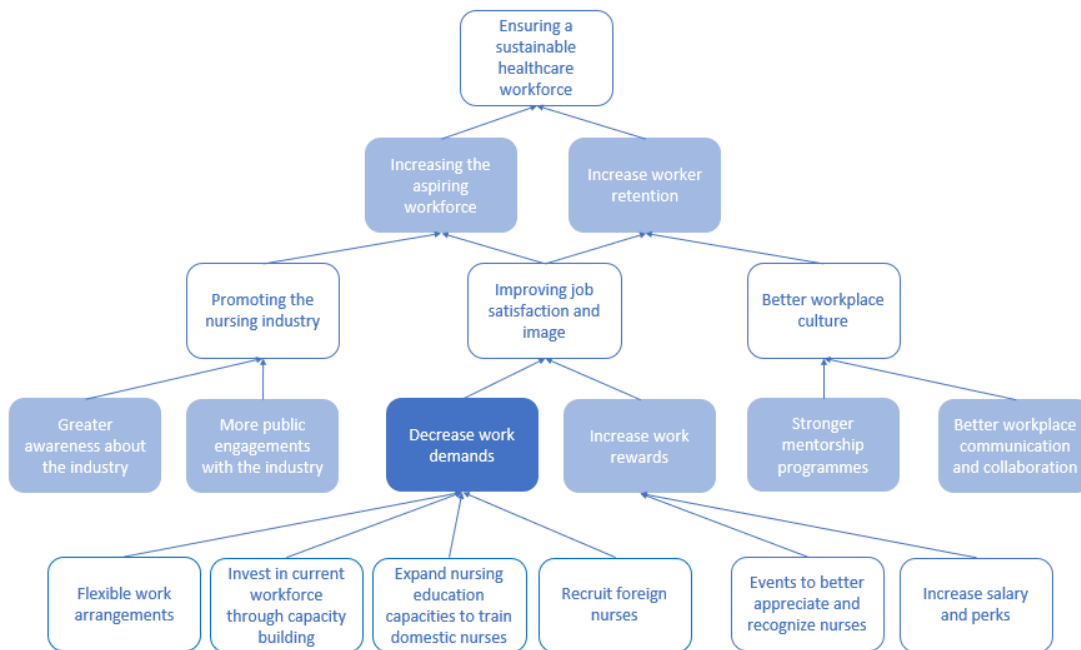
<sup>1</sup> With Highland as a made-up country, this paper will draw healthcare narratives and political structures from developed/ high-income countries (e.g., United Kingdom, Germany, United States) as inspiration for Highland's circumstances.

<sup>2</sup> Highland is also assumed to employ a public healthcare system

# 1. Problem Demarcation

## 1.1. Means-Ends Diagram & Focal Objective

From the client's brief, it is assumed that the goal of the Ministry of Health is to ensure a sustainable healthcare workforce to meet the needs of the population. The Ministry of Health, therefore, seeks organization-level solutions that maintain an adequate supply of nurses. The means-ends diagram in Figure 1 maps a hierarchy of possible means to achieve this goal.



**Figure 1: Means-ends diagram (darker box is our focal objective)**

Especially with the ongoing shortage of nurses, the Ministry of Health will need to address the immediate and long-term aspects of the issue. This comes in the form of *improving worker retention*, but also *increasing the aspiring workforce* (to meet future needs). Ideally, our focal objective should address these concerns to be of adequate scope.

Our chosen focal objective will be the **decrease work demands** (bolded in Figure 1) due to its significance to the problem context:

- 1) Its impact is substantial; there is a vicious cycle between work demand and labour shortage – where the decline in available staff will result in more work-related stresses and further exacerbate labour shortages. There is a need to address this before it will influence the present workforce through resignations and the future workforce through fewer interests in the industry (Reyes, 2019).
- 2) It will be difficult to solve; work demand can be a moving goalpost with the growing need for healthcare services e.g., COVID-19, the ageing population (Morris, 2022), and the present momentum of a downward spiral.

Figure 1 also shows four suggested means to achieve this focal objective.

## 1.2. Focal Means & Side Effects

With each focal means, side effects are identified and grouped as described in Table 1 below.

Means	Side-Effect	Description
Flexible work arrangement	Impact on personal life	Employers see flexibility to maximize efficiency and save costs, and it would require staff to fill rota gaps at short notice. This “flexibility” would cause it difficult for staff to plan life outside of work due to greater unpredictability (Timewise, 2017).
Invest in current workforce through capacity building	High cost	This is greatly limited by government/state funding for healthcare (Cameron, 2022).
	High lag time <sup>3</sup>	The introduction of tools (to relieve administrative and planning burdens) will take time before it comes into effect.
Expanding nursing education capacity to train domestic nurses	High cost	Expanding education to increase the domestic supply of nurses can be expensive in a high-income developing country, especially when the alternative of foreign nurses is much cheaper (Das, 2022).
	High lag time	Educational policies will have a long lag time before it has an actual influence on labour shortage in the industry.
Recruiting foreign nurses	Lack of robustness in supply of nurses	With a high reliance on foreign nurses to plug domestic vacancies, disruptions such as changes in immigration policies or global pandemics will hinder healthcare capacities (Buchan & Shembavnekar, 2020).
	Worsening inequities of health human resources between countries	With a global shortage of healthcare workers, rich countries often recruit foreign nurses from poorer countries. This provides a quick fix and solves the local shortages but causes other countries to be increasingly vulnerable (Farge, 2022).
	Low productivity	Due to cultural differences and a language barrier, it is expected that foreign workers would experience difficulties in communication which could result in overall lower productivity (Salleh et al, 2021).

