SSM QUOTE TO REMEMBER:

"Hell, this stuff ain't no magic; it's just a bunch of hard work!"

- private owner
Michigan Ambulance Association
EFFICIENCY
SSM PRACTICES 13-POINT CHECKLIST
© 1990 The Fourth Party, Inc.

   A. Current measurement practices.
   B. Systemwide performance.
   C. Performance by neighborhood or area.

   A. Measurement of unit hour production.
   B. Measurement of effective unit hour production.

3. Appropriateness of Workload Distribution.
   A. Corporate standards by type of shift.
   B. Actual distribution by type of shift.
   C. Reporting practices.

   A. All crews and all stations.
   B. By station.
   C. By crew.

5. Facility Turnaround Times (pick up and drop off).
   A. By facility.
   B. By crews.

6. Sources of Wasted Unit Hours.
   A. Out-of-chute times.
   B. Hospital turnaround times.
   C. Vehicle failure rates
      1. During emergency missions.
      2. Total on-duty fleet downtime per month.
      3. Down crew.
      4. Shift change procedures, timing and efficiencies
         a. End of shift overtime accumulated.
         b. On-coming crew paid time before in-service
         c. Centralized vs. remote shift changes
   D. Financial accounting and accountability for lost unit hours.
   E. Unit hours in excess of SSP requirements.

7. Frequency of Post-to-post Moves.
   A. Too much or too little.
   B. Smart routing.
8. Efficiency and Flexibility of Schedules.
   A. Does supply match demand or demand based at all?
      1. geographical demand
      2. frequency of demand
   B. Options available for personnel and management.
   C. How are shifts allocated among personnel?
   D. Look for excess UH production.
   E. Look for inadequate UH production.
   F. Procedures for measuring and reporting direct UH costs.
   G. Reasonableness of direct costs per UH.
   H. Are shift changes timed to avoid excessive simultaneous shift changes especially during peakload periods?

9. Mutual Aid Profit and Loss Analysis.

10. Effective use of first responders and related priority dispatching protocols.

11. How well are SSM protocols documented?......Are they documented at all?

12. Are there externally imposed limitations on the use of various SSM practices
   A. Contract requirements designating post locations.
   B. Contract requirements limiting vehicle usage (e.g. emergency.
   C. In multiple jurisdictions, does each jurisdiction require a dedicated ambulance (sometimes with city logo printed on the side)?

13. Are our response time exemptions reasonable or loopholes?
The Prime Directive

To provide each critical patient the best possible chance of survival without disability or medical complication, given the current state-of-the-art of prehospital care technology.
Control These....

And You Control Your Market

- **UNIT-HOUR PRODUCTION**
  - Unit-Hour Quality
  - Unit-Hour Cost
    - % Unit Hours “Lost”
    - Percent Extraordinary Overtime
    - % Paid Time = Effective Unit Hour Production

- **UNIT-HOUR UTILIZATION**
  - Effective U/UH Ratio
  - Response Time Reliability

- **PATIENT ACCOUNTS MANAGEMENT**

- **COMMUNITY/GOVERNMENT RELATIONS**
A Short Poem

A dollar spent (or wasted) here,
Cannot be spent (or wasted) there.
Public vs. Private: Which is best?

Some of the best EMS is provided by government agencies.

Some of the worst EMS is provided by government agencies.

Some of the best EMS wages are provided by government agencies.

Some of the worst EMS wages are provided by government agencies.

Some of the best EMS is provided by private firms.

Some of the worst EMS is provided by private firms.

Some of the best EMS wages are provided by private firms.

Some of the worst EMS wages are provided by private firms.
Subsidy/Price Tradeoffs -- 1990 Data

Underlying Data:

Tulsa: average bill @ zero subsidy = $324.30; system cost per capita/yr. = $13.61
Reno: average bill @ zero subsidy = $404.00; system cost per capita/yr. = $13.22
KCMO: average bill @ zero subsidy = $391.60; system cost per capita/yr. = $18.74
E. Tex: average bill @ zero subsidy = $316.60; system cost per capita/yr. = $10.44
Investment Opportunity:

Relationship of Productivity to Unit Hour Funding

Assumptions: 1. Gross revenue at $400.00 per transport
2. Collection rate of 50%
3. Cash per transport at $200.00
EMS is Protocol Driven

Call Rec'd

Unit On Scene

Medical Protocols

System Status Management

Unit at Hospital
The U/UH Ratio

U (Utilization)  
UH (Unit Hours)

Patients Transported During Period  
Unit Hours Produced During Same Period

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THE MEN FROM THE BOYS

Easy: High U/UH ratio with poor response time reliability.

Easy: Low U/UH ratio with good response time reliability.

Stupid: Low U/UH ratio with poor response time reliability.

The Challenge: High U/UH ratio with good response time reliability.
July 21, 1988

Mr. Neil Malmud, Division Chief E
City of New York
Bureau of Financial Audit
Bureau of Management Audit
161 William Street
New York, NY 10038

Dear Mr. Malmud:

As requested in your letter of July 14, the following comments clarify common policy regarding exemptions of ambulance calls from response time statistics. The comments below assume, of course, that the clock starts the moment the EMS system has callback number, location of patient, and nature of emergency (i.e. "time call received"). Time spent giving pre-arrival instructions, asking additional questions regarding the patient's condition, etc., occurs after starting the clock. The clock stops upon the ambulance's arrival at the scene, and (where both BLS and paramedic units are used for emergency calls) response time reports account for the arrival of paramedic vs. BLS units separately. That is, the arrival of a BLS unit cannot serve to stop the ALS clock, nor does it satisfy the patient's need for paramedic-level care. Addressing your itemized listing, my comments are as follows:

1. **Regarding routine patient transfers:** In most contracted systems, less stringent standards exist for response time to routine transfers, and associated "late run" financial penalties are also reduced. Typical standards for routine transports are one hour maximum (not average) with 90% reliability for unscheduled calls, and within 15 minutes of scheduled time of pickup on routine transfer requests made several hours in advance of desired pickup time. Such runs are not "exempt," but the standards are less stringent. (Typical standards in urban areas for presumptively-classified life threatening calls are 8 to 10 minutes maximum with 90% reliability, and for non-life threatening emergency requests, 12 minutes maximum with 90% reliability.)

