



# Development of Teacher Attrition Indicator in the OECD-NESLI Network

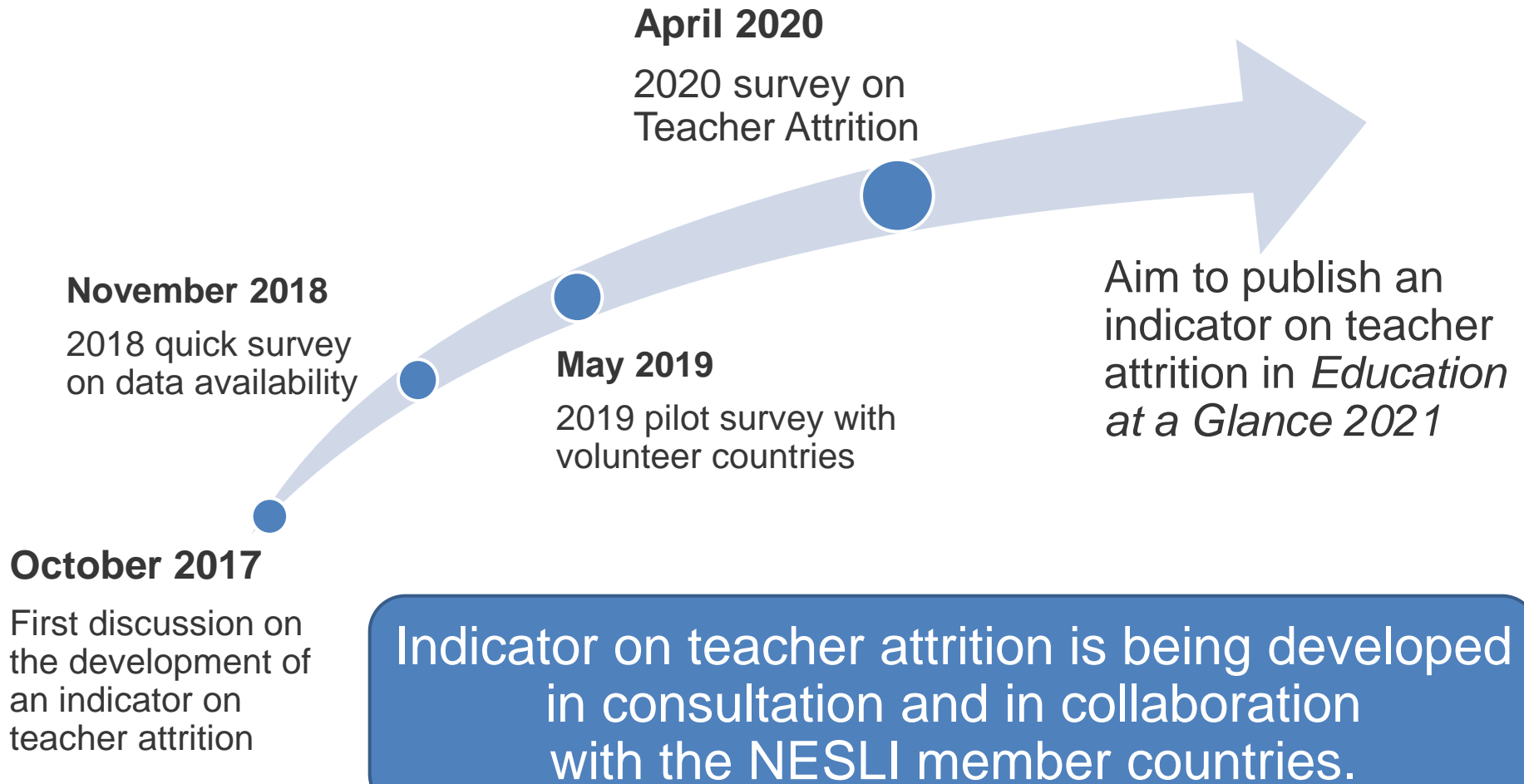
TCG Working Group Meeting  
16 October 2020

Choyi Whang (OECD)



# Work on teacher attrition in the OECD-NESLI Network

## Development timeline





# METHODOLOGIES EXPLORED FOR ESTIMATING TEACHER ATTRITION



# Work on teacher attrition in the OECD-NESLI Network

## Methods reviewed with NESLI delegates

### Method 1

- Proposed by UNESCO for SDG indicator on teacher attrition
- Measures teacher attrition using the number of new teacher entrants and the total number of teachers in two consecutive reference years

