MCP SERVER | NO CODE | CLOUD HOSTED

ACWR Analyzer MCP for AI Agents

Predicting Athlete Injury Risk Through Training Load Analytics

The ACWR Analyzer predicts athlete injury risk by comparing recent workout loads against long-term baseline fitness data. It calculates the Acute:Chronic Workload Ratio, telling coaches exactly when an athlete spikes their training too hard or isn't loading up enough.

A+ Quality Score 100/100

acwr | injury-prevention | athlete-performance | workload-management | sports-analytics

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vinkius.com/mcp/acutechronic-workload-ratio-acwr-analyzer

SCAN TO VIEW

The connectivity layer between AI and the world's software.

Vinkius sits between AI and every application. All communication passes through Vinkius Cloud via the Model Context Protocol (MCP) — with governance, observability, and security at every layer.

Your AI Connections Run Through Vinkius Cloud

The world's largest managed MCP catalog

Vinkius is the connectivity layer where AI connects to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

> *The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.*
>
> — Architecture principle

Four Pillars of the Vinkius Runtime

01 — Security by design

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

02 — Built on MCP Fusion

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

03 — Deterministic observability

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

04 — Autonomous operations

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

AES-256	Ed25519	24h TTL	V8 Isolate
Encryption at rest	PKI vault signatures	Ephemeral session keys	Sandboxed execution

One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT

```
https://edge.vinkius.com/{token}/mcp
```

Claude · Cursor · VS Code · Windsurf · Grok · Gemini

Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

01 — Ed25519 PKI Vault

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

02 — V8 Isolate Sandboxing

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

03 — SSRF Guard

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

04 — DLP & PII Redaction

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

05 — Cryptographic Audit Trail

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

06 — Honeytoken Trap System

Phantom credentials are injected into isolated environments. If a honeytoken is used outside Vinkius infrastructure, the server is quarantined instantly.

Emergency Kill Switch

EU AI Act Art. 14(1) Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

01 — Server deactivated

The MCP server is immediately taken offline across the entire cluster.

02 — All tokens revoked

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

03 — WebSocket connections killed

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

Control Plane

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

Agent Activity

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

FinOps

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

Tool Health

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

Firewall & DLP

PII redaction activity, sensitive data protection counters, and security event timeline.

Incident Log

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

> Get started at **cloud.vinkius.com** — connect your AI agent in under 60 seconds.

Acute:Chronic Workload Ratio (ACWR) Analyzer MCP

4 tools available
Cloud-hosted on Vinkius

Training athletes requires constantly balancing progress and safety. The ACWR Analyzer takes all that guesswork out of sports science. Instead of relying on gut feelings about whether a spike in activity is safe, your agent connects directly to established metrics. It calculates the ratio between an athlete's recent workload and their long-term baseline load. This lets coaches see immediate 'danger zones' before minor strains turn into major injuries. You can use this MCP through any compatible client connected via Vinkius, giving you a complete catalog of professional tools. Your agent doesn't just spit out numbers; it uses the data to detect load trends and even generate specific coaching advice based on real-time risk assessments.

Core Capabilities

01 — Calculate Training Load Ratios

It determines the precise ratio between an athlete's recent training volume and their established historical workload.

02 — Identify Risk Tiers

The system evaluates if the current loading places the athlete in a safe zone, a caution area, or a high-risk danger zone.

03 — Analyze Load Changes Over Time

It detects underlying patterns in training volume, showing if loads are consistently increasing, decreasing, or remaining stable.

04 — Generate Actionable Training Plans

The MCP produces specific coaching recommendations based on the current calculated workload and risk profile.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/mcp/acutechronic-workload-ratio-acwr-analyzer** — connect your AI agent in three steps.

01 Feed your agent the athlete's recent workout data and their historical training baseline.

02 The ACWR Analyzer calculates the ratio, identifying immediate risks like excessive spikes or insufficient volume.

03 Your agent interprets this result to provide a clear risk tier evaluation and actionable coaching advice.

The bottom line is you get an instant, data-backed assessment of injury risk that prevents guesswork in athlete care.

Built For

This MCP is built for the professional sports environment. If your job involves managing physical performance or preventing injuries through structured training plans, you need this. It's for those who are tired of making critical decisions based on instinct alone.

Strength and Conditioning Coach

You use the MCP to monitor athlete loads between cycles, ensuring they peak correctly for competition without burning out or sustaining overuse injuries.