2. **Regarding "duplicates," i.e. multiple requests to the same scene:** The clock is started with the receipt of the first such request. Duplicate requests to the same scene are excluded. (Where multiple units of the same type are dispatched to a scene, arrival of the first unit stops the clock.)
3. Regarding "training" dispatches: Training or "practice" dispatch records are excluded, as no request for service was actually made, and no unit was actually dispatched. (I assume your contractor does not actually dispatch vehicles on "practice" or "test" runs is a dangerous policy.)

4. Regarding "standbys": The response times of units dispatched to cover scheduled special event "standbys" (e.g., rock concerts, etc.) are excluded. Response times of units dispatched to cover unscheduled "standbys" (e.g., working fire, burglary in progress, etc.) are, in some systems, counted as "non-life-threatening" emergency dispatches, and evaluated accordingly.

5. Regarding "preempts," or re-assigned calls: Where an ambulance is originally dispatched to a call, and the same request for service is then later re-assigned to another unit before arrival of the originally-assigned unit, the response time is clocked from the original "time call received" to the arrival of the ambulance to which the call was finally assigned. Such calls are not exempt.

6. Regarding "out-of-service" units: As is the case with re-assigned calls, the clock starts at the original "time call received" and terminates upon arrival of whichever unit arrives first. (It is not important to the patient or to the public whether the unit that arrived was the first unit dispatched or some other unit.)

7. Regarding "reopened calls:" A "reopened call" (i.e. one where the 1st unit arrived at the scene but couldn't find the patient, then a 2nd request is made and another unit sent) is normally treated as separate calls, with response times calculated and reported for each call separately.

8. Regarding canceled calls: If the call is canceled prior to arrival of the ambulance (e.g., by an on-scene 1st responder), the call is excluded unless the cancellation occurs after the response time standard has elapsed. If the response time clock is not stopped either by the arrival of the unit or by cancellation before the response time standard for that class of call has elapsed, the call is counted as a "late run" and, where applicable, financial penalties are applied.

9. Regarding no on-scene time reported: If data is inadequate to determine the response time, the run may or may not be excluded, depending upon why the data is inadequate. In general, the contractor is held accountable for employing communications systems and record keeping systems capable of accurately documenting the contractor’s performance. Failure to do so is itself a major default. (Anything in excess of a percent or two frequency bad data would normally be considered unusual, and possible grounds for a finding of major default.)
10. **Regarding unit not sent**: Failure to send an ambulance to the scene of any request for medical assistance would be grounds for a finding of major default under a properly-structured EMS contract. If the unit was not sent and never did arrive, the response time would, I suppose, be recorded as "infinite," and that's a long time.

11. **Regarding DOA's**: Since the patient might be dead because the ambulance was late, response times to such calls are at least as important as those of other types of calls. Certainly they are not excluded.

12. **Regarding "unfounded calls"**: To avoid an incentive for providers to artificially create "good run" statistics by calling in "prank calls" for locations near available units, this class of calls is usually excluded from response time statistics.

13. **Regarding "RMAs" (refused medical attention)**: This class of call is often excluded from response time statistics and "late run" financial penalties, however, the frequency of such calls by senior medic is usually checked to detect patterns of abuse of this policy.

14. **Regarding "patients transported by other means"**: Since a delayed ambulance response could well be the reason for resorting to "transport by other means," these runs must of course be included in response time statistics. (As noted under Item 8 above, if the call is canceled before the unit arrived and before the response time standard has elapsed, the call would be excluded from response time reports.)

As you can see, the answers to most of these questions are just common sense, when viewed from the patient's point of view, i.e. the perspective that matters most. In general, your day's high population density and vast economies of scale would be considered (by our industry's most qualified firms) valuable assets to efficient production of good clinical performance and response time reliability. Keep in mind that reliable response times are just half the job -- clinical performance is equally important but harder to measure accurately.

Sincerely,

Jack L Stout
The "Stout Curve" displays the relationship between potential productivity (U/UH ratio) and the "Difficulty of Coverage Index" (DOC Index). The index is based upon weighted values assigned to the following factors:

1. Response-time requirements.

2. Artificial production constraints:
   A. Mandatory coverage levels;
   B. Mandatory deployment;
   C. Emergency-only restrictions;
   D. Mandatory use of specialized production strategy;
   E. Single-jurisdiction deployment restrictions;
   F. Barriers to peak-load staffing; and
   G. Barriers to responsive event-driven re-deployment.

3. Call density per square mile:
   A. Rural/urban;
   B. Multi-provider emergency system; and
   C. Cream skimmers in market

4. Economics of scale.

5. Quality/availability of mutual aid.

6. Traffic factors:
   A. Road system;
   B. Traffic congestion;
   C. Natural barriers;
   D. Weather; and
   E. Shape of primary service area.

