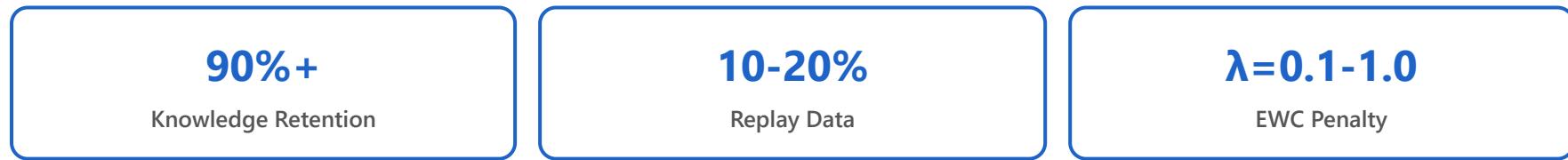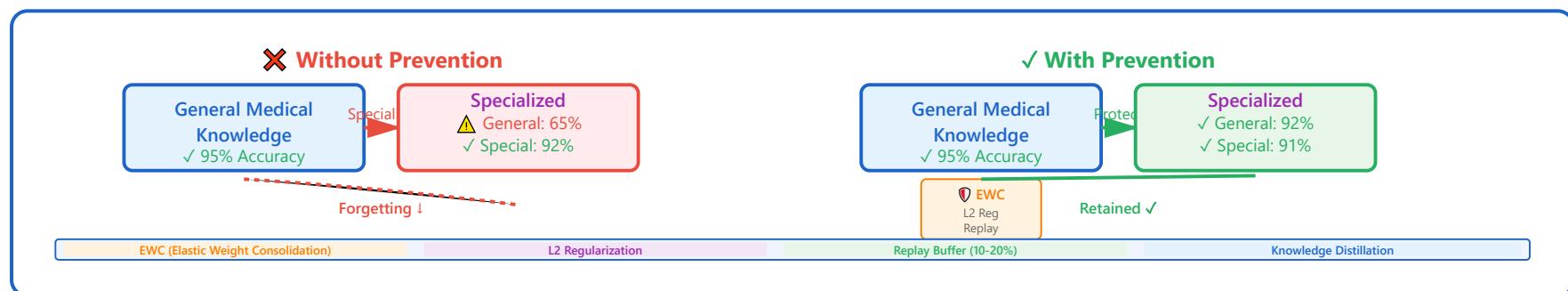# Catastrophic Forgetting Prevention

Preserve General Medical Knowledge
While adapting to specialized domains

❌ **Without Prevention**

General Medical Knowledge
✓ 95% Accuracy

Special

Specialized
⚠️ General: 65%
✓ Special: 92%

Forgetting ↓

✓ **With Prevention**

General Medical Knowledge
✓ 95% Accuracy

Protec

Specialized
✓ General: 92%
✓ Special: 91%

🛡️ EWC
L2 Reg
Replay

Retained ✓

EWC (Elastic Weight Consolidation) | L2 Regularization | Replay Buffer (10-20%) | Knowledge Distillation

90%+	**10-20%**	**λ=0.1-1.0**
Knowledge Retention	Replay Data	EWC Penalty

🛡️ Prevention Techniques

- **Elastic Weight Consolidation (EWC):** Protect important parameters
- **L2 Regularization:** Stay close to pre-trained weights
- **Replay Buffer:** Mix old and new data (10-20% ratio)
- **Knowledge Distillation:** Maintain original model behavior

📊 Monitoring Strategy

- Track performance on general medical benchmarks

- Measure forgetting rate: $\Delta = Acc\_initial - Acc\_final$

- Set threshold: Stop if forgetting > 5%

- Periodic evaluation on held-out general tasks