**Table 1: Identification of side-effects of the focal means**

## 1.3. Problem Statement

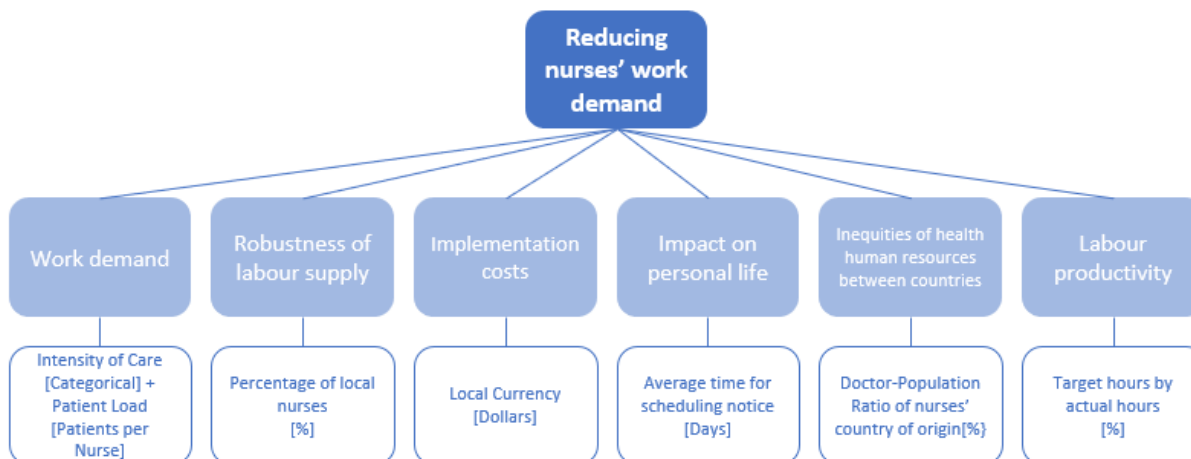
From the focal objective, the focal means, and their associated side-effects, we can develop a thorough problem statement to describe the Ministry of Health’s decision problem surrounding the nursing shortage:

*How can Highland’s Ministry of Health reduce nurses’ work demand without lowering labour productivity, compromising the robustness in the supply of nurses, incurring excessive implementation costs, exacerbating human resource equities between countries, and affecting workers’ personal lives?*

<sup>3</sup> *High Lag time* will not be included as a criterion as it depends on the nature of the shortage (immediate or long-term). However, this will be addressed in Scenario Testing (Section 3.5) as we assess flexibility.

## 1.4. Objectives Tree

The problem statement can be broken down into a set of objectives, each defined by a criterion and a metric. The six criteria are visualized in Figure 2 and further defined below in Table 2.



**Figure 2: Objectives Tree**

Means	Definition, Measured Unit
Work Demand	This is typically defined in the healthcare industry by the patient load which can be measured by the Nurse-to-Patient ratio but also depends on the criticality of care where differing types would expect different ratios (WoltersKluwer, 2016).
Robustness of labour supply	Robustness can be approximated by the proportion of local or domestic nurses over the total supply of nurses since domestic nurses are less sensitive to disruptions of immigration.
Implementation costs	Costs will be measured based on the local currency of Highland.
Impact on personal life	The extent of impact can be approximated by the average time taken to release scheduling for nurses (Timewise, 2017).
Inequities of health human resources between countries	Researchers typically measure staffing inequities through a Workers-to-Population ratio (Runnels et al., 2011), and by comparing the country of hiring to the country of the hirees, it can suggest if hiring practices are exacerbating the problem.
Productivity of nurses	Hospitals often monitor the productivity of the departments by dividing target hours over productive hours, where target hours are dependent on the budgeted hours per patient day (HPPD) (Hunt & Hartman, 2018).

**Table 2: Criteria and Definition**

## 2. System Diagram

This system diagram is illustrated in Figure 3 – the left boxes are the means M1 to M4 (obtained from section 1.2), the right boxes are the criteria C1 to C6 (established in section 1.4), and the links and nodes in between show the interlinkages of variables that determine how the means will affect the criteria. We also introduced three external factors (explained in section 2.2) on the top which we believe will influence the outcomes of the system

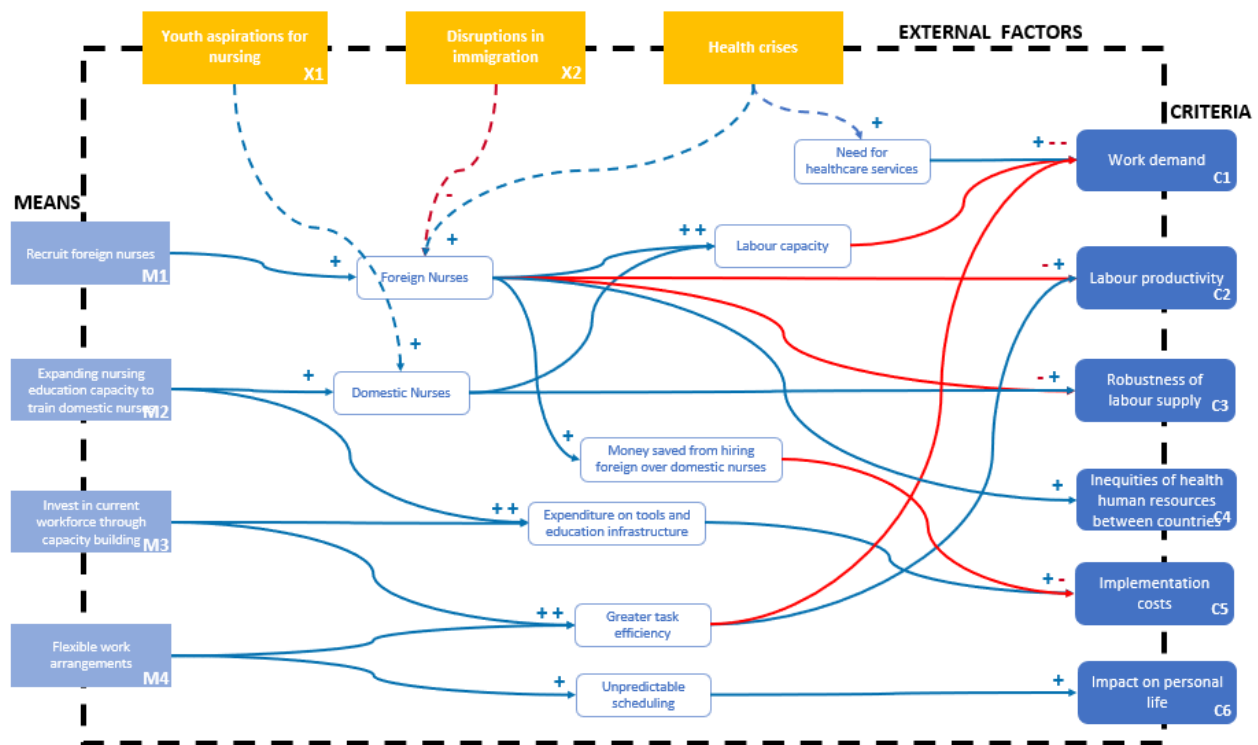


Figure 3: System Diagram

### 2.1. Causal Links

Each means generally aims to decrease the work demand of nurses but differs in their influence on other criteria.