7. Demand-pattern effects:
   A. Day/Night; and,
   B. Special events.

8. Special factors.
The Stout Curve

Potential U/UH Ratio

- Current to Future Potential
- Current Substandard Performance
6. **Money Goes in One End; Service Comes Out the Other In Between is “The System”**

![Diagram of high and low performance EMS systems]

**Efficiency**

*Is this the best we can do with the money we’ve got?*

**Comments:** Some EMS systems ingest huge sums of money while producing service of limited quality and quantity. Other EMS systems feed on scarce financial resources yet consistently produce impressive quantities of reliable service.
Local Tax EMS Subsidy Per Capita Per Year

- $20
- $20
- $10
- $16
- $14
- $12
- $10
- $8
- $6
- $4
- $2
- $0

Very Low
- e.g.: Kansas City*
- Tulsa*
- Oklahoma City*
- Las Vegas*
- Syracuse*
- Fort Wayne*
- Little Rock*

Low
- e.g.: Fort Worth*
- San Diego

Average
- e.g.: Dallas
- Pittsburg
- Corpus Christi
- Richmond*

High
- Houston
- Detroit
- San Antonio

Very High
- Washington, DC

* Note: The systems indicated by asterisk are state-of-the-art, externally monitored, 100% paramedic, full-service systems which do not permit: telephone call-screening, hand-offs of patients to BLS crews, refusal to respond, refusal to transport, or on-scene collections.
PATTERNS OF DEMAND
Tuesday

- Average
- Avg. High
- Avg. Peak
- Maximum
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RESPONSE TIMES

% OF CALLS

RESPONSE TIMES (IN MINUTES)

SOURCE: CODE #1 & CODE #2 COMBINED
SAMPLE STANDARD FOR EQUALITY OF SERVICE

There shall be no chronic pattern of response time discrimination against any neighborhood, councilmanic district, or zone as defined by local ordinance.
DIFFICULTY OF COVERAGE

ESTIMATING PRODUCTIVITY POTENTIAL
LEVELS OF EFFICIENCY

- High quality with above-average cost;
- Low quality with below-average cost;
- Low quality with above-average costs; and,
- HPEMS systems—i.e., those which produce above-average service at below-average cost.
LEVELS OF EFFICIENCY

• High quality with above-average cost;

• Low quality with below-average cost;

• Low quality with above-average costs; and,

• HPEMS systems—i.e., those which produce above-average service at below-average cost.
FACTS REGARDING UNIT-HOUR COSTS:

1. Average cost/unit-hour ÷ U/UH ratio = Cost per patient transport.

2. Cost per patient transport ÷ collection rate = Average user-fee at zero subsidy level.

3. The Industry Range (paid services): $25 to $80 average cost/unit-hour.

4. Marginal cost/unit-hour ranges from about 40% to 60% of average cost/unit-hour.

5. Direct street labor costs (non-management) make up more than 50% of total average unit-hour costs.

6. Unit-hour costs are powerfully affected by economies of scale.

7. Unit-hour cost is a poor predictor of clinical quality.

8. Unit-hour cost is a poor predictor of cost per patient transport.

9. Unit-hour cost is a poor predictor of subsidy requirements.

10. Far less money is wasted in the production of unit hours than is wasted from squandered unit hour.
TEMPORAL U/H H ALLOCATION
EXERCISE 1
EXERCISE # 1

DEVELOP A BASIC COVERAGE PLAN*

The most elementary and yet, for the beginner, most frustrating step in building your first system status plan (SSP) is determining how many units will be needed for adequate coverage of the 168 hour week. The sum total of each hour's requirements will determine your weekly unit hour requirements, which when divided by transports per week determine your overall unit hour utilization ratio.

THE SETUP:

You are about to submit a proposal to provide exclusive ambulance service (both emergency and non-emergency) for the City of Podunk. Your bid security is a $10,000.00 cashier's check, and your performance security will be an irrevocable letter of credit for $300,000.00, plus a lien on your outstanding accounts receivable, i.e. you'll have over $1 million at stake on this contract.

The basic task of this exercise is to estimate as accurately as possible the number of units you would need to: cover the area shown on the map; respond to all emergency calls within 8 minutes maximum and 90 percent reliability; provide reasonably prompt service on non-emergency calls; and provide a sufficient margin of safety to avoid bankruptcy in case your estimates prove overly optimistic but not so wide a margin that your costs of coverage eliminate you as a serious competitor.

YOUR TOOLS:

1. Your extensive experience in ambulance services.
2. Your native intelligence and uncanny judgment.
3. Blank "Unit Hour Distribution" sheets.
4. The map on the following page.
5. The demand pattern analysis.

*Note: In actual practice, your final coverage plan would have to be modified to accommodate any surplus but unavoidable unit hours associated with the shift schedules you eventually decide to use. The process of scheduling personnel to match as closely as possible your desired coverage plan will be covered in a later session. For now, just figure out how many units you think you’ll need for each hour of coverage.
| Group ______ |

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## Simplified Demand Analysis for Podunk

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Situation: Total fee for service income and subsidies available to support your system are $2.8 million per year. Currently, your average total system cost per unit hour is $68.

Exercise: Using demand pattern data from Exercise #1, and the financial resources available to you as described above, allocate your “affordable unit hours” around the clock to achieve the best possible response time reliability.
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Total for Day
1. To reduce nonemergency service delays.*
2. To equalize service among various neighborhoods.
3. To free up more capacity for "marginal cost" production.
4. To reduce use of on-call crews.
5. To create shift schedules more preferable to employees.*
6. To reduce the average labor cost per unit hour of coverage.
7. To reduce frequency of post/post moves.
8. To eliminate unneeded unit hours (i.e., improve U/UH ratio).*
9. To simplify the SSP.
10. To equalize workloads among certain crews.*
11. To differentiate workloads among other crews.*
12. To equalize call-types seen by various crews.
13. To set an example of excellence and effort.
14. To develop a base of experience:
   a) to insulate your company against outside bidders;
   b) to prepare for bidding other markets.
15. To outperform a neighboring provider in his own area.
16. To provide more reliable mutual aid service.
17. To reduce overtime costs.
18. To reduce use of mandatory overtime.
19. To bury a cream-skimmer working your market.*
20. To minimize damage done by stupid government policies.
21. To enjoy the satisfaction of being among the very best.

* Website for the Fourth Party, Inc.
EXERCISE # 2
DEVELOP A PARTIAL SSP FOR A SINGLE HOUR
A. To demonstrate the relationship in EMS between "demand" & "supply."

