Gender-Based Analysis Plus

Automated triage and positive eligibility determinations of International Experience Canada Work Permit Applications

Immigration, Refugees and Citizenship Canada
Immigration, Réfugiés et Citoyenneté Canada

Canada

1. Background

Immigration, Refugees and Citizenship Canada (IRCC) issues work permits under the Temporary Foreign Worker Program (TFWP) and the Internationality Mobility Program (IMP). The TFWP requires Canadian employers to obtain a labour market impact assessment (LMIA) from ESDC, while the IMP allows employers to hire foreign workers without the need for an LMIA. IRCC issues two kinds of work permits under the IMP: one that is open, allowing the holder to work for any employer, and another that restricts the holder to the employer listed on the work permit. In 2022, IRCC issued work permits to approximately 554,000 foreign nationals; over 470,000 (85%) of these were issued under the IMP and over 84,000 (15%) under the TFWP.

Under the IMP's International Experience Canada (IEC) program, IRCC issues both open and employer-specific work permits under three categories:

- Working Holiday (WH) - open work permit
- Young Professionals (YPP) - employer specific work permit
- International Co-op (ICP) - employer specific work permit

Namely, under the IEC, IRCC manages Canada's bilateral youth mobility instruments that facilitate work and travel authorizations for youth aged 18 to 35. Currently, Canada has signed youth mobility instruments with over 35 country and territory partners spanning Europe, Oceania, East Asia, and the Americas. To ensure that the program is as inclusive as possible, IEC works with partner countries and territories, and stakeholders to identify barriers to youth mobility, and to develop resources and strategies that will help mitigate those barriers for Canadian and foreign national youth.

Following significant Covid-related disruption to this program in 2020 and 2021, when IEC intake and processing were placed on hold, numbers have now returned to pre-pandemic levels: in 2022, IEC intake was 72,491 and output was 70,864. This represents approximately 15% of the total IMP caseload and 13% of the total IRCC work permit caseload in 2022 .

In response to record high application inventories and a Ministerial announcement to raise IEC's global annual quota by 20%, the Department has developed an automated triage tool to assist in the processing of IEC applications.

The tool is designed to apply pre-defined triage criteria created by officers to:

a. Identify routine cases where the eligibility portion of the decision can receive a positive eligibility determination (Tier 1)
b. Triage remaining applications to support more efficient manual eligibility assessments (Tier 2)

No artificial intelligence or advanced analytics techniques were used in the creation of the triage criteria. The eligibility assessments are based on human-devised business rules only. The model triages IEC WP applications by grouping files with similar characteristics based on the regulatory authority for each sub-program and participating country or territory. The criteria that inform the model are the same that currently exist and that officers would currently examine (i.e. the model is automating something that is currently done manually).

Eligibility criteria used to determine how applications are sorted into the bins is based on the eligibility requirements outlined in IEC's Youth Mobility Arrangements and Agreements (YMAs) with the existing partner countries and the Department's existing admissibility requirements.

2. Expected Overall Impact

Ultimately, the triage model should reduce decision-maker time per application by copying routinely-searched-for information on each application and client from the Department's Global Case Management System (GCMS) and displaying this information with the triage bins in a single unified view (output spreadsheet).

The model's overall impact on clients is expected to be minimal given that the model neither refuses applications nor makes any form of negative recommendation but instead assigns applications into one of the bins.

It is worth noting, however, that the Department maintains control over how to distribute any gains in efficiency that the use of the model brings about. More generally, it is expected that the use of the model will lead to an overall decrease in processing times for applicants in all bins.

3. Analytical Method

This initial analysis proceeds primarily by comparing, along different dimensions, the proportion of applications in an inventory before it is run through the model to the proportion of applications in the Tier 1 and Tier 2 bins after assessment. Any significant variations, or lack thereof, are then noted and discrepancies are explained. Sometimes raw data tables appear to show differential impacts of the model, but contextual knowledge is important and sometimes discrepancies are explained by the particularities of certain client groups and the parameters of bilateral agreements, which can vary from one country to another. For example, while applicants from some countries may represent a larger share of applications in the overall inventory, their citizens may only have access to IEC's Young Professional and International Co-op categories (i.e. no access to Working Holiday program). They would, therefore, always be triaged to the Tier 2 bin, as these categories require manual officer review due to eligibility requirements outlined in the bilateral Youth Mobility Arrangements.