**Recruiting foreign nurses** (M1) and **expanding nursing education capacity** (M2) are similar in ways as they address *work demand* through improving labour capacity. However, they defer in their dependencies on foreign nurses and domestic nurses for labour, and hence, result in different effects. Foreign nurses are a cheaper alternative to domestic nurses but have side effects on *productivity*, *robustness* and *equities* (as explained in Table 1). Training more domestic nurses are indeed costly as more education infrastructure is needed (Das, 2022) but they do not face the above issues.

**Capacity building** (M3) and **flexible work agreements** (M4) are also similar as they address task efficiencies to reduce work demand. They defer in the “expenses” they employ to achieve

this – for M3, it would be monetary expenses (C5), and for M4, it would be at the counterproductive expense of the nurses’ social lives (C6) (Timewise, 2017).

## 2.2. External factors

The following external factors are identified as significant to the problem space

- 1) The first factor is **youth aspirations for nursing (X1)** where we acknowledge that it could be heavily swayed by factors out of our control.
  - This will influence the number of domestic nurses.
- 2) The second factor is **disruptions in immigration (X2)** where the inflow of migrants will be either limited or delayed.
  - This will influence the number of foreign nurses
- 3) The third factor is **health crises (X3)** such as epidemics and pandemics.
  - This will influence the need for healthcare and creates pressure to hire more foreign nurses to meet this spike in demand (Buchan & Shembavnekar, 2020).

## 3. Qualitative Impact Assessment

This section attempts to understand the qualitative impact of the means, external factors, and scenarios on the criteria.

### 3.1. Means Scorecard

The means scorecard as presented in Table 3 illustrates the overall impact of each means on the criteria. A “+” or “-” in the table indicates the increase or decrease in the criteria respectively. The colour of a cell indicates whether the outcome is **desirable**, **undesirable**, **neutral or ambiguous** or has **no relationship**.

	Means	C1: Work demand	C2: Labour Productivity	C3: Robustness	C4: Inequities	C5: Implementation costs	C6: Impact on personal life
M1	Recruit foreign nurses	-	-	-	+	-	
M2	Expanding nursing education capacity to train domestic nurses	-		+		+	
M3	Invest in current workforce through capacity building	-	+			+	
M4	Flexible work arrangements	-	+				+

**Table 3: Means scorecard**

The means scorecard shows the inherent dilemmas of reducing the work demand of nurses.

- **M2 and M3** are similar in that they both reflect the trade-off of *implementation costs* (C5) to solve the *work demand* problem (C1). However, they both have other positive effects – M2 improves the *robustness of labour supply* (C3), while M3 helps in *labour productivity* (C2).
- **M1**, conversely, solves *work demand* (C1) while saving *implementation costs* (C5), however, it introduces quite a few undesirable effects (C2-C4).
- **M4** addresses both *work demand* (C1) and *labour productivity* (C2), however, negatively impacts the *personal lives of nurses* (C6), which is a unique effect of this means.

### 3.2. Choice of Preferred Policy

Based on the scorecard, our preferred policy is to **expand nursing education capacity (M2)** as it has the least undesirable effects (*implementation costs* (C5) can be controlled), yet achieve criteria which have great functional importance to the healthcare system (*work demand* (C1) and *robustness* (C3)).

### 3.3. External Factors Scorecard

Table 4 makes references to the external factors (identified in section 2) and documents their impacts on the criteria.

	External Factors	C1: Work demand	C2: Labour Productivity	C3: Robustness	C4: Inequities	C5: Implementation costs	C6: Impact on personal life
X1	Youth aspirations for nursing	-		+			
X2	Disruptions in Immigration	+	+	+	-	+	
X3	Health crises	+	-	-	+	-	

**Table 4: External factors scorecard**

An increase in **youth aspirations for nursing** (X1) will allow for more domestic nurses in the future which eases the workload (C1) and increase the robustness of the nursing capacity (C3).

**Disruptions in immigration** (X2) will increase *work demand* (C1) as it inhibits the supply of foreign nurses and would cost (C5) much more for domestic nurses to cover for them. However, the shift in reliance back to domestic nurses will allow greater *labour productivity* (C2), *robustness* (C3) and could curb international *health inequities* (C4) from foreign hiring.

**Health crises** (X3) will cause a spike in *work demand* (C1), which will typically be filled by the staffing of foreign nurses. Hence, this dependency on foreign nurses will lead to negative impacts (as explained in section 3.1 for M1) regarding *labour productivity* (C2), *robustness* (C3) and *inequities* (C4).

### 3.4. Scenario Analysis

To test the robustness of the chosen policy (M3), we identify three possible scenarios in descending order of severity (speed/intensity) as combinations of external factors to test the performance of the policy.

	X1	X2	X3	Speed/ Intensity of Disturbance	Description
<b>S1</b>	-	+	+	Rapid/ Heavy	A worst-case scenario would be during a <b>global health crisis</b> (e.g., the COVID-19 pandemic) where immigration is delayed or suspended, and the public perception of nursing as a career worsens due to more reported cases of burnout (Johnson, 2021).
<b>S3</b>			+	Rapid/ Mild	In a scenario of <b>mild epidemics</b> , there will be disturbances to the healthcare system, but are often controlled and not significant enough to affect aspirations or immigration processes. Typically, developed countries would often hire “travel” or “temporary” nurses to deal with the surge in demand (Rudderham, 2022).
<b>S2</b>	+			Slow/ Mild	In a best-case <b>post-crisis scenario</b> , the healthcare system is starting to stabilize, immigrations are business-as-usual, and nursing school applicants rise as youths were inspired by the crisis and hope to contribute to the growing healthcare needs of their society (Kowarski, 2020).

**Table 5: Proposed analysis scenarios in descending order of severity**

### 3.5. Robustness and Flexibility Evaluation

The cells present the effective outcome when the effects of the chosen policy are combined with the effects of external factors under the respective scenarios.

