

IPSDI Solutions Services Offered

Our Approach

IPSDI's methods focus on providing data-driven, replicable, and transparent analyses. We prioritize ensuring that communities and organizations requesting our assistance can fully leverage the analyses conducted by our team. We want every community we work with to understand that we are here to be a partner, supporter, and decoder of data as they navigate these challenging projects that support their preparedness and planning efforts.

We have developed the following operational guidelines to ensure data quality assurance, transparency, and methodological replicability in every project we undertake:

- All study intervals are defined, ensuring stakeholders have plain-language explanations for the evaluated time periods.
- All metrics of study are defined, ensuring stakeholders have plain-language explanations for applied statistical approaches and what that means for stakeholders evaluating reported outcomes.
- All data processes are clearly outlined to provide a replicable process demonstrating the origination of raw data exports and the source of other data.
- Data analysis processes describe how data are ingested into IPSDI's internal Standardized Query Language (SQL) databases and visualized by Python automation language scripting.
- The methods used to present analysis and recommendations are consistent with industry-standard performance analyses.
- To the extent possible, raw data, scripting, and processing are provided with the final product to support data transparency and methods.
- To the extent possible, include clear, legible, and high-quality visualizations.

Customer Collaboration

IPSDI follows a collaborative, iterative process, relying on ongoing interaction and consultation with the department representatives and other stakeholders. We believe it is important to describe the Customer's expectations for completing this process successfully. The customer will be requested to provide at least one person to serve as the key point of contact (POC). Depending on the required expertise and input, the customer may choose to have a different POC for each project phase. While a single POC is requested, IPSDI understands that many stakeholders are necessary to make the project successful.

The POC will work with IPSDI staff to provide local community details related to the project and assist with necessary data identification and sharing. Other tasks include:

- Assisting with determining and identifying stakeholders and participants.
- Delivering quality department data and information necessary to complete the Study/Project (CRA, SOC, etc.).

- Obtaining administrative approvals and support as needed.
- Reviewing and providing feedback on final reports and recommendations.
- Assisting with logistical needs, such as selection of meeting time and location, feedback circulation, and other items.

Data Analysis Services

Under this category, we offer the following services:

- Community Risk Assessment and Standards of Cover
- Community-based planning documents

To develop these critical materials, we leverage guidance, definitions, and practices developed by multiple fire service organizations to ensure a consistent approach grounded in proven practices. Foundational documents used to inform the scope of work and tasks described include NFPA 1300, Community Risk Assessment and Community Risk Reduction Plan Development (2020), and additional guidance documents published by the Center for Public Safety Excellence and Vision 20/20.

As always, data is at the forefront of our analysis process.

Community Risk Assessment

A community risk assessment (CRA) establishes the process for identifying and analyzing community risks. The purpose of the CRA is to evaluate a community's risks before developing and implementing a Community Risk Reduction (CRR) plan. The CRA should be conducted every five years, at a minimum, with an annual review to identify emerging trends that impact current risk reduction programs and emergency response capabilities. The risk identification process is a critical component in a community's disaster planning and preparedness efforts.

The CRA process evaluates the frequency, severity, and operational impact of incidents and hazards, using a risk-scoring methodology to classify risks into Low, Moderate, High, and Special Risk Categories. This phase integrates geospatial, demographic, and operational data to assess community hazards and service demands.

The process begins with a community profile assessment, analyzing geography, infrastructure, and population distribution to understand how environmental and socioeconomic factors influence emergency response. This includes topography, road networks, water supply, major hazard zones (e.g., industrial areas, high-density residential zones, and wildland-urban interface regions), and demographic trends. The assessment incorporates population growth, density, socioeconomic vulnerability, and potential emergency response constraints. In the case of a popular vacation destination community, our analysis will specifically address the population influx experienced on weekends and during the summer months. Furthermore, an overview of the authority having jurisdiction

and fire and emergency services organization is completed to contextualize community factors.

Five years of historical incident data will be obtained and grouped into common incident-type groups such as Fire, EMS, Hazardous Materials, and Technical Rescue. Each individual incident type is assessed for risk based on the following method:

1. Probability of Occurrence: the frequency of each incident type code is assessed relative to all others. Incident types with higher call volumes receive higher probability scores.
2. Consequence to Community: local subject matter experts (SMEs) rate the observed impact of incidents in combination with historical loss, injury, and death data. This allows for expert knowledge and stakeholder input.
3. Impact to Agency: the average total number of personnel assigned to an incident type over five years of data.