B. To show why peakload staffing is essential to quality patient care.

C. To briefly demonstrate the complexity of shift pattern development.

D. To show why short, high-productivity shifts should pay the same effective salary as long, low-productivity shift.

E. To discuss the shift-bid process, including seniority rights.

F. To demonstrate the value (to the patients, to personnel, and to the bottom line) of having available a wide variety of shift options.
Exercise #2
Develop a Partial SSP for Monday, Hour 8

In Exercise #1, we determined how many units would be needed to cover Podunk during each of the week's 168 hours. In real life, the next step would be to determine where each unit will be located during each hour at each level of coverage, and to assign post priorities at every level, every hour.

The Setup: In Exercise #2, you will develop part of an SSP for Monday, hour 8, by assigning post locations and priorities for coverage levels 1 through 4. The demand map shows the locations of all emergency calls for the past three months—a total of 67 emergency calls. You may use any of the 22 post locations shown on the map.

Assignment: Using the enclosed blank SSM record sheets to record your decisions, begin with the assumption that you are down to a single unit on a Monday, hour 8, identify the single post that would provide the best possible coverage, and assign that post "priority 1". Then, having identified where one unit should be posted, decide where you could best place two units if you had them; then three units; and so on, up to four units. When multiple posts are used, assign more valuable posts higher priority numbers (i.e., lower Arabic numerals), and less valuable posts lower priority numbers.

Hints:

1) Identify the posts you are using on the blank SSM Record in the same relative "geographic" location as they appear on the map.

2) If multiple units are to be positioned at the same post location, create a second adjacent "dummy post" and assign it an alphabetical suffix. (E.g., the second unit at Post 12 would show up as being at "Post 12A", which might have a different priority level than that of Post 12.)

3) If two posts seem equally valuable, you can assign an identical post priority level to both of them.

4) To reduce unnecessary post/post moves, consider giving lower post priorities to posts not in use at the next lowest level of coverage, but only if such practice would not otherwise jeopardize coverage.

5) In actual practice, your system stan controllers and most experienced field personnel should be trained to effectively participate in this process and included on the SSP development team. They'll better understand the requirements of high performance operations, and will be far more helpful later in suggesting SSP refinements.
The train goes through town to the river several times a day. It travels under the interstates, but crosses both roads leading from posts 6 to posts 7 and 11, and blocks traffic several times a day. The drawbridge opens on demand for commercial vessels, and on the hour for pleasure vessels.
SSM Post Priority Record

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# units available:____  On-call Crew Call Up Level:____

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# units available:____  On-call Crew Call Up Level:____

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DEVELOPING THE INITIAL SSP
EMS is Protocol Driven

- Call Rec'd
- EMD
- Medical Protocols
- Unit On Scene
- Unit at Hospital
- System Status Management
QUALITY SSM IS:

STRIKING A BALANCE

• Concern for adequate coverage of high-volume areas and peak load periods;

• Concern for adequate coverage of low-volume areas and off-peak periods;

• Concern for employee health, safety, skills maintenance, and job satisfaction; and,

• Concern for economic efficiency and the system's financial stability.
1. Demand Pattern Analysis (standard form or equivalent)

2. Demand Maps:
   • "Problem" maps
   • "Solution" maps

3. Late Run Incident Reports (with "snapshot" feature)

4. Crew Performance Statistics:
   • Pickup times
   • Drop times
   • Out-of-chute times
   • No-haul percentages

5. Support Services Performance Statistics:
   • "Produced" vs. "Effective" Unit Hour Production
   • Vehicle failure rates
   • Dispatch processing time
Step 1. Conduct Level 1 SSM Seminar for 100% of personnel.

Step 2. Estimate your target U/UH ratio.

Step 3. Estimate your weekly transport volume.

Step 4. Calculate your target "in-plan" unit hour production per week (i.e. weekly transports + U/UH ratio).

Step 5. Using demand-pattern analysis reports (or your estimates if data is unavailable), allocate your target unit hour production across the 168 hours of the week. (Consider traffic congestion, other factors.)

Step 6. Determine shift options for fulfilling the plan, and survey individual employee shift preferences.

Step 7. Using as many preferred shifts as possible, develop a cost-effective schedule which closely matches the coverage plan.

Step 8. Allocate the selected shifts by shift-bid process.

Step 9. Make final adjustments to the schedule, and to the coverage plan.

Step 10. Using demand maps (if available), assign post priorities for each hour, up to one or two levels above maximum planned coverage.

Step 11. Establish your SSM information system.

Step 12. Implement
# Coverage Plan for Exercise #2

## Unit Hour Distribution Sheet

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Total for week: **715**
## Sample Coverage Plan for Exercise #2

### Unit Hour Distribution Sheet

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Total for week: \( 715 \)
Diagnostic Tools:

1. Demand Pattern Analysis – Volume
2. Demand Pattern Analysis – Geographic
3. Late Run Failure Analysis
4. Unit-Hour-Based Cost and Productivity Analysis

Treatment Tools:

5. “Flexible” Production Strategy (i.e., all ALS, full service)
6. Peak Load Staffing (Including Workload Management)
7. Geographic Deployment
8. Event-Driven Re-deployment Protocols
   a. Establishing Post Priorities
   b. Double-Unit Post Assignments
   c. Equal Alternate Posts
   d. Conditional Equal Alternate Posts
   e. Smart Routing of Post/Post Moves
9. Non-Emergency Cutoff Levels
10. On-Call Crew Callup Levels
11. Supervisor Unit Standby Status
12. Reduce Gap Between “Effective” vs. “Produced” Unit Hours
13. Eliminating Errors In Managing Response
14. Cost/Effective Planned Use of Mutual Aid
ORIGINS OF DELAYED EMERGENCY RESPONSE

The causes of most late runs have little to do with the number of units in service, or even the locations of the posts from which those units are intended to operate. Analyses of thousands of actual late runs have shown that, except in the most efficient and highly refined EMS operations, most late runs are directly or indirectly caused by sloppy or poorly thought-out operating protocols, poor organization, or just plain lack of effort. Specifically, the most frequent causes of poor response time performance are as follows:

A. Poor Dispatching or Field Operations. (These causes cannot be corrected by adding units, changing post locations, or changing post priorities.)