It should be noted that the main inventory used to test the model is composed of open applications from the current IEC 2023 season. In addition, the report relies on data (see section 5, tables 12 & 13) that contain closed/finalized applications from two past IEC seasons (2019 & 2022), to allow for an analysis of whether approval and refusal rates change with the introduction of the new automated triage.

4. GBA Plus Data Tables – Model Development and Testing Data

Gender

According to the last evaluation of the IEC program, conducted by IRCC's Research and Evaluation Branch in 2019, approximately half of IEC foreign national youth participants were women. This is consistent with the gender distribution within the data set used to test and develop the model.

Table 1: Testing Dataset by applicants Gender

Gender	Total #	Total %
Male	10288	48%
Female	11119	52%
Other	4	0%
Total	21411	100%

This data set contained 21,411 open applications from the current IEC 2023 season inventory, 11,119 (52%) of which had female applicants, while 10,288 (48%) had male applicants.

Table 2: Testing Dataset by Bin and Gender

Bins:	Other	Female #	% of Female	Male #	% of Male	Total #
Tier 1 Bin	0	3316	48%	3633	52%	6949
Tier 2 Bin	4	7790	54%	6644	46%	14438
Withdrawal	0	13	54%	11	46%	24
Total	**4**	**11119**		**10288**		**21411**

When these applications were run through the model, 6,949 applications were triaged into the Tier 1 Bin and 14,438 into the Tier 2 Bin.

The gender profile of these bins is very similar to the initial data set. In the Tier 1 Bin, 3,316 (48%) applicants were female, while 3,633 (52%) were male. There is a slightly higher percentage of female applicants in the Tier 2 Bin, where from 14,438 applications passed in this bin, 54% of applicants were female and 46% male. This is likely attributable to the fact that the Tier 2 Bin has a higher volume of applications overall, as it contains applications for employer-specific categories and all applications which require assessment of other bin-specific parameters such as Police Certificates, Travel History, and Medical Requests. Although there is no obvious single cause of the minor gender differences between these bins, the data allows us to reflect on numerous potential causes. One potential conclusion is that this data reflects the more general over-representation of females in fields that interact with vulnerable populations (e.g. children, the elderly). As a result, these applications would require a little more scrutiny, involving some form of criminal check and/or a medical history check. Of note, when the model was tested/evaluated against the data set from two past IEC seasons, this gender gap in Tier 2 Bin appears non-existent (see section 5, tables 8 & 9). This further confirms that the model did not result in any major differential output along the dimension of gender.

Country of Citizenship

The potential for the automated triage model to introduce differential impacts along the citizenship dimension is severely limited by the fact that criteria for triaging are set on either eligibility requirements stipulated in the unique YMAs that Canada has with each country or territory partner, or departmental admissibility requirements (e.g. police certificate, medical requests).

Table 3 Total Dispersion Across Bins Based on Country of Citizenship		
Bins:	**# of total applications**	**% of Total applications**
Bin 1:	6944	33%
Bin 2:	14331	67%
Total:	21275*	100%

*Please note discrepancy between Total in table 3 and table 4 as table 4 only references the top 10 countries of citizenship in terms of size rather than all countries

Tier 1 Bin

A moderate percentage (33%) of applications end up in the Tier 1 Bin. This bin contains Working Holliday applications that meet the specific eligibility criteria for different subsets of participating countries, and have no other admissibility factors to review (such as travel history, medical requests).

A higher percentage (60%) of applications from the participating countries in Tier 1 also end up in the Tier 2 Bin when applications did not meet different regulatory criteria for the IEC Working Holiday category (e.g. there is travel history on file which triggers an additional police certificate request) and when these countries have applications for the employer specific categories

Established rules for police certificate requirements were set by IRCC's International Network when Global Affairs Canada administered the program, and any new country or territory partners that join the program adopt police certificate requirements consistent with the requirements established by the Department for other work permit lines of business.

Tier 2 Bin

The Tier 2 Bin contains the largest number of applications (67%), as any applications with a travel history of more than six months are triaged here for assessment and additional police certificates/medical requests. In addition, all applications for the Young Professional and International Co-op categories are triaged into this bin to assess employer-

specific requirements (review of job offers, NOC codes and education credentials). One hundred per cent of applications from some countries, including Costa Rica, Hong Kong, Italy, Latvia, Lithuania, South Korea, Switzerland and Taiwan, end up in the Tier 2 Bin due to the need to either review eligibility requirements stipulated in the YMAs or admissibility requirements set by the Department. For example:

- All applicants from Costa Rica are visa required and are triaged into this bin due to the need to issue a visa counterfoil, rendering applications from this country ineligible for bulk approval.
- All applicants from Hong Kong require the issuance of a special police certificate request letter that allows their citizens to obtain the correct document from Hong Kong authorities.
- All applicants from Italy must have a residency certificate on file to satisfy residency requirements stipulated by the Italian government in the youth mobility arrangement.
- Applications from Latvia, Lithuania, South Korea and Taiwan all require an upfront medical exam; therefore, the processing officer's action is necessary.

