

# Developing an Air Force Retention Early Warning System

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## Concept and Initial Prototype

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### ISSUE

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RAND Project Air Force was tasked with developing a new capability for planners: a retention early warning system (REWS) that alerts policymakers when a subgroup of Air Force military members is at risk for future shortages. The goal of the research project was to develop a forecasting model for retention, operationalized within a prototype decision-support application, that can alert decisionmakers of emerging problems and thus allow them enough time to consider adjusting accession and retention policies before shortages occur.



### APPROACH

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Our overall approach to designing the system drew on widely used paradigms for solving data science problems. These paradigms emphasize understanding the business problem, drawing on a wide array of data sources and types, testing several flexible prediction approaches to optimize performance, and operationalizing the information for decisionmaking. To inform our understanding of the data sources that would be desirable for this application, we also performed an extensive review of the turnover literature, identified gaps in existing data collection, and made recommendations to address them.



### CONCLUSIONS

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- The Air Force has access to rich historical information on many factors that the established research literature links to turnover. Further, the structure of the Air Force personnel system captures additional information beyond what a civilian employer would have access to, including precise information on when members become eligible to separate and when separation appears imminent.
- The most significant gap in turnover-related information available to REWS is the lack of information on member attitudes and perceptions. Possible sources for this information exist, but their frequency is not optimal for detecting negative trends that could affect retention.
- Machine learning (ML) algorithms can increase the accuracy of individual-level predictions, and these improvements result in more accurate group-level estimates for separation rates. The full models used dozens of variables from multiple sources, yet far simpler models that used ten variables that are already available to the Air Force also performed extremely well.

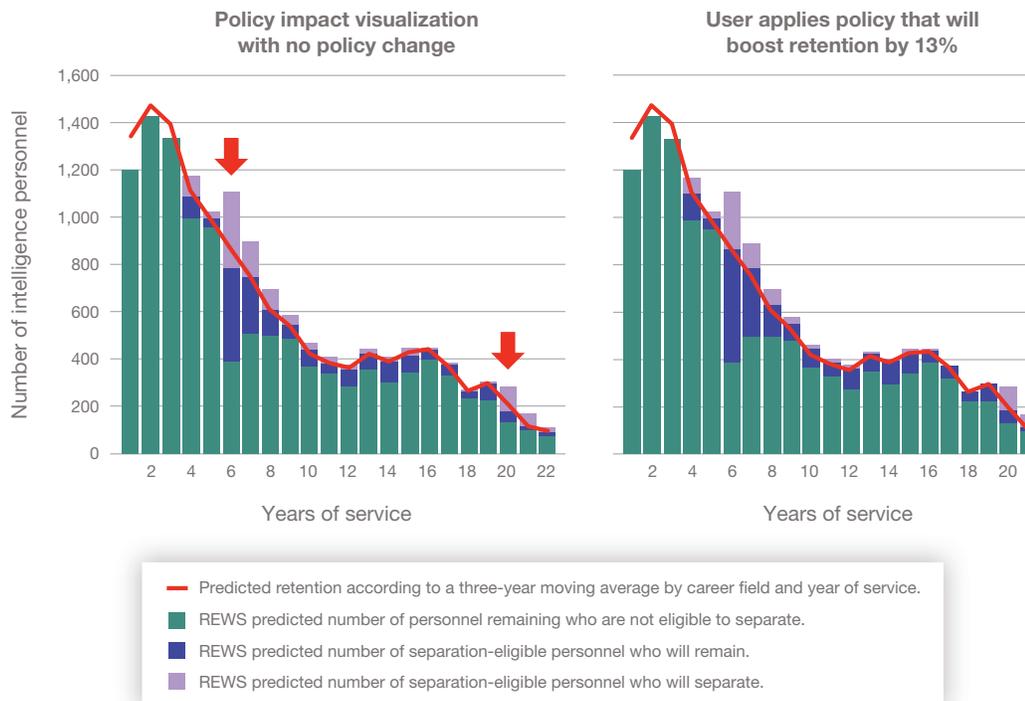
- The REWS decision workflow operationalizes these predictions so that various Air Force planners can generate customizable warnings, understand potential drivers, and assess the policy response required to preempt emerging problems. The figure below shows an example visualization from the application that allows planners to see the impact of policies on the REWS predictions. In the left panel, predicted retention (shown in teal/blue) in years six and 20 for intelligence specialties falls below the three-year moving average for these same specialties (solid red line). The right panel shows that it would require a 13-percent increase in retention to fully mitigate these gaps, which would be more than ten times the size of the effect of raising the Selective Reenlistment Bonus multiplier.



## RECOMMENDATIONS

- Feedback from human resources decisionmakers should guide REWS refinements.
- Alterations to retention survey data collection could enhance Air Force planning capabilities to anticipate negative trends.
- Simplified data inputs offer a way to refresh predictions with minimal resources while longer-term efforts improve data inputs, model accuracy, and functionality.

### POLICY IMPACT EXAMPLE FOR INTELLIGENCE SPECIALTIES



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