1. Bad address/faulty telephone procedure
2. Bad address/locator system computer error
3. Bad address/faulty radio procedure
4. Lost Unit (dispatcher forgot unit or unit got lost)
5. Dispatched wrong unit
6. Poor routing instructions
7. No routing instructions
8. Crew unfamiliar with area
9. Crew slow getting out of the "chute"
10. Delayed unit alert
    a) Dispatcher failed to follow unit alert protocol
    b) Unit-alert communications system inadequate
    c) Poor CAD system design
11. Crew couldn't report arrival time
    a) Control center overload
    b) No available radio channel
12. Road obstructions other than traffic
13. Special events coverage error
14. Failure to follow the SSP in selecting units
B. Squandered Unit Hours. (These causes also cannot be corrected by adding unit hours or changing the SSP.)

1. Inefficient patient (facility) exchange procedures.
   a) Slow facility
   b) Slow crew
   c) Slow combination, usually OK (money locator combo)
   d) Inconvenient restocking method

2. Not-so-bright shift change procedures.
   a) Peak load changes
   b) Inadequate equipment inventory
   c) Multiple simultaneous crew changes
   d) Slow checkout procedure

3. Slow "down-unit" changeout procedure

4. Crew not at assigned location

5. Crew not at reported location

6. Too many cancelled runs

7. Too many transport refusals

8. Failure to follow SSP
   a) Wrong P/P move
   b) Delayed P/P move
   c) No P/P move
   d) Violated no-nonemerg. transfer rules
   e) Violated on-call callup rules.

C. Causes that can be corrected by SSP changes or addition of units.

1. Pattern traffic congestion.

2. No nearby unit.

3. No units available.

4. Dispatched unit enroute P/P move at time call received.
1. Clinical Quality
2. Customer Service
3. Response Time Performance and Reliability
4. Effective U/UH Ratio
5. Ratio P/P Moves Per Unit Hour
6. Dept. Cost Per Billable Run/Effective UH
7. Effectiveness of Workload Management
8. Control of End-Shift Extraordinary Overtime
TOOLS FOR REDUCING POST-TO-POST MOVEMENT

• Assign routine transfer calls to:
  
  Best: Crews starting their shift;
  
  2nd Best: Crews completing a run;
  
  Still pretty good: Crews posted at low(est) priority post.

• Use double-unit post assignment at high priority posts.

• Use more equal/alternate posts, where and when feasible.

• Further fine-tune using conditional alternate posts.

• Avoid domino-style movements.
POSSIBLE OBJECTIVES OF THE SSP

1. To reduce nonemergency service delays.*
2. To equalize service among various neighborhoods.
3. To free up more capacity for "marginal cost" production.
4. To reduce use of on-call crews.
5. To create shift schedules more preferable to employees.*
6. To reduce the average labor cost per unit hour of coverage.
7. To reduce frequency of post/post moves.
8. To eliminate unneeded unit hours (i.e., improve U/UH ratio).*
9. To simplify the SSP.
10. To equalize workloads among certain crews.*
11. To differentiate workloads among other crews.*
12. To equalize call-types seen by various crews.
13. To set an example of excellence and effort.
14. To develop a base of experience:* 
   a) to insulate your company against outside bidders;
   b) to prepare for bidding other markets.
15. To outperform a neighboring provider in his own area.
16. To provide more reliable mutual aid service.
17. To reduce overtime costs.
18. To reduce use of mandatory overtime.
19. To bury a cream-skimmer working your market.*
20. To minimize damage done by stupid government policies.
21. To enjoy the satisfaction of being among the very best.

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Contractor shall manage its resources as necessary to prevent development of a chronic pattern of response time discrimination against any of the four districts within the “8-minute zone,” as such “districts” are defined in Attachment A.

For purposes of this provision, “chronic” shall be defined as delivery of the worst “district” response time performance (i.e., to life-threatening emergencies) within the same “district” more than three (3) consecutive months, or more than a total of six (6) months during any 12-month period.

Provided, however, that the worst “district” performance during any month wherein performance within every “district” exceeds the 90% level of reliability shall be considered acceptable performance and shall not be counted as evidence of response time discrimination against that “district.”
The "unit hours we produce may be:

- Expensive or cheap;
- Clinically advanced or rudimentary;
- Caring or indifferent;
- Professional or amateur;
- Nearly 100% available for patient care, or substantially wasted due to inadequate support services and wasteful management practices.
- Distributed to match or ignore demand pattern fluctuations:
  a. Temporal
  b. Geographic
1. Fierce competition for the local tax dollar.
2. Classic "Utility" Industry
3. Peak-Load Demand Pattern Characteristics
4. Distribution Costs Exceed "Product" Costs
5. "Product" Shelf-Life Is Measured in Minutes & Seconds
6. Significant Economies of Scale
7. Multiple Types of "Customers" — All Crucial
8. Increasingly Complex (Clinically, Technologically, Financially, Legally, Politically)
9. Increasing Use of Competitive Market Allocation
10. Intelligent Workforce, Operating Independently
11. Very Low Tolerance for Error (Politically and Legally)
12. Perf. "Yardsticks" (Becoming) Better Understood
13. Perf. "Yardsticks" (Becoming) More Demanding
14. 60-85% of Our Production Capacity is Idle
15. Economic "rules" changing rapidly
16. Supply Side Consolidating Rapidly, Nearing Oligopoly Likely
17. Paramedics Will Learn What Other Skilled Crafts and Professions Already Know.
18. Shift to Managed Health Care Inevitable
SSM/CAD FUNCTIONS
(Generic)

A. Post priorities by status level for each SSP
B. Equal/alternate posts feature
C. 2-variable "and/or" conditional alternate post feature
D. Double-unit post assignment
E. On-call crew callup feature
F. Special unit activation feature
G. Non-emerg. cutoff level
H. Status 5 restriction
I. Status 10 restriction (manual vs. automatic)
J. "Home post" feature
K. Emerg.-only unit restriction
L. Emerg. dispatch unit recommendation
M. Routine transport unit recommendation
N. Separate "system" feature
O. Work schedule management
P. Status change delay prompts
Q. Workload distribution management features
R. Planned vs. actual coverage levels
S. Response time compliance
T. Unit-status screen
U. Wrong direction warning
V. Auto-page low status levels
W. Geographic demand-pattern history display
X. (deleted)
Y. Post coverage "satisfaction"
Step 1. Conduct Level 1 SSM Seminar for 100% of personnel.