	X1	X2	X3	Speed/ Intensity	C1: Work demand	C2: Labour Productivity	C3: Robustness	C4: Inequities	C5: Implementation costs	C6: Impact on personal life
<b>S1</b>	-	+	+	Rapid/ Heavy	- /+ /+ /+	+ /-	+ /- /+ /-	+ /-	+ /- /+	
<b>S2</b>			+	Rapid/ Mild	- /+	-	+ /-	+	+ /-	
<b>S3</b>	+			Slow/ Mild	- /-		+ /+		+	

**Table 6: Scenario Analysis Scorecard in descending order of severity**

#### Robustness of policy

I would argue that our policy to **expand nursing education capacity (M2)**, is robust even without clear desirable results for all scenarios and criteria because it addresses the key exogenous pressures well (based on M2’s effects which are bolded).

Healthcare shocks are largely characterized by the surge in healthcare demand which requires labour to address. Our policy of choice M2 essentially targets these shocks at the core which is to invest a reasonable sum of *implementation costs* (C5) to ease *work demand* (C1) by stimulating the local supply of nurses, depending on the envisioned severity of the scenario (from S1 to S3). The policy has a much greater potential to resist the surge in work demand as compared to task



efficiencies which would have limited influences. In addition, by shifting dependencies to local nurses, the side effects C2-C4 of hiring foreign nurses will be largely kept in check.

#### Flexibility of policy

The policy, however, falls short in flexibility. Education policies have significant lag time (explained in section 1.2) which does not work especially well with most healthcare shocks which have rapid disturbances. This is additionally illustrated in the scenario analysis where S1 and S2 (rapid) seem to do worse overall as compared to S3 (slow).

S1 and S2 (rapid) also generate many negative side effects such as C2 and C4, while S3 (slow) does not; the policy only does well in slow-onset trends when the lag time matches the speed of disruption, and the healthcare system is not forced to employ short-term fixes that create more potential problems.

## 4. Actor Analysis

With acknowledging the flaws of our focal objective/ chosen policy, we transition to a multi-actor perspective to provide a broader view of solutions and considerations outside the Ministry of Health. We seek other possible approaches to the nursing shortage and - in a pragmatic sense, understand if they can be carried out.

#### Based on the case description, an exhaustive actor list is composed:

- 1) World Health Organization (WHO) [X]
- 2) Highland's Ministry of Health [a]
- 3) Highland's Ministry of Finance [b]
- 4) Highland's Ministry of Foreign Affairs [d]
- 5) Highland's Ministry of Education [c]
- 6) Universities and Nursing Schools in Highland [c]
- 7) National Union of Healthcare Workers [e]
- 8) Local Hospitals [a]
- 9) Domestic Nurses [e]
- 10) Foreign Nurses [X]
- 11) Countries of origin to foreign nurses [d]
- 12) Aspiring Nurses [e]
- 13) Patients [e]

#### Omitted Actors [X]:

World Health Organization (WHO) will not be considered as they do not hold institutional powers to influence decisions within the Highland (Kelland, 2020). Foreign nurses are omitted as they are less of a stakeholder but rather a 'rational consumer' whose decisions are mostly influenced by larger institutions with economic power (e.g., lucrative pay to work overseas).

Consolidated actors [a-e]:

Our problem context exists largely on the national level, hence, our focus on actors lies at the organization/government level within Highland which signals the conflicting interests when attempting to address the national healthcare issue. The remaining actors will be categorized into the following stakeholder groups (also labelled above) based on the similarity in their interests, means and objectives:

- a. *Ministry of Health and Healthcare Institutions*
  - The problem owner speaks for the other healthcare institutions regarding the nursing shortage and the workforce's unsustainability.
- b. *Ministry of Finance*
  - Highland's healthcare system is fully public and depends on general government expenditure and tax revenues to finance its solutions. This actor oversees government revenue and controls the budget for healthcare.
- c. *Ministry of Education and Education Institutions*
  - As our policy involves training more domestic nurses and building capacities within the industry, education institutions play a significant role in executing them.
- d. *Ministry of Foreign Affairs and Immigration Authorities*
  - Foreign nurses will typically make up for the nursing demand that is unable to be filled by domestic nurses. This actor controls the migrant flow of foreign nurses into Highland to ensure the mutual benefits of Highland and foreign countries.
- e. *Citizens of Highland*
  - The citizens comprise both potential patients and nurses where every individual will be heavily affected by the healthcare shortage and hold the collective power to enact changes. Citizens can also speak up against the working conditions of nurses.

#### 4.1. Interest, Objectives & Possible Actions of Relevant Actors

The consolidated actors will be analyzed further through a summary of interests, objectives and possible actions of each group in Table 7.

<b>Actor 1</b>	<b>Ministry of Health and Healthcare Institutions</b>
<b>Interest</b>	<ul style="list-style-type: none"><li>- Provide adequate healthcare for the citizens</li><li>- Establish a healthy environment for workers and provide support and protection for them</li></ul>
<b>Objectives</b>	<ul style="list-style-type: none"><li>- Ensure labour retention in the healthcare</li><li>- Protect the nurses and healthcare workers from burnout</li></ul>
<b>Actions</b>	<ul style="list-style-type: none"><li>- Increase staffing through domestic and foreign recruitment</li><li>- Capacity building to promote task efficiency and reduce unnecessary workload on nurses</li></ul>
<b>Actor 2</b>	<b>Ministry of Finance</b>
<b>Interest</b>	<ul style="list-style-type: none"><li>- Ensure responsible and effective spending of government resources</li><li>- Formulate an equitable and solid tax legislation</li></ul>