### Method 2

- Measures attrition using the actual number of teachers leaving the profession and the total number of teachers in the reference year

### Method 3

- Measures teacher attrition using data from national labour force surveys on the total number of teachers and on the number of teachers who left the teaching profession in the reference year

Difficult to use due to:

- sampling issues from labour force surveys
- data not available in most countries



# Work on teacher attrition in the OECD-NESLI Network

## Methodologies used in the NESLI Network

### Method proposed by SDG

#### Method 1

##### **indirect estimation**

(using the **estimated** number of teachers leaving the profession based on the number of teachers entering the profession)

#### Method 2

##### **direct estimation**

(using the **actual** number of teachers leaving the profession)

$$A_{(t,t+1)} = \frac{(N_t - N_{t+1}) + E_{(t,t+1)}}{N_t} = \frac{L_{(t,t+1)}}{N_t}$$

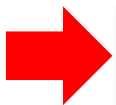
These two methods theoretically gives the same estimation.

However, if teachers on temporary leaves are **not** included in the reported total number of teachers (**N**), the estimation results from the two methods could be different (by up to 0.6%p for combined level (ISCED 02-3) in many countries)



## Method 1 vs Method 2

	Method 1 (indirect)	Method 2 (direct)
Number of variables	3 variables	2 variables
Limitations in methodology	<ul style="list-style-type: none"><li>• Over- or under-estimation bias from teachers on temporary leaves</li><li>• Bias in FTE estimates where there are teachers with changes in workload between <math>t</math> and <math>t+1</math></li><li>• Over- or under-estimation bias from teachers moving between levels of education when estimating attrition by level of education</li></ul>	Over-estimation bias from teachers on temporary leaves
Data availability (out of 15 countries in the 2020 survey)	13-15 countries (HC) 11-13 countries (FTE)	10-13 countries (HC) 10-12 countries (FTE)

 **Method 1:** preferred for an attrition estimation in head-counts as more countries can be involved.  
**Method 2:** must be used for estimation in FTE.



## Method 1 vs Revised Method 1

Variables needed for estimating attrition rates:

Method 1  
variables



### Additional variables for Revised Method 1

- Number of teachers **entering the ISCED level**, but not new to the teaching profession between  $t$  and  $t+1$
- Number of teachers **leaving the ISCED level**, but not leaving the teaching profession between  $t$  and  $t+1$

Net number of teachers moving into the ISCED level from other ISCED levels between  $t$  and  $t+1$

$$A_{(t,t+1)} = \frac{(N_t - N_{t+1}) + E_{(t,t+1)} + (E^*_{(t,t+1)} - L^*_{(t,t+1)})}{N_t}$$

Method 1 is sufficient to use an aggregated ISCED level  
(e.g. ISCED02-3 combined)

*But may introduce **bias** when estimated by ISCED level  
(by  $\pm 0.5\%$  in many comparable cases)*



# Methodologies used in the NESLI Network

## Method 1 vs Revised Method 1

	Method 1	Revised Method 1
Number of variables	3 variables	5 variables
Limitations in methodology	<ul style="list-style-type: none"><li>• Over- or under-estimation bias from teachers on temporary leaves</li><li>• Bias in FTE estimates where there are teachers with changes in workload between <math>t</math> and <math>t+1</math></li></ul>	
	<ul style="list-style-type: none"><li>• Over- or under-estimation bias from teachers moving between levels of education when estimating attrition at individual ISCED level</li></ul>	
Data availability (out of 15 countries in the 2020 survey)	13-15 countries (HC) 11-13 countries (FTE)	8-10 countries (HC) 8-10 countries (FTE)



- ✓ **Method 1** preferred for estimating attrition at an aggregated level
- ✓ **Revised Method 1** preferred for estimating attrition by level of education





## Methodologies used in the NESLI Network

# Method 2 vs Revised Method 2

Variables needed for estimating attrition rates:

**Method 2  
variables**



**Additional variable for Revised Method 2**

- Number of teachers **retiring from the profession** between  $t$  and  $t+1$

$$A_{(t,t+1)} = \frac{L_{(t,t+1)} - R_{(t,t+1)}}{N_t}$$

Number of teachers leaving the teaching profession due to retirement

Method 2 is sufficient to use in general,

*But when there are many retirees during the reference period, it may also be interesting to leave retirees out of the attrition estimate of the oldest age group to focus more on voluntary attrition*

(teacher attrition rates of all age groups: 0-3%p difference;  
teacher attrition rates of the oldest age group (age 55+): 2-23%p difference)



## Methodologies used in the NESLI Network

# Method 2 vs Revised Method 2

	Method 2	Revised Method 2
Number of variables	2 variables	3 variables
Limitations in methodology	Over-estimation bias from teachers on temporary leaves	
Data availability (out of 15 countries in the 2020 survey)	10-13 countries (HC) 10-12 countries (FTE)	9-11 countries (HC) 9-10 countries (FTE)



- ✓ **Method 2** is sufficient.
- ✓ **Revised Method 2** can be considered for the oldest age group (which includes the typical retirement age) to exclude the impact of retiring teachers on teacher attrition.