Step 2. Estimate your target U/UH ratio.

Step 3. Estimate your weekly transport volume.

Step 4. Calculate your target "in-plan" unit hour production per week (i.e., weekly transports + U/UH ratio).

Step 5. Using demand-pattern analysis reports (or your estimates if data is unavailable), allocate your target unit hour production across the 168 hours of the week. (Consider traffic congestion, other factors.)

Step 6. Determine shift options for fulfilling the plan, and survey individual employee shift preferences.

Step 7. Using as many preferred shifts as possible, develop a cost/effective schedule which closely matches the coverage plan.

Step 8. Allocate the selected shifts by shift-bid process.

Step 9. Make final adjustments to the schedule, and to the coverage plan.

Step 10. Using demand maps (if available), assign post priorities for each hour, up to one or two levels above maximum planned coverage.

Step 11. Establish your SSM information system.

Step 12. Implement
Diagnostic Tools:

1. Demand Pattern Analysis – Volume
2. Demand Pattern Analysis – Geographic
3. Late Run Failure Analysis
4. Unit-Hour-Based Cost and Productivity Analysis

Treatment Tools:

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13. Eliminating Errors In Managing Response
14. Cost/Effective Planned Use of Mutual Aid
Diagnostic Tools:

1. Demand Pattern Analysis -- Volume
2. Demand Pattern Analysis -- Geographic
3. Late Run Failure Analysis -- 52% Causes on Employee Training Field
4. Unit Hour-Based Cost and Productivity Analysis

Treatment Tools:

1. "Flexible" Production Strategy (i.e. all ALS, full service)
2. Peak Load Staffing (Including Workload Management)
3. Geographic Deployment
4. Event-Driven Re-deployment Protocols
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INTRODUCTION TO MANAGEMENT

STRUCTURE
A high-performance organization can be a satisfying place to work, but it is never without tension. Healthy tension within the organization is necessary to maintaining the organization's balance, as well as its drive. Too much tension, or the wrong kind of tension, creates friction and conflict—driving costs up and productivity down. But the right amount of the right kind of tension can motivate and guide your organization's performance.

Perhaps the best example of healthy tension is the relationship between the waiters and the kitchen in the best restaurants. The waiter's job is advocacy—to represent each customer's interests in dealing with the kitchen. From the waiter's point of view, each customer's wishes must be individually satisfied. If the waiter succeeds, the customer is satisfied, repeat business is assured, and the waiter earns a fat tip.

Back in the kitchen, the chef's job is similar but significantly different. The chef must keep the kitchen routine in order. He must not allow orders to fall too far behind. He is not insensitive to customer's individual preferences, but he cannot allow special requests and rush orders to disrupt the overall workflow.

Thus, the waiter pleads for something special, but not on the menu. The customer does want the gnocchi, but with gorgonzola instead of the regular cheese. The chef resists automatically. The waiter points out that the customer is an important guest of Mr. Williamson—a valued regular customer (and substantial tipper). Mr. Williamson will be embarrassed if the chef cannot deliver. And so on and on.

This sort of tension.....this on-going negotiation.....is an inevitable feature of every great restaurant. Someone must represent the customer, and must do so effectively. Someone else must resist the intrusion of chaos into the kitchen's process, also effectively. When
both do their jobs, a balance is struck. When one is less effective, orders stack up and customers must wait. When the other is less effective, customers no longer feel valued as individuals, and can’t get what they want.

In the best-managed restaurants, this tension is serious, constant, and highly productive. But it is rarely uncomfortable. Mutual respect, and a recognition of respective interests, keep the tension under control and allow it to work its magic.

In every kind of organization, analogies can be found. In manufacturing, a 4-way tension links marketing, engineering, production, and distribution. The responsibilities are similar—i.e., everyone serves the customer—but significantly different. When balance is maintained, the organization prospers and customers reap the benefits.

On the production side of a high-performance EMS organization, that tension must exist between the person responsible for unit hour production, and the person responsible for unit hour utilization. Their responsibilities are similar, but significantly different. To understand the form of this tension, we must first study these positions’ generic job descriptions.

Unit Hour Utilization Manager. This job includes responsibility for determining coverage requirements, and for managing the use of unit hours but not for producing them. Doing a “good job” means holding unit hour coverage requirements to a minimum while achieving consistently high levels of response time reliability—i.e., maintaining a high U/UH ratio and excellent response time reliability at the same time.

Unit Hour Production Manager. The goal of this job is to produce high-quality unit hours at a reasonable cost per unit hour, and to fulfill as closely as possible the coverage requirements of the Unit Hour Utilization Manager. A “high-quality unit hour” may be summarized as a clinically-competent, neat-appearing, well-motivated crew conducting themselves at all times in a safe, friendly, caring, and
professional manner and working with high-quality, reliable, clean, and well-maintained equipment while under control center direction for one hour.

While these job descriptions have a great deal in common, they are also in conflict. The responsibilities are similar—i.e., everyone serves the customer—but significantly different. When balance is maintained, the organization prospers and patients reap the benefits.

The Unit Hour Production Manager's job would be easier if the Unit Hour Utilization Manager could live with level staffing instead of complex peak-load coverage, fixed post assignments rather than event-driven redeployment, few post-to-post moves, and separate crews for handling emergencies vs. routine calls.