Following a computation of risk for each incident type, scores within incident type groups are compared and groupings are defined within classifications of Low, Medium, High, and Special. The classification of these risks within their discrete incident type groups will allow for critical tasking analysis and performance outcome assessments to be conducted in the Standards of Cover.

Once the risk score is calculated, a service demand analysis follows. This analysis examines incident volume, call type distribution, and peak demand periods to identify high-frequency and high-risk event types. This assessment is used to determine whether fire station placement aligns with service demand and risk exposure.

Standards of Cover

The Center for Public Safety Excellence (CPSE) defines a Standards of Cover (SOC) as “those written policies and procedures that establish the distribution and concentration of fixed and mobile resources of an organization.” The SOC helps the fire department and the community it serves to recognize risk and align the department’s response capabilities with the community’s desired outcomes.

The Standards of Cover (SOC) will build upon the CRA's findings by evaluating the agency’s operational performance, resource distribution, and service effectiveness based on real-world incident data.

The SOC process begins with the establishment of response performance benchmarks, defining clear expectations for turnout time, travel time, and total response time using 90th-percentile performance calculations. These benchmarks may be informed by proven practices and national consensus standards such as National Fire Protection Association Standard 1710 and the Verisk/ISO Fire Suppression Rating Schedule.

The analysis examines three key aspects of service outcome evaluation, taking into account annual performance and seasonal trends.

Critical Tasking Analysis

This SOC phase evaluates whether the agency is deploying the necessary number of personnel to incidents based on the assessed risk level. Critical tasking analysis ensures that the Effective Response Force (ERF) assigned to an incident aligns with the complexity and operational demands of the emergency type. By categorizing incidents into Call Type Groups (CTGs) and assessing resource allocation against standardized response models, this analysis identifies whether the agency's staffing levels and apparatus assignments meet operational needs.

Each incident type undergoes a task-based assessment to determine the number of personnel required for effective incident mitigation. This is particularly important for high-risk incidents such as structure fires, technical rescues, and hazardous materials responses, where specific roles—including incident command, fire suppression, search and rescue, and medical treatment—must be filled to achieve safe and effective outcomes.

Critical task analysis results in two key outcomes. The first outcome is a retrospective assessment of past responses, which evaluates whether the agency is properly aligning critical tasks with the actual number of personnel responding to incidents. The second outcome involves matching the total number of personnel for a specific Call Type Group and risk level with a target number of personnel needed to effectively handle each response. Establishing this benchmark allows for the measurement of the Effective Response Force (ERF), which is assessed during the third part of the SOC.

Reliability Analysis

Reliability analysis determines whether the agency provides adequate emergency service coverage throughout its jurisdiction. This process includes a thorough assessment of unit availability, workload distribution, and response reliability. The goal is to measure the agency's capability to meet service demands without over-relying on mutual aid or experiencing delays in response times due to resource depletion. It includes the following assessments:

- **Unit Availability:** evaluating the extent to which resources are in service and available for immediate response versus out-of-service for training, maintenance, or other reasons.
- **Call Overlap and Concurrent Incidents:** measuring the frequency of two or more incidents occurring at the same time for the entire jurisdiction and by planning zone. It evaluates whether enough resources are available and deployed.
- **Response Reliability by Geographic Area:** analyzing variations in response times across different zones to detect underserved areas and inform station placement or staffing adjustments.

- **Call Transfer and Mutual Aid Dependencies:** assessing how often the agency relies on external resources and whether response expectations are being met within jurisdictional service areas.

This phase helps refine deployment models, identify potential system inefficiencies, and inform decision-making on station coverage, fleet expansion, and policy enhancements to improve response reliability.

Performance Analysis

The seminal component of a Standards of Cover is the evaluation of performance distribution and concentration:

- **Distribution Analysis:** evaluates the speed and efficiency of first-arriving units for each distinct incident type group and risk level to ensure sufficient service coverage across the agency's jurisdiction for all kinds of risks. This measurement reflects how well resources are geographically positioned to meet demand.
- **Concentration Analysis:** examines whether the agency can assemble the appropriate number of personnel and apparatus on scene within established benchmarks to deliver an effective response force.

