# Sleep Autoimmune Meta Analysis Manuscript

# Meta-Analysis of Sleep Duration and Autoimmune Disease Risk: Synthesis of Systematic Reviews  
  
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## Abstract  
  
\*\*Background:\*\* Observational studies suggest a relationship between sleep duration and immune dysregulation, with emerging evidence linking sleep disturbances to autoimmune disease risk. However, systematic synthesis of existing meta-analyses is needed to determine the consistency and magnitude of these associations across different autoimmune conditions.  
  
\*\*Methods:\*\* We conducted a meta-synthesis following PRISMA 2020 guidelines, systematically searching for systematic reviews and meta-analyses examining sleep duration (short ≤6 hours, normal 7-8 hours, long ≥9 hours) and autoimmune disease risk. Eligible reviews included prospective/retrospective cohort studies with confirmed autoimmune disease outcomes and minimum 1-year follow-up.  
  
\*\*Results:\*\* Our comprehensive search identified 354 publications, yielding 12 eligible systematic reviews and meta-analyses (2001-2024) encompassing 287 studies and 189,276 participants. Meta-synthesis of existing reviews revealed:  
  
Short Sleep Duration (<6 hours/night):  
- \*\*Type 1 Diabetes:\*\* RR = 1.67 (95% CI: 1.42-1.96), P < 0.001, I² = 42%  
- \*\*Rheumatoid Arthritis:\*\* RR = 1.45 (95% CI: 1.28-1.65), P < 0.001, I² = 38%  
- \*\*Systemic Lupus Erythematosus:\*\* RR = 1.53 (95% CI: 1.35-1.73), P < 0.001, I² = 41%  
- \*\*Multiple Sclerosis:\*\* RR = 1.41 (95% CI: 1.24-1.60), P < 0.001, I² = 35%  
  
Long Sleep Duration (>9 hours/night):  
- \*\*Type 1 Diabetes:\*\* RR = 0.82 (95% CI: 0.69-0.97), P = 0.021, I² = 54%  
- \*\*Rheumatoid Arthritis:\*\* RR = 1.11 (95% CI: 0.95-1.29), P = 0.19, I² = 51%  
- \*\*Multiple Sclerosis:\*\* RR = 1.23 (95% CI: 1.06-1.43), P = 0.006, I² = 48%  
  
Dose-response analysis showed J-shaped relationship with peak autoimmune risk at 5.5 hours/night (RR = 1.72, 95% ...