<b>Objectives</b>	<ul style="list-style-type: none"> <li>- Cost-effective spending in the healthcare system</li> <li>- Appropriate expenditure of government funding on healthcare needs</li> </ul>
<b>Actions</b>	<ul style="list-style-type: none"> <li>- Allocate a greater budget to healthcare expenditure</li> <li>- Raise taxes to support national developments</li> <li>- Maintain/ cut funding for healthcare</li> </ul>
<b>Actor 3</b>	<b>Ministry of Education and Education Institutions</b>
<b>Interest</b>	<ul style="list-style-type: none"> <li>- Ensures accessibility of education</li> <li>- Prepare citizens to meet the needs of the workforce</li> </ul>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>- Provide sufficient training for aspiring nurses to meet the demands of the healthcare industry</li> <li>- Meet the nurse and healthcare personnel demands of the industry</li> </ul>
<b>Actions</b>	<ul style="list-style-type: none"> <li>- Increase educational staff capacities</li> <li>- Reassess the education requirements to allow for flexible ways of credentialing new nurses</li> <li>- Adjust their intakes based on signals from the healthcare industry</li> </ul>
<b>Actor 4</b>	<b>Ministry of Foreign Affairs and Immigration Authorities</b>
<b>Interest</b>	<ul style="list-style-type: none"> <li>- Maintain relations with other countries and international organizations</li> <li>- Control migrant flows based on the demands of the economy and society</li> </ul>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>- Attract enough nurses to make up for the labour deficits in Highland</li> <li>- Ensure that foreign recruitment does not worsen health inequities between countries</li> </ul>
<b>Actions</b>	<ul style="list-style-type: none"> <li>- Design strategies to attract foreign talents</li> <li>- Discuss and collaborate with other countries to ensure ethical hiring practices</li> </ul>
<b>Actor 5</b>	<b>Citizens of Highland</b>
<b>Interest</b>	<ul style="list-style-type: none"> <li>- Living in a safe environment with adequate and affordable healthcare</li> </ul>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>- Being able to afford healthcare</li> <li>- Contribute and support the growing healthcare of the country</li> </ul>
<b>Actions</b>	<ul style="list-style-type: none"> <li>- Voice out inadequacies and inaccessibilities of the current healthcare system</li> <li>- Entering the industry as a healthcare worker</li> </ul>

**Table 7: Summary of Actors, Interests, Objectives, Actions**

## 4.2. Institutional Context

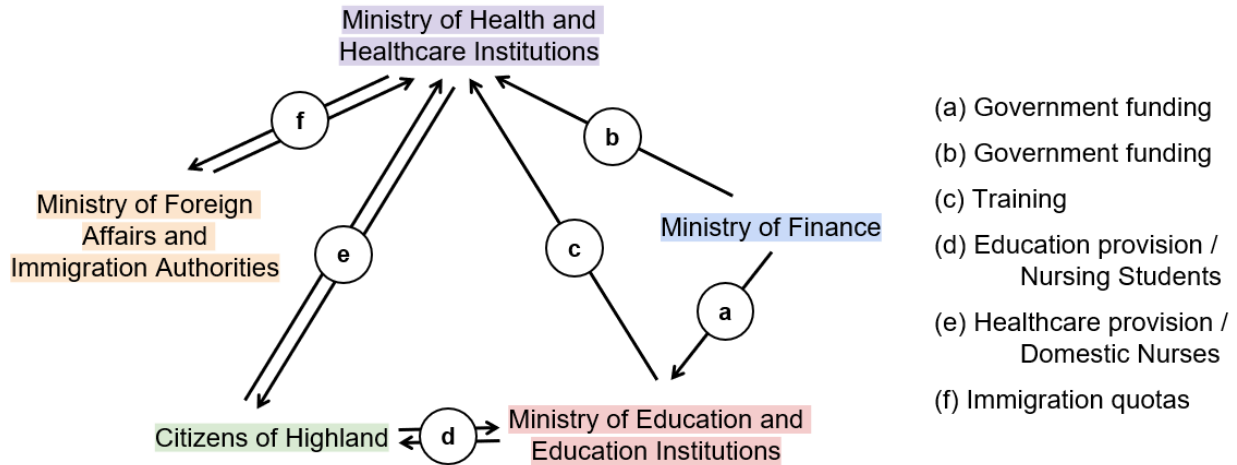
In this subsection, the institutional context of each other is examined, and their respective obligation, rights and prohibitions are listed in Table 8.

Actor Group	Obligations	Rights	Prohibitions
<b>Ministry of Health and Healthcare Institutions</b>	<ol style="list-style-type: none"> <li>1) Must ensure the adequate provision of healthcare for citizens</li> <li>2) Must protect the well-being of their healthcare workers</li> </ol>	<ol style="list-style-type: none"> <li>3) May increase staffing through domestic and foreign recruitment</li> <li>4) May alter the working programmes and conditions for healthcare workers</li> </ol>	<ol style="list-style-type: none"> <li>5) Must not exceed allocated budget</li> </ol>
<b>Ministry of Finance</b>	<ol style="list-style-type: none"> <li>1) Must ensure the equitability of tax legislation</li> <li>2) Must ensure the prosperity and stability of the financial system</li> </ol>	<ol style="list-style-type: none"> <li>3) May determine the allocation of budget for different ministries</li> <li>4) May alter tax legislation</li> </ol>	<ol style="list-style-type: none"> <li>5) Must spend within their means</li> </ol>
<b>Ministry of Education and Education Institutions</b>	<ol style="list-style-type: none"> <li>1) Must ensure the sufficiency of training for students to meet the demands of the workforce</li> <li>2) Ensure affordability of education</li> </ol>	<ol style="list-style-type: none"> <li>3) May alter the admission numbers and requirements</li> <li>4) May adjust the educational programme</li> </ol>	<ol style="list-style-type: none"> <li>5) Must not exceed allocated budget</li> </ol>
<b>Ministry of Foreign Affairs and Immigration Authorities</b>	<ol style="list-style-type: none"> <li>1) Must maintain bilateral, multilateral diplomatic ties</li> <li>2) Must moderate immigration based on the social and economic demands of the country</li> </ol>	<ol style="list-style-type: none"> <li>3) May process visa applications</li> <li>4) May change the immigration requirements</li> </ol>	<ol style="list-style-type: none"> <li>5) Must not break international laws</li> <li>6) Must not damage international relations</li> </ol>
<b>Citizens of Highland</b>	<ol style="list-style-type: none"> <li>1) Must participate in political processes</li> <li>2) Must serve the community and promote the common good</li> </ol>	<ol style="list-style-type: none"> <li>3) Right to be protected by the government</li> <li>4) Right to have accessible healthcare</li> <li>5) Right to leave the nursing industry</li> </ol>	<ol style="list-style-type: none"> <li>6) Must not break national laws</li> </ol>

**Table 8: Obligations, Rights, Actions, and Prohibitions of each actor group**

### 4.3. Resource Dependence

Following the institutional context established in the previous section, the resource dependency between the different actors is drawn in Figure 4.



**Figure 5: Resource dependence diagram. Arrows point from provider to dependent.**

**Ministry of Finance** appears to be the most influential actor. As healthcare in Highland is public, it will be constrained (dependent) on the tight limitations of government funding [a,b]. *Healthcare-* and *education-*related actors have to depend on the *Ministry of Finance* for financial resources to pursue solutions.