In contrast, the job of the Unit Hour Utilization Manager would be easier with exclusive use of short-shift crews capable of working safely throughout their entire shifts, elaborate precision peak-load coverage, fully-flexible street-corner deployment, unlimited use of post-to-post moves, an all-ALS system, and a healthy dose of routine calls to help support the U/UH ratio.

When both managers do their jobs, a balance is struck. But when one is less effective, "orders" stack up and customers must wait. When the other is less effective, employees no longer feel valued as individuals. In the best-managed EMS organizations, this tension is serious, constant, and highly productive. But it is rarely uncomfortable. Mutual respect, and a recognition of respective interests, keep the tension under control and allow it to work its magic.

A final point: This tension should operate at the management level. Real animosity between control center personnel and field personnel is a symptom of bad management. The job of top management is to manage the tension, to keep it alive, but keep it productive.
Step 1. Follow the damn plan. (Every day.)

Step 2. Select specific problem hours. (Weekly or monthly.)

Step 3. Determine the cause of every late run for the problem hours selected.

Step 4. Separate the incidents into three categories by type of solution.
The three categories are:
- Solutions not requiring changes to the SSP or shift schedules;
- Solutions requiring SSP changes but not shift schedule changes;
- Solutions requiring SSP changes and shift schedule adjustments

Step 5. Develop solutions to problems NOT requiring SSP changes. (Weekly or monthly.)

Step 6. Develop SSP changes NOT requiring shift schedule changes or additional unit hours. (Monthly.)

Step 7. Analyze for reduction in post-to-post movement. (Monthly.)

Step 8. Develop SSP changes requiring minor shift schedule adjustments. (Monthly or quarterly.)

Step 9. Develop SSP changes requiring major shift schedule adjustments. (Seasonal or every six months.)

Step 10. Add unit hours last. (Seasonal or every six months.)
POSSIBLE SSP FINE-TUNING OBJECTIVES
(C) 1987 The Fourth Part, Inc.

The best and most important objective of fine-tuning your SSP is, of course, reducing late runs (both frequency and length of delay) while simultaneously improving your system's economic efficiency. However, experienced system status managers know that SSM fine-tuning must also take into consideration a number of additional objectives, many of which can have a direct and positive impact upon job satisfaction of both SSCs and field personnel. The most important of these objectives are as follows:

1. To reduce non-emergency service delays.
2. To equalize service among various neighborhoods.
3. To free up more capacity "marginal cost" production of non-emergency services.
4. To reduce use of on-call crews.
5. To create shift schedules more preferable to workers.
6. To reduce the average labor cost per unit hour of coverage.
7. To reduce frequency of post to post moves.
8. To eliminate unneeded unit hours (i.e. improve U-UH ratio).
9. To simplify the SSP.
10. To equalize workloads among certain crews.
11. To differentiate workloads among other crews.
12. To equalize call-types seen by various crews.
13. To set an example of excellence and effort.
14. To develop a base of experience:
   a. to insulate your company against outside bidders, and
   b. to prepare for bidding other markets.
15. To outperform a neighboring provider in his own area.
16. To provide more reliable mutual aid service.
17. To reduce overtime costs.
18. To reduce use of mandatory overtime.
19. To buy a cream-skimmer working your market.
20. To minimize damage done by stupid government policies.
21. To enjoy the satisfaction of being among the very best.
<table>
<thead>
<tr>
<th>Phase</th>
<th>Opportunity to Screw Up</th>
</tr>
</thead>
</table>
| 1. Call Received: | a. bad address match from 911  
b. failure to confirm patient is with caller  
c. failure to obtain location information  
d. failure to obtain access information  
e. failure to arrange for lead-in to scene  
f. failure to promptly initiate unit-alert |
| 2. Unit Selection | a. inadequate unit availability  
1. insufficient UH production this hour  
2. unusual system overload  
3. slow hospital turnaround times  
4. inefficient shift-change process  
5. inefficient mid-shift re-stocking  
6. fleet maintenance problems  
7. production capacity depleted by specialized routine transport units  
8. wrong non-emergency cut-off level  
9. wrong on-call crew call-up level  
10. unit in SSP send on long-distance transfer with out replacement  
11. failure to activate supervisor unit |
2. Unit Selection Cont'd:
   b. poor placement of available units
      1. good SSP, but not for this call
      2. faulty post placement
      3. faulty post priorities
      4. caught in post to post lag time
      5. bad routing of P/P and R/P units
      6. SSP not followed
      7. SSP updates not prompt
      8. earlier dispatch of routine call from high priority post
   c. selected wrong unit from those available
      1. blatant error (closer unit overlooked)
      2. assigned upstream unit
      3. missed unit mobile in area
         a. enroute to post
         b. enroute to lower priority call
      4. overlooked construction barriers
      5. "nearest" unit wasn't "closest" unit
      6. should have used mutual aid
      7. should have double-dispatched

3. Unit Alert:
   a. alert initiated too late
   b. communications failure
   c. crew non-responsive
   d. incorrect address
   e. ambiguous location
   f. failure to give cross streets
3. Unit Alert Cont'd:
   g. inadequate routing advice
   h. failure to promptly follow-up on

4. Continued Monitoring:
   a. unacknowledged alert inadequate
   "tickler" system for monitoring unit
   status changes
   b. failure to follow-up delayed unit
   status changes

5. Unit Enroute:
   a. slow out-of-chute time
   b. delayed start studying map-book
   c. vehicle malfunction
   d. can't locate or access scene
   e. can't locate or access patient
   f. motor vehicle accident
   g. poor driving tactics
   h. crew got lost
   i. tied up in traffic
      1. poor route selection
      2. no better way (wrong unit
         assigned)

6. On Scene:
   [This is the province of medical control
   However, for routine and inter-facility
   transfer, pickup time is analogous to
   hospital drop time.]
7. Destination Selection:
   a. hospital divert problems
   b. patient chooses distant facility
   c. specialized facilities more distant