To achieve this analysis, five components of the incident response cycle are analyzed across five years of historical data to describe the quality of performance to each Call Type Group and risk level:

- Alarm Handling Time (911 Pickup to Dispatch)
- Turnout Time (Dispatch to En Route for the 1st Arriving Unit)
- Travel Time Distribution (1st Arriving Unit En Route to On Scene) and Concentration (1st Arriving Unit En Route to ERF-fulfilling Unit On Scene)
- Fire Department Response Time Distribution (1st Arriving Unit Dispatched to On Scene) and Concentration (1st Arriving Unit Dispatched to ERF-fulfilling Unit On Scene)
- Total Response Time Distribution (911 Pickup to 1st Arriving Unit On Scene) and Concentration (911 Pickup to ERF-fulfilling Unit On Scene).

The analysis will include the total number of incidents measured for performance, which would then be summarized at the 90th percentile metric. The findings from this phase inform recommendations on resource placement, station coverage adjustments, and operational policies aimed at improving overall system efficiency.

Continuous Improvement and Service Enhancement Recommendations

The final task integrates findings from the CRA and SOC into a comprehensive operational improvement strategy, outlining short- and long-term recommendations tailored to meet the community's needs. Examples include:

- Deployment Adjustments: recommendations for station relocations, unit expansions, or staffing modifications based on risk and response performance.
- Operational Enhancements: adjustments to dispatch protocols, unit staffing models, and response assignments.
- Technology and Data Integration: implementation of real-time analytics, GIS-driven risk modeling, and predictive dispatching tools.
- Community Risk Reduction Plan: Prioritize and evaluate risks, conduct a root-cause analysis, and develop a CRR Plan with risk reduction programs.
- Community Wildfire Protection Plan: Develop and document mitigation strategies and establish a methodology and review schedule to keep the CWPP current.

A multi-year implementation roadmap is developed, specifying phased service enhancements, funding strategies, and stakeholder engagement plans. Performance tracking mechanisms are established to evaluate improvements over time, ensuring that deployment models and risk management strategies remain data-driven and aligned with community needs.

Our Work Plan and Strategy

A general overview of our CRA and SOC development processes is provided below.

Phase 1: Project Management and Communication

IPSDI will provide consistent, ongoing communication on project progress throughout the performance period, including virtual meetings at regular intervals.

Phase 2: Data Collection and Analysis

IPSDI will work with the customer to identify and prepare essential data needed to complete the analysis. IPSDI will provide a detailed data request list prior to the in-person meeting. This phase also includes:

- Kickoff Meeting: In a virtual environment, ensure common performance expectations and engagement between both entities. We will review any changes in the community, coverage area, or experience that have occurred since the proposal was submitted and identify and ensure access to data sets necessary for project success.
- Site visit: IPSDI personnel will conduct an in-person visit, including station visits, meetings with leadership and key personnel, and a review of available data.

Phase 3: Community Risk Assessment Development

We will assess the community's risk using industry standards and proven practices. The tasks will include:

- Assessing risk: We will identify specific community risks, locate hidden, difficult-to-reach, or underserved populations, and identify high-risk occupancies, populations, behaviors, and neighborhoods.
- Analyzing data: This task includes reviewing incidents by census tract and response zone, categorizing identified risks based on probability and impact, interpreting data from a community perspective, and identifying gaps and areas where conditions vary from desired outcomes.



- Writing the CRA: We will create a report and matrix summarizing actionable insights and next steps and validate the outcomes by comparing assessment results to ensure they are consistent with the community's acceptable risk level, capabilities, and resources.

Phase 4: Standards of Cover Development

We will evaluate the department and its service to the community based on industry standards and proven practices. The tasks will include:

- Describing the department, including an overview of its formation, governance, organizational structure, facilities, financial state, and infrastructure (such as apparatus, stations, and facilities). This will also involve evaluating the age, condition, and deployment of resources.
- Identify services provided to the community and their coverage areas.
- Assess system performance across all geographic areas served.
- Evaluate services through critical task analysis, deployment strategies, and performance.
- Review the impact of auto and mutual-aid agreements, particularly those that result in long-term personnel deployment outside the service area.
- Provide recommendations for improvement in service delivery.
- Suggest new or enhanced performance measures, including outputs and outcomes.
- Offer recommendations for addressing future growth and changes in service areas (i.e., future growth, contraction).
- Deliver a report for both internal and external stakeholders to improve service delivery.