**Ministry of Health and Healthcare Institutions** is the most resource-dependent. The provision of healthcare relies on manpower [e], government funding [b], and training [c] - as such, all actors contribute to these resources that healthcare actors require to function.

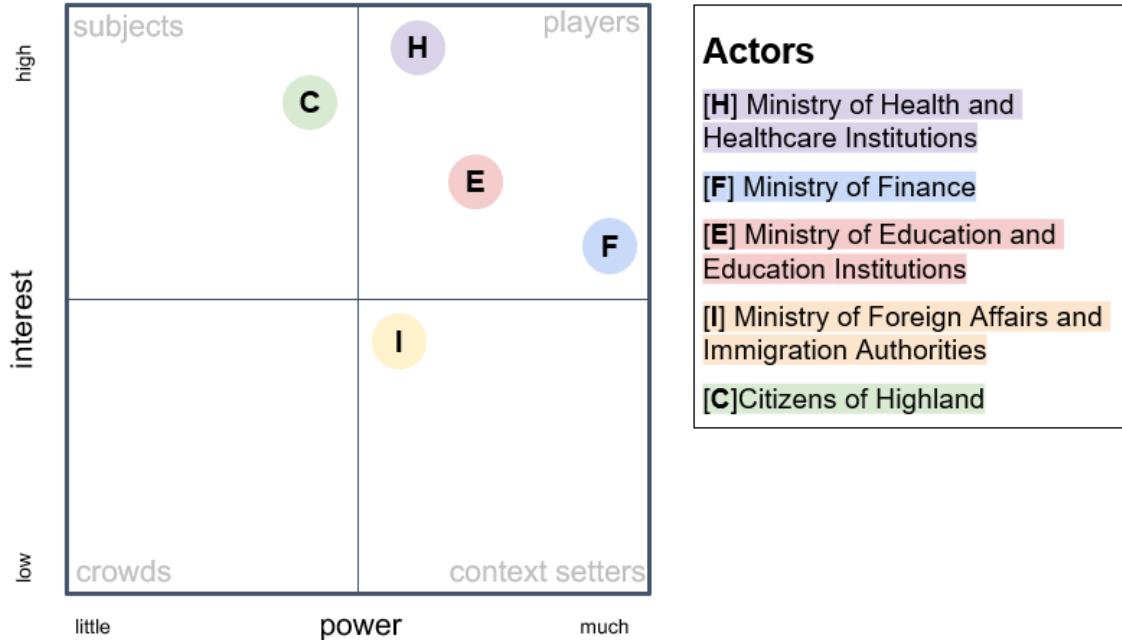
**Ministry of Foreign Affairs and Immigration Authorities** share a reciprocal relationship with *Ministry of Health* [f], to communicate and manage the inflow of foreign recruitments of nurses based on the needs of Highland.

**Ministry of Education and Education Institutions** tends to function as an intermediary in the healthcare context where they depend on students (*Citizens*) [e] and financing from the government (*Ministry of Finance*) [a] to train nurses to provide for the needs of *Citizens* and *Healthcare Institutions* [c,d].

**Citizens of Highland** share a reciprocal relationship [d,e] with the *health-* and *education-*related actors as they have the potential to be both the patient and the healthcare worker. Signals that citizens could have some influence on this problem context.

#### 4.4. Power-vs-Interest Matrix

Considering the interest and objectives (section 4.1), institutional context (section 4.2) and resource interdependencies (section 4.3), the stakeholder groups are mapped below in the power-interest diagram displayed in Figure 6.



**Figure 6: Power vs. interest matrix**

**Players** comprise 1) Ministry of Health and Healthcare Institutions, 2) Ministry of Education and Education Institutions, and 3) Ministry of Finance. They have higher power and high interests due to closely linked resources they are responsible for, namely healthcare, education, and government funding respectively, which jointly allows the healthcare system at large to function.

Unfortunately achieving an appropriate balance will be the main challenge since each player has to deal with limited resources to achieve their wide range of interests for Highland; there is both the potential for collaboration and conflict.

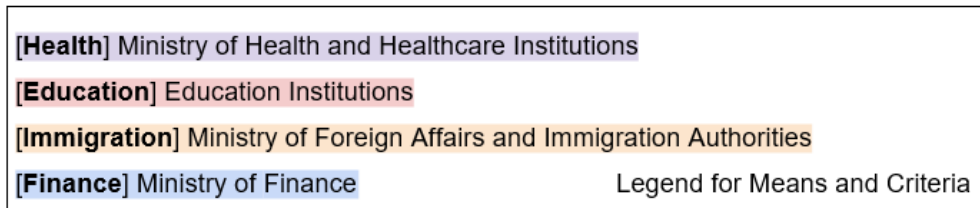
The **Context Setter** would be Ministry of Foreign Affairs and Immigration Authorities, which have the power to control foreign recruitments, but their interests lie more in preventing harm to international relations i.e., inequities from aggressive foreign hiring.

Finally, the **Subject** would be the Citizens of Highland, who unfortunately will be the most affected by a nursing shortage but have little power to solve the issue except to voice their concerns for the government to solve on the organizational level.