Please see below for a table emphasizing the dispersion of applicants country of citizenship through each bin. To ensure the integrity of the analysis, the table lists the ten highest citizenship totals per country from the sample data (with more than 500 applications). Other countries may not be listed as their sample size was not large enough to be able to draw any definitive conclusions. Each country listed has been triaged through the model using pre-existing bilateral agreements to ensure the models efficacy.

Table 4 Applicants Country of Citizenship dispersed through each bin						
Country of citizenship	Tier 1 Bin # of App	Tier 1 Bin % of App	Tier 2 Bin # of App	Tier 2 Bin % of App	Total	% of Tota
France	2377	37%	4016	63%	6403	30%
Korea Republic of	0	0%	2195	100%	2198	10%
UK - British citizen	709	39%	1087	60%	1798	8%
Australia	585	36%	1027	64%	1613	8%
Republic of Ireland	613	43%	822	57%	1438	7%
Japan	682	49%	706	51%	1390	7%
Germany	564	44%	730	56%	1294	6%
Chile	603	52%	555	48%	1158	5%
Taiwan	0	0%	922	100%	922	4%
New Zealand	203	40%	310	60%	513	2%
Total	6336		12370		18727	

Age

Due to the nature of the program, IEC has a diverse range of applicants between the ages of 18 and 35 years old. According to the last evaluation of the IEC Program, conducted by IRCC's Research and Evaluation Branch in 2019, most (77%) foreign national youth admitted to Canada under IEC were between 21 and 29 years old when they started their IEC experience. Participants under the Young Professionals stream were slightly older, with a greater share (21%) falling into the 30 to 35 age group. Foreign national youth participants from the International Co-op stream were slightly younger than the other streams, with a greater share in the 18 to 20 age group (19%).

The data set used to test and develop the model shows results similar to those from the evaluation of the program.

Many (33%) younger applicants who have recently graduated secondary school take gap years, look for a working holiday experience, or take advantage of the International Co-op stream to fulfill their post-secondary academic requirements. There is also an influx of older applicants in the 30-35 age group who apply to the Young Professional category to gain professional experience to contribute to career development.

Table 5: Total Age Distribution Table		
Age	Total #	% of Bin total
18-20	2670	12%
21-23	4552	21%
24-26	5145	24%
27-29	4332	20%
30-32	2808	13%
33+	1903	9%
Total	21410	100%

Tier 1 and Tier 2 Bins

The spread of age ranges remains very similar across Tier 1 and Tier 2 bins. Given that Tier 2 Bin is accepting all applications which were not triaged into the Tier 1 Bin, it is by far larger in terms of the number of applications that it contains. Yet, the age dispersion within the Tier 2 Bin is largely consistent with the Tier 1 Bin and the overall age distribution within the program.

Table 6 Tier 1 Bin: Age Distribution Table		
Age	Total #	% of Bin total
18-20	1023	15%
21-23	1684	24%
24-26	1666	24%
27-29	1313	19%
30-32	779	11%
33+	584	8%
Total	7049	100%

Table 7 Tier 2 Bin: Age Distribution Table		
Age	Total #	% of Bin total
18-20	1646	11%
21-23	2962	21%
24-26	3471	24%
27-29	3013	21%
30-32	2027	14%
33+	1318	9%
Total	14437	100%

Through the collection of data regarding the age distribution between the bins, there does not appear to be a strong correlation between age and bin distribution. It is not a determining factor in how an application is triaged across the bins. However, age dispersions are an important aspect of intersectional analysis. An applicant's age can affect their financial status, willingness to travel abroad, education level, and other deciding factors. Although the parameters of each bin do not explicitly outline these factors, this analysis allow us to better understand foreign travellers' patterns better relative to their age group. Of note, very similar results were obtained when the model was tested against historical data for two previous IEC seasons (see section 5, tables 10 & 11).

5. Validating the automated triage model

Data tables from previous IEC seasons (2019 & 2022) allow us to draw additional conclusions regarding the effectiveness of the triage model. The two identity factors we focused on were gender and age. We also looked into the approval and refusal rate of closed/finalized applications from the past seasons to see if it changes with the introduction of the automated triage.