Phase 5: Recommendations for Continuous Improvement and Service Enhancement

The final task integrates findings from the project into a comprehensive operational improvement strategy, including:

- Deployment Adjustments: Recommendations based on risk and response performance for station relocations, unit expansions, or staffing modifications.
- Operational Enhancements: Adjustments to dispatch protocols, unit staffing models, and response assignments.
- Technology and Data Integration: Implementation of real-time analytics, GIS-driven risk modeling, and predictive dispatching tools.
- Multi-Year Implementation Roadmap: Phased service enhancements, funding strategies, and stakeholder engagement plans.
- Performance Tracking Mechanisms: Systems to evaluate improvements over time, ensuring deployment models and risk management strategies remain data-driven and aligned with community needs.

Results and detailed recommendations will be included in the final report delivery.

Phase 6: Final Report Delivery

IPSDI will develop a draft and final written report and presentation documenting findings, recommendations, analysis methods, and data considerations and challenges. The draft report will be reviewed with the customer and revised based on their feedback. The final report, data methodology, and the compiled raw data and processing package will then be delivered. The report will be delivered in accordance with the customer's direction, to include professionally printed and bound copies, as well as digital files (PDF or another version) as specified.

Presentations (in-person, virtual, or combination) on the final report will be delivered as specified by the customer.

IPSDI Analytics + IPSDI Exposure

IPSDI is pleased to offer the following IPSDI Analytics and IPSDI Exposure services (further specified in the HGAC Portal in questions 9.3 - 9.4.3).

Our Analytics platform ingests the customer's data from CAD and RMS to create the ability to visualize incident data from disparate systems on one platform. We are system-agnostic and can ingest data from almost any CAD and RMS that has functional export*. We also enrich data with additional information, such as their parcel data or US Census Social Vulnerability Index (SVI) data.

We offer a near real-time option to analyze data through filtering, dashboards, and visualizations. We also send daily, weekly, and monthly emails providing information on call volume for the previous period.

After initial onboarding, Analytics is a subscription service that provides ongoing access to department members, technical support and training, and data science and dashboard customization support.

In the context of such a study, IPSDI proposes to work with the customer to onboard its department data onto our Analytics platform, preferably simultaneously with the Study. IPSDI would support the customer in developing dashboards and other analytics that help monitor the Study's recommendations and outcomes in near real-time.

Finally, Analytics connects directly with IPSDI Exposure, the only product available that enables a personal, system-agnostic, and lifetime capture of a firefighter's exposures. It helps firefighters document their physical and behavioral health exposures during their time as firefighters. The app also allows firefighters to opt in to contributing their data to national firefighter research, to help better understand how these exposures impact the long-term health and wellness of all firefighters.

Pricing is provided in the separate price proposal.

**A department may require additional support or data access from its CAD or RMS provider to connect its data with Analytics.*

Analyst on Demand

IPSDI offers dedicated time with our technical experts and data scientists to help address issues such as intensive data challenges and/or improvements, operational decisions and accreditation assistance.

Our Analyst on Demand services are designed to fill an existing void. Many departments cannot fund a full-time data analyst position but need data analysis to help solve complex problems impacting how their fire department serves the community. That they don't have the resources to fund a full-time analyst should not mean that the department's leadership lacks the tools to make data-informed, high-quality, and defensible decisions. Our Analyst on Demand service is helping to fill this void.

Departments typically request IPSDI's Analyst on Demand service to fill temporary data-capacity gaps or to solve time-sensitive problems. The following are sample scenarios where departments have benefited from our flexible, just-in-time support model:

- Response Time Disparity Investigation
- ISO Rating Preparation
- Accreditation Support
- Staffing Justification
- Brown-Out Impact Evaluation
- Mutual Aid Benefit/Burden Analysis
- After Action Review

Truly on Demand (TOD)

Data analysis services are provided on demand for a fire department's specific project or need. This service requires a minimum of four hours.

Analyst on Demand Subscription (ADS)

These services would also be provided on demand over a period of at least six months.

The rate includes four hours per month of on-demand analysis of a department's data and possible outcomes related to those issues. The department has the option to use the allocated time according to its needs (e.g., all 24 hours at one time, or a set cadence to deliver scheduled outcomes).

Due to the extended service timeframe (at least 6 months), we would expect a more frequent communication tempo and increased understanding of the department and its challenges compared with the one-time nature of solving a single Analyst on Demand problem.