# 5. Multi-actor analysis

## 5.1. Multi-actor system diagram

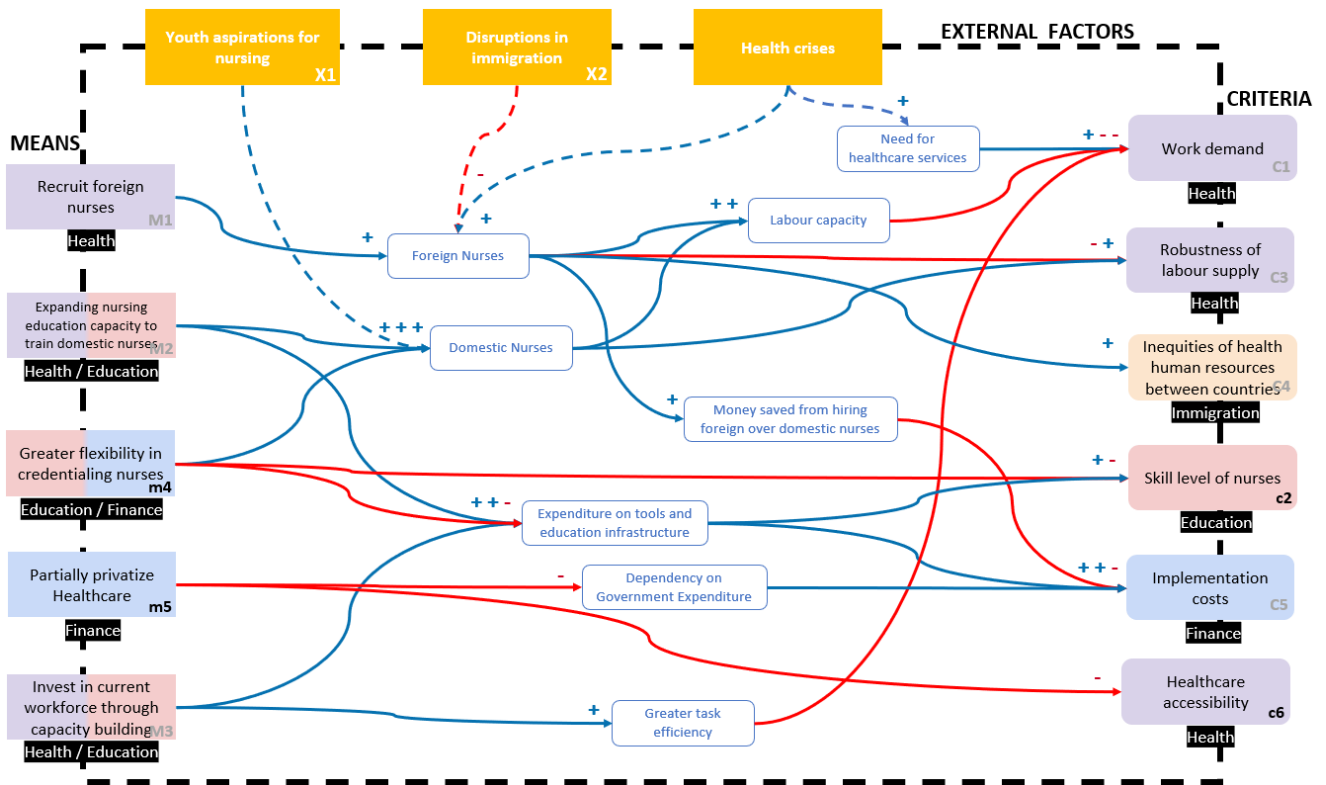
A multi-actor system diagram is shown in Figure 8 as a combination of the system diagram in section 2 and the actor analysis in section 4. Only key actors (players and context-settlers as reflected in section 4.4) will be considered:



**Figure 7: Legend for Multi-actor System Diagram**

The following changes from the original mono-actor system diagram were made:

- Flexible work arrangements (M4) and impact on personal life (C6) are removed due to their relatively low influences on the problem at hand
- Means of greater flexibility in credentialing nurses (m4) and partially privatise healthcare (m5) are added to consider possible means that could be executed outside the Ministry of Health. Skill level of nurses (c2) and healthcare accessibility (c6) are considered additional criteria.



**Figure 8: Multi-Actor System Diagram**

## 5.2. Coalitions and Conflicts

As hinted in section 4.3, the triadic relationship of resource dependence could give rise to conflicts and coalitions between the 3 key players (Health, Education, and Finance). Table 9 reflects these interactions through the new means scorecard.

	Means	C1: Work demand (Health)	C3: Robustness (Health)	C4: Inequities (Immigration)	c2: Skill level of nurses (Education)	C5: Implementation costs (Finance)	c6: Healthcare accessibility (Health)
M1	Recruit foreign nurses Health	-	-	+		-	
M2	Expanding nursing education capacity to train domestic nurses Health/Education	-	+		+	+	
m4	Greater flexibility in credentialing nurses Health/Finance	-	+		-	-	
m5	Partially privatizing healthcare Finance	-	+				-
M3	Invest in current workforce through capacity building Health	-			+	+	

**Table 9: Multi-actor Means scorecard**

### Conflicts

**Health ↔ Finance (e.g., m5, M3).** If the Ministry of Finance acts in its own interests of reducing costs, it directly compromises the quality of healthcare; likewise, if the Ministry of Health attempts to increase staffing, it would require an increase in government expenditures. This trade-off in criteria is a reiteration of our mono-actor analysis (section 3).

### Coalitions with unfortunate 3<sup>rd</sup> party conflicts

**Health ↔ Education (through M2).** These actors can work together easily due to their shared goals and benefits of strengthening the education system. Unfortunately, it cannot be achieved without sinking a large sum of money as an investment (C5), a criterion protected by the **Ministry of Finance**.

**Health ↔ Finance (through m4).** These actors have possible synergies too as they share the same desire of staffing nurses in the most cost-effective way. Jones & Gates (2007) shows that dropouts incur huge monetary costs, hence, it is within the interest of the Ministry of Finance to ensure better to save healthcare expenditure by raising retention rates. However, this could compromise the skill level of nurses (c2), which is an obligation and responsibility that **Education-related** actors must uphold.



## 6. Reflection and Recommendation

### 6.1. Reflection and Recap

In Section 1, we identify that work demand was a critical factor in the nursing shortage of Highland and should be demarcated as the focal objective.

In Sections 2-3, we assessed that education could be an appropriate direction for a solution, where it has the greatest capacity to address the work demand problem well through domestic staffing. However, its shortfall lies in flexibility – where the means pursues a “planned” supply of nurses for the long term but will be vulnerable in scenarios of healthcare shocks when demand is immediate and unpredictable.

In Sections 4-5, we further explore how actors would influence the viability of an education policy and widen the possible objectives to consider. We have interpreted based on multi-actor assessments that execution could be difficult due to resource dependencies; the multi-actor system diagram (section 5) confirms that even with coalitions, not all key players’ goals can be met and at least one player’s criteria would be compromised.

Therefore, the solution to the nursing shortage needs to either be innovative to overcome resource limitations to simultaneously achieve the needs of finance, education, and healthcare and/or take a combinatory approach to address the weaknesses of flexibility and conflicting interests.

### 6.2. Recommendations

We recommend Highland’s Ministry of Health pursue a robust education policy that expands nursing education capacities while allowing greater flexibility in the credentialing of nurses.