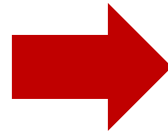
# Work on teacher attrition in the OECD-NESLI Network

## Summary of the methodologies

### Method 1: **indirect estimation**

(using the **estimated** number of teachers leaving the profession)

- 1) Bias from **teachers returning from or leaving for temporary leaves**
- 2) Bias from **teachers changing workload between reference years**
- 3) Bias from **teachers moving between ISCED levels**



### Revised Method 1

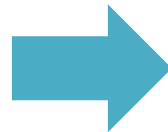
(attrition by level of education  
**minimising bias of teachers moving between ISCED levels**)

- 1) Bias from **teachers returning from or leaving for temporary leaves**
- 2) Bias from **teachers changing workload between reference years**

### Method 2: **direct estimation**

(using the **actual** number of teachers leaving the profession)

Bias from **teachers leaving for temporary leaves**



### Revised Method 2

(attrition (by age group)  
**removing impact of teachers retiring from the profession**)

Bias from **teachers leaving for temporary leaves**



Work on teacher attrition in the OECD-NESLI Network

## Data collected by:

### Teacher counting method:

Head-counts, Full-time equivalents



### Type of institution:

All types of institutions (Public + Private),  
Public institutions



### Levels of education:

Pre-primary, primary, lower secondary, upper  
secondary, ISCED 2-3 combined (=secondary),  
ISCED 1-3 combined (=primary + secondary),  
ISCED 02-3 combined (= pre-primary + primary + secondary)



### Gender:

Male,  
Female



### Age group\*:

Below 25  
25-34  
35-44  
45-54  
55 and over



\* Data collected for ref. yr. 2 uses age groups (Below 26, 26-35, 36-45, 46-55, 56 and over) to ensure the same group of teachers are tracked over the reference period for Method 1.



## Work on teacher attrition in the OECD-NESLI Network

# Preferences on the methods by NESLI

Method 1 and 2 did not yield the same estimate in practice due to bias. NESLI delegates **expressed mixed views** on the preferred methodology.

### Support for Method 1 (indirect estimation)

Method used for SDG indicator on teacher attrition

More countries have data on the number of teachers entering the profession, than those leaving the profession

### Support for Method 2 (direct estimation)

More intuitive and easier to understand

This method is already used in some OECD countries to estimate teacher attrition in their countries.



## Work on teacher attrition in the OECD-NESLI Network

# Future step for improvement

Over- or under-estimation bias occurs in estimated attrition when the reported number of teachers from the source data **does not include** teachers returning from, leaving for or currently on temporary leaves.

### Tentative solutions

Identify the teachers who left their teaching position temporarily based the additional data from two years before and after the reference years.

Use other data to estimate the extent of bias due to teachers returning from/ leaving for temporary leaves.

### Suggested next step

Draft more clear definitions and guidelines on the way to take account of teachers returning from, leaving for or currently on temporary leaves in the reported data.



Work on teacher attrition in the OECD-NESLI Network

---

**Thank you for your attention.**



# REFERENCE: BACKGROUND INFORMATION





## Background information

# Definitions of key terminologies

Teachers

Fully-qualified teachers (full-time and part-time)  
(as in the UOE data)

Reference year

Time point when the total number of teachers is  
measured annually

Reference period

Period between the two “reference years”

Teacher attrition rate

Percentage of teachers at a given level of education  
leaving the profession in a given reference period

Temporary leaves

Any form of leaves that leaves the teacher out of the  
total number of teachers at the reference time points  
(e.g. sick leave, maternity/paternity leaves, study  
leaves, personal long leaves etc.)

Teachers leaving the  
teaching profession

- Subject of teacher attrition indicator
- Excludes teachers leaving for temporary leave

Teachers entering the  
teaching profession

- Teachers who has never taught before the  
reference period
- Excludes teachers returning from temporary leave