Data tables with bin and gender distribution across 2019 and 2022 IEC seasons

Table 8: Historical Dataset by Bin and Gender (2019)						
Bins:	Another gender	Female	% of female	Male	% of Male	Total
Tier 1	1	18338	49%	18858	51%	37197
Tier 2	0	20748	48%	22194	52%	42942
Withdrawal	0	64	60%	43	40%	107
Total	1	39150	49%	41095	51%	80246

Table 9: Historical Dataset by Bin and Gender (2022)						
Bin	Other	Female	% of Female	Male	% of Male	Total #
Tier 1	7	16818	49%	17407	51%	34232
Tier 2	4	18080	50%	18416	50%	36501
Withdrawal	0	1	100%	0	0%	1
Total	11	34899	49%	35823	51%	70734

Data tables with total age distribution across 2019 and 2022 IEC seasons

Table 10: Total Age Distribution Table (2019)		
Age	Total #	% of Bin Total
18-20	12951	16%
21-23	18712	23%
24-26	20354	25%
27-29	15985	20%
30-32	7819	10%
33+	4425	6%
Total	80246	100%

Table 11: Total Age Distribution Table (2019)		
Age	Total #	% of Bin Total
18-20	9120	13%
21-23	16623	24%
24-26	18344	26%
27-29	14412	20%
30-32	7805	11%
33+	4388	6%
Total	70692	100%

Further analysis of this age and gender historical data and comparison to the results within the current data set used to develop the triage model is referenced previously in the document.

Data tables with final decisions for 2019 & 2022 IEC seasons

By testing the model against historical data for both the 2019 and 2022 seasons, the model successfully triaged all Tier 1 applicants, as those applications maintained a 100% approval rate by officers during both seasons (see tables 12 & 13). Since the historical data was not used to develop the model, the test set is therefore deemed to be unbiased.

We also notice that in the Tier 2 Bin for both seasons, a high percentage (n=>80) of applications were approved. This suggests the potential for a future iteration of the triage model to triage more applications into the Tier 1 Bin, allowing more clients to benefit from an automated positive eligibility determination.

Table 12: FinDec Post Bin Triage - Year 2019						
Bin	Approved (#)	Approved (%)	Refused (#)	Refused (%)	Total (#)	Total (%)
Tier 1	37197	100%	0	0%	37197	46%
Tier 2	34653	81%	8289	19%	42942	54%
Withdrawal	0	0%	107	100%	107	0%
Total	65975		4759		80246	100%

Table 13: FinDec Post Bin Triage - Year 2022						
Bin	Approved (#)	Approved (%)	Refused (#)	Refused (%)	Total (#)	Total (%)
Tier 1	34227	100%	5	0%	34232	48%
Tier 2	31748	87%	4753	13%	36501	52%
Withdrawal	0	0%	1	100%	1	0%
Total	65975		4759		70734	100%

6. Conclusion

Data from the testing stage indicated that the model does not appear to have any significant, disproportionate impact on clients. Assignments into the Tier 1 and Tier 2 bins appear to be in accordance with the established eligibility rules and the notable variances are easily understood following a review of the data.

In terms of gender profile, the distribution within the Tier 1 and Tier 2 bins are very similar to the related profiles in the testing dataset and model implementation. Thus, the model did not result in any major differential output along the dimension of gender. However, further analysis of the seemingly minor gender difference across Tier 2 in comparison to Tier 1 revealed that this is likely attributed to the fact that the Tier 2 Bin contains a higher volume of applications overall, including applications for IEC employer-specific categories and all applications that require assessment of other bin-specific parameters, such as Police Certificates, Travel History, and Medical Requests.

In addition, an examination of the country of citizenship data revealed that the model eligibility approval rate is being accordingly distributed based on the model rules. If some applicants are missing out on a potential benefit by virtue of being from a particular country, this is due to the strict eligibility requirements stipulated in the unique YMAs that Canada has with each country or territory partner, or due to departmental admissibility requirements, but not to the model itself.

In the case of age, it is to be noted that the spread of age ranges remains more or less consistent across bins as it is not a determining factor when applications are assessed prior to going into the bins.

In sum, it is observed that application assignments into the Tier 1 and Tier 2 bins does not appear to introduce any new unintended bias into application processing. As a result, it does not appear that the model will have any significant, disproportionate impact on different groups of clients