This combined policy aims to maximize the coalition of health-, finance- and education-related actors; to increase the supply of domestic nurses while maximizing cost efficiencies and ensuring adequate training. This policy also promotes flexibility as revising the credentialing process intervenes negative spiral of burnout through quick improvements in work conditions and amount of help while expanding capacities becomes the long-term sustainable solution to stimulate the supply of nurses. As such, a key aspect of this policy would be in its execution- to achieve an optimal balance of players’ criteria to ensure the continuity of the coalitions, and to adapt the policy based on exogenous pressures to the healthcare system (Haasnoot, 2013).

In a nutshell, the analysis introduces a holistic overview of the nursing shortage, providing insights into possible actions and potential problems that the Ministry of Health will encounter. This analysis can be improved by exploring the systemic interactions quantitatively to improve the accuracy of our solutions. Also, we have assumed a rather optimistic dynamic of actors' relations by grouping them. A more in-depth understanding of individual actors can help in improving the political framing of collaborative approaches.

## References

- Buchan, J., & Shembavnekar, N. (2020, July 23). *Thinking local and global: Exploring the UK's reliance on international nurses and the impact of covid-19*. The Health Foundation. Retrieved November 1, 2022, from <https://www.health.org.uk/news-and-comment/charts-and-infographics/thinking-local-and-global-exploring-the-uks-reliance-on-international-nurses>
- Cameron, A. (2022, October 28). *New health plan shackled by current budget constraints*. New Zealand Doctor. Retrieved November 1, 2022, from <https://www.nzdoctor.co.nz/article/news/new-health-plan-shackled-current-budget-constraints>
- Das, S. (2022, March 27). *Overseas nurses in the UK forced to pay out thousands if they want to quit jobs*. The Guardian. Retrieved November 1, 2022, from <https://www.theguardian.com/society/2022/mar/27/overseas-nurses-in-the-uk-forced-to-pay-out-thousands-if-they-want-to-quit-jobs>
- Farge, E. (2022, January 24). *Rich countries' access to foreign nurses during Omicron raises ethical concerns, group says*. Reuters. Retrieved November 1, 2022, from <https://www.reuters.com/business/healthcare-pharmaceuticals/rich-countries-access-foreign-nurses-during-omicron-raises-ethical-concerns-2022-01-23/>
- Guerriero, L. (2022, September 22). *Health-care worker shortage presenting serious challenge to Niagara Hospital System*. Niagara Health. Retrieved November 1, 2022, from <https://www.niagarahealth.on.ca/site/news/2022/09/22/health-care-worker-shortage-presenting-serious-challenge-to-niagara-hospital-system>
- Haasnoot, M., Kwakkel, J. H., Walker, W. E., & ter Maat, J. (2013). Dynamic Adaptive Policy Pathways: A method for crafting robust decisions for a deeply uncertain world. *Global Environmental Change*, 23(2), 485–498. <https://doi.org/10.1016/j.gloenvcha.2012.12.006>
- Hunt, P. S., & Hartman, D. (2018). Meeting the measurements of inpatient staffing productivity. *Nursing Management*, 49(6), 26–33. <https://doi.org/10.1097/01.numa.0000533765.82263.65>
- Johnson, S. R. (2021, December 8). *Immigrant Visa backlog blocks COVID nursing help in U.S.* U.S. News. Retrieved November 1, 2022, from <https://www.usnews.com/news/health-news/articles/2021-12-08/immigrant-visa-backlog-blocks-covid-nursing-help-in-u-s>
- Jones, C., & Gates, M. (2007). The costs and benefits of nurse turnover: A business case for nurse retention. *OJIN: The Online Journal of Issues in Nursing*, 12(3). <https://doi.org/10.3912/ojin.vol12no03man04>

- Kelland, K. (2020, April 16). *Explainer: Who's who? The World Health Organization under scrutiny*. Reuters. Retrieved November 4, 2022, from <https://www.reuters.com/article/us-health-coronavirus-who-role-explainer-idUSKCN21Y290>
- Kowarski, I. (2020, June 18). *How coronavirus is affecting nursing school admissions*. Retrieved November 1, 2022, from <https://www.usnews.com/education/best-graduate-schools/top-nursing-schools/articles/how-coronavirus-is-affecting-nursing-school-admissions>
- Morris, G. (2022, August 29). *Post-pandemic nursing shortage: What it means for aspiring nurses*. NurseJournal. Retrieved November 1, 2022, from <https://nursejournal.org/articles/post-pandemic-nursing-shortage/>
- Reyes, C. (2019, June). *At your defense: Ending the vicious nursing shortage cycle : Emergency medicine news*. Emergency Medicine News. Retrieved November 1, 2022, from [https://journals.lww.com/em-news/fulltext/2019/06000/at\\_your\\_defense\\_\\_ending\\_the\\_vicious\\_nursing.16.aspx](https://journals.lww.com/em-news/fulltext/2019/06000/at_your_defense__ending_the_vicious_nursing.16.aspx)
- Rudderham, H. (2022, October 25). *Vitalité, Horizon Hire 'Travel Nurses' to help during shortage | CBC News*. CBCnews. Retrieved November 2, 2022, from <https://www.cbc.ca/news/canada/new-brunswick/health-networks-travel-nurses-1.6627744>
- Runnels, V., Labonté, R., & Packer, C. (2011). Reflections on the ethics of recruiting foreign-trained human resources for health. *Human Resources for Health*, 9(1). <https://doi.org/10.1186/1478-4491-9-2>
- Salleh, M. M., Mohi, Z., Nordin, N., Mohamad, N. A., & Razali, N. A. (2021). The impact of language barriers and discrimination issues on work productivity of foreign workers. *International Journal of Academic Research in Business and Social Sciences*, 11(16). <https://doi.org/10.6007/ijarbss/v11-i16/11215>
- Timewise. (2017, November 1). *Flexible working in nursing: Could it fix the staffing crisis?* Timewise. Retrieved November 1, 2022, from <https://timewise.co.uk/article/flexible-working-nursing-fix-staffing-crisis/>
- Wolters Kluwer. (2016, November 11). *The importance of the optimal nurse-to-patient ratio*. Wolter Kluwer. Retrieved November 1, 2022, from <https://www.wolterskluwer.com/en/expert-insights/the-importance-of-the-optimal-nursetopatients-ratio>
- World Health Organization. (n.d.). *Health workforce*. World Health Organization. Retrieved November 1, 2022, from <https://www.who.int/health-topics/health-workforce>