Athletic Trainer

You rely on the system's risk tier evaluation when an athlete returns from injury, confirming that their current activity load is safe enough to resume training.

Sports Performance Director

You manage entire teams by running aggregate workload reports across multiple athletes to identify systemic training deficiencies or group-level overtraining risks.

What Changes When You Connect

01 Stop guessing about athlete safety. The ACWR Analyzer uses the `evaluate_risk_tier` tool to immediately tell you if an athlete is in a high-danger zone, preventing unnecessary risk.

02 Get data that drives decisions. Instead of manual calculations, use the MCP to calculate full series of ratios with `calculate_acwr_series`, giving coaches a comprehensive performance view.

03 Anticipate overtraining before it happens. The ability to detect load trends gives you early warning signs, letting you adjust training weeks ahead using `detect_load_trend`.

04 Move beyond just numbers. When the system generates coaching advice via `generate_training_prescription`, you get actionable steps, not just raw data points.

05 Improve recovery planning. By understanding the relationship between acute and chronic loads, coaches can structure optimal return-to-play programs.

Real-World Applications

Managing Peak Competition Load

A head coach inputs a week's worth of load data for an athlete right before a major championship. The agent calculates the ACWR series and uses `evaluate_risk_tier` to confirm that the peak training cycle is safe, allowing them to confidently plan the final taper.

Addressing Plateauing Performance

A performance director sees an athlete's load trend stagnating. The agent detects this using `detect_load_trend` and then uses `generate_training_prescription` to suggest a specific, safe method for increasing intensity.

Return-to-Play Assessment

An athletic trainer needs to clear an athlete returning from hamstring injury. The MCP calculates the initial ACWR and uses `evaluate_risk_tier` to confirm that the current low volume is appropriate, preventing relapse.

Optimizing Long-Term Cycles

A sports scientist inputs data spanning six months. Using the full range of tools, they calculate the ACWR series and generate a training prescription that spreads high loads out over time for sustained peak performance.

Patterns to Avoid

Using only single-point calculations

✗ AVOID

A coach calculates one ACWR value based on the last week's load and ignores historical data, leading to an inaccurate 'safe' decision.

✓ INSTEAD

Always run `calculate_acwr_series` first. This gives you a full picture of how recent spikes relate to weeks of baseline work, providing a much safer assessment.

Ignoring load trajectory

✗ AVOID

Relying only on the current ACWR score without checking if the athlete's overall training volume is trending up or down. This misses crucial warning signs.

✓ INSTEAD

Run `detect_load_trend` before trusting any risk assessment. A stable trend means sustainable progress; a volatile trend means caution.

Getting just a number without guidance

✗ AVOID

The agent tells the coach, 'Your ACWR is 1.5,' and stops there. The coach is left to guess what action to take next.

✓ INSTEAD

Use `generate_training_prescription` immediately after getting the risk tier. This translates the data point into specific instructions for the athlete.

The Right Fit

Use this MCP if your primary concern is preventing overuse injuries and accurately managing training intensity cycles. If you need to know *if* an athlete can train hard, but not *how* they should train after it, this tool works great. It's built for the full spectrum of sports science analysis. Don't use it if you just need simple metrics; that's what basic spreadsheet formulas do. You need the MCP because it connects data calculation to actionable coaching advice. For example, while a standard system can calculate an ACWR series, only this tool provides the `generate_training_prescription` based on that analysis. If your goal is pure data visualization without prescriptive guidance, you might be better off with a dedicated analytics dashboard rather than relying solely on this MCP.

ACWR Analyzer: Preventing Overtraining Injuries in Sports Science

Right now, managing an athlete's peak load is mostly guesswork. Coaches track workouts and try to keep the numbers 'in range,' but they often miss the subtle signs of cumulative stress until it results in a painful tear or severe overuse injury. It's a constant cycle of logging data into different systems and trying to cross-reference what was good last week against what’s safe this week.

With this MCP, your agent handles the heavy lifting. You feed the training load history, and the system immediately calculates the ACWR ratio while detecting underlying trends. The result isn't just a number; it's an immediate risk assessment that tells you exactly whether to increase volume or pull back for recovery.

ACWR Analyzer: Optimizing Training Cycles and Load Management

The biggest manual drain is correlating load spikes with historical data. You have to manually compare the last four weeks of volume against the athlete's six-month average, then decide if that ratio warrants a change in plan.

Now, your agent runs `calculate_acwr_series` and instantly provides the full picture. The system interprets this data using `evaluate_risk_tier` and concludes with concrete advice via `generate_training_prescription`. It's predictive planning, not retrospective logging.

4 Tools for Calculating Sports Training Load & Injury Prevention

Use these four tools to calculate workload ratios, detect load trends, evaluate risk tiers, and generate coaching prescriptions instantly.

#	TOOL	DESCRIPTION
01	`calculate_acwr_series`	Calculates a time series of ACWR values based on provided load data points.
02	`detect_load_trend`	Analyzes the input data to detect general patterns in how training loads are changing over weeks or months.
03	`evaluate_risk_tier`	Assigns a specific injury risk status (e.g., Safe, Caution, Danger) based on the calculated ACWR ratio.
04	`generate_training_prescription`	Produces tailored coaching instructions or adjustments to the athlete's current training regimen.

See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

U What is my injury risk if I go from a 30-unit week to a 65-unit week?

⚠️ **Danger Zone Alert.** A spike of this magnitude (ACWR > 1.6) indicates a high probability of overuse injury, specifically muscle strain or tendonitis. We recommend scaling back the next three sessions by at least 20% to allow for tissue adaptation and prevent acute failure.

U Analyze my load history: [50, 55, 60, 70, 85]. What trend should I be worried about?

📊 **Load Trend Analysis:** The training load is showing a clear and concerning upward trajectory with high volatility (Std Dev: 12.4). While the current ACWR is acceptable, this rate of increase suggests cumulative fatigue. We recommend stabilizing volume for two weeks before attempting another major spike.

U Give me advice for an athlete who just finished a competition with high load.

📝 **Training Prescription (Recovery Focus):** Based on the recent peak, your priority must be active recovery. For the next 7 days, limit intensity and keep volume stable. Suggested activities: low-impact cardio (cycling), mobility work, and core stability. Do not exceed a calculated ACWR of 1.0.

Frequently Asked Questions

01 **How does the ACWR Analyzer determine if my athlete is safe to increase training load?**

The analyzer calculates your Acute:Chronic Workload Ratio and compares it against established thresholds. It doesn't just give a number; it tells you whether that ratio puts them in a safe zone or requires immediate volume reduction.

02 **Can the ACWR Analyzer help with return-to-play planning?**

Yes, coaches use it to monitor an athlete's load progression after injury. It provides continuous monitoring and specific advice, ensuring that increases in training are gradual enough to prevent setback.

03 **Is this better than just looking at the last week's workout numbers?**

Absolutely. The ACWR Analyzer is superior because it factors in long-term fitness baselines. It understands that a single high week means less if the athlete has been consistently training hard over months.

04 **What kind of data does the ACWR Analyzer need to run an analysis?**

It needs recorded workout volumes and intensities, both from recent weeks (acute) and averaged out over a longer period (chronic). The more comprehensive your input data, the better the prediction.

05 **If my ACWR is high, what does the tool recommend I do?**

The MCP doesn't just flag danger; it uses its tools to generate specific training prescriptions. It tells you exactly *how* much and *what kind* of load reduction or adjustment is needed.

Go Live in 60 Seconds

Get your connection token from **cloud.vinkius.com**, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

```
https://edge.vinkius.com/[TOKEN]/mcp
```

CLIENT	WHERE TO CONFIGURE
Claude AI	Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint
Cursor	Settings → Features → MCP Servers → "+ Add New MCP Server" → Type: SSE → Paste endpoint
VS Code	Ctrl/Cmd+Shift+P → "MCP: Add Server" → add `"acutechronic-workload-ratio-acwr-analyzer": { "url": "…" }`
Windsurf	MCP Settings → `mcp_settings.json` → Add endpoint URL
ChatGPT	Settings → Tools & plugins → Add MCP server → Paste endpoint
Gemini	Extensions → Add MCP Server → Paste endpoint URL

ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

- Ask ChatGPT
- Ask Claude
- Ask Perplexity
- Ask Gemini
- Ask Grok

READY TO CONNECT

Acute:Chronic Workload Ratio (ACWR) Analyzer is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and start building. No SDK. No deployment. Just results.

Start at cloud.vinkius.com →

vinkius.com · support@vinkius.com

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Platform	Vinkius Cloud for AI Agents
Endpoint	`https://edge.vinkius.com/{token}/mcp`

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