8. Enroute Destination:
   a. vehicle malfunction
   b. can't locate destination
   c. motor vehicle accident
   d. poor driving tactics
   e. tied up in traffic
      1. poor route selection
      2. no better way (wrong unit assigned)
   g. crew got lost
   h. failure to use helicopter when needed

9. Arrive Destination:
   a. inadequate staffing of facility
   b. admission to floors
   c. failure to rotate equipment
   d. inadequate clean up/restocking arrangements
   e. cumbersome information exchange
   f. no info-system interface
   g. delayed Code 5 status report
   h. delayed "Available" status report
   i. coffee too good at receiving facility
10. **New Post Assignment**

   a. wrong post
   b. delayed assignment
   c. faulty route assignment
   d. no route assignment
   e. vehicle malfunction
   f. motor vehicle accident
Step 1. Follow the same plan, every day, all the time. You can't refine a plan you haven't been following. To test an SSP, you must use it.

Step 2. Correct all deviations from the current SSP (e.g., failure to execute P/P moves promptly, shift startups delayed by faulty resupply/refueling procedures, etc.)

Step 3. Correct all errors directly impairing response, where the causes cannot be corrected by changing the SSP (e.g., slow out-of-cube times, faulty communications, bad route selection to scene, simultaneous shift changes, upstream unit selection, etc.)

Step 4. Correct all causes of wasted unit hours (e.g., slow hospital turnaround times, faulty mid-shift resupply, faulty routing of P/P movement, etc.)

Step 5. After correcting all errors, test your current SSP (i.e., by following it) on a multi-week segment containing at least 500 emergency responses, preferably more.

Step 6. Conduct Mutual Aid Profit & Los Analysis for All Hours. (Quick review: When marginal unit-hour costs of additional coverage of a border post during a given hour exceed the net revenues generated by units responding from that post during that hour, and if nearby mutual aid is clinically sound and reliable, consider reducing that post's priority or eliminating its coverage during that hour. But when marginal unit-hour costs of adding coverage for a border post during a given hour would be less than the net revenues currently being lost to mutual aid response in that area during that hour, consider adding that post to the coverage plan, or increasing that post's priority level, during that hour.)

Step 7. Identify the 10 worst and 10 best hours (of the 168 hour week), using the hourly fractile response time distribution reports, or the problem/solution maps.
Step 8. Starting with the worst hour, make adjustments to improve performance during each of the 10 worst hours as follows:

A. Identify the cause of every late run during the problem hour.

B. Determine whether a given problem hour is caused by events occurring during that same hour or by carryover activity from the previous hour.

C. Adjust the SSP (this or previous hour) in the following sequence:
   1. Alter priorities of posts now in the plan (as often as needed).
   2. Alter mix of posts used this hour (as often as needed).
   3. Alternate cutoff/full-up levels (as often as needed).
   4. Add new post locations (only when really needed).
   5. Shift unit-hour coverage by minor adjustments to start times of existing shifts. (not more often than quarterly).
   6. Reallocate unit-hours from “best” hours to problem hours (usually requires re-bidding of shifts, not more often than 3-6 months).
   7. Add new unit-hours to the plan (only when all else has failed).

Step 9. Examine the Need for New Permanent Post Facilities. (Quick review: When testing the use of a new post location, street-corner deployment is often appropriate. Street-corner deployment may also be appropriate for a high-priority post so active that crews rotate too frequently to make good use of a permanent facility at that location. However, after an SSP has been reasonably well-refined, an analysis should be made of the amount of time per week crews spend in "available-at-post" status at each post and reported to the Unit Hour Production Manager. For posts totaling substantial "available-at-post" crew time, permanent facilities should be considered.)
- Assign routine transfer calls to:
  Best: Crews starting their shift;
  2nd Best: Crews completing a run;
  Still pretty good: Crews posted at low(est) priority post.

- Use double-unit post assignment at high priority posts.

- Use more equal/alternate posts, where and when feasible.

- Farther fine-tune using conditional alternate posts.

- Eliminate "domino" movements.
Assignment of routine transport calls. Many EMS systems operate under a standard of 60 minutes with 100% reliability for response times to unscheduled routine-transport calls. When receipt of such a request is well within 60 minutes of a crew’s shift start-time, the call should be held for a few minutes, then assigned to the on-coming crew. The run is thus handled by a “fresh” crew. High priority post coverage is not disturbed, and no post-to-post movement is necessary.

Tip: When not inconvenient for the customer, deliberately set pickup times for scheduled routine runs to coincide with start-times of on-coming crews.

Even when routine runs cannot be assigned to crews starting their shifts, such calls can often be held for a few minutes, then assigned to a crew that has just completed a run (e.g., a crew which has completed delivery of a patient and is requesting a new post assignment, or one that has just been released from a canceled run). Again, no post-to-post movement is necessary, and high-priority coverage is not disturbed. Tip: To help balance each crew's mix of emergency vs. routine runs, try to assign routine calls to crews which have just completed an emergency transport, and try to avoid assigning back-to-back routine transports.

In a properly-constructed SSP, dispatching a unit from the lowest priority post will often (but not always) require no post-to-post movement. For example, if the Level 5 SSP is the Level 6 SSP, then the lowest priority post in the Level 6 plan. If the distance from the lowest priority post to the site of the routine transport pickup is not excessive (e.g., less than 8 or 10 miles with good traffic conditions), it makes good sense to assign a routine run to the unit stationed at the lowest priority post. A post-to-post move is avoided, and high-priority posts remain covered.

Note: Advanced EMS-based CADs will soon be capable of recommending the unit(s) least likely to require post-to-post movement for routine transport runs rather than recommending the “nearest” unit for such calls. Call mix per crew and workload distribution will also be taken into consideration.

Double-Unit Post Assignment. To reduce excessive late runs caused by post-to-post lag times, skilled system status managers sometimes create a “double-unit post assignment.” The same concept can also reduce frequency of post-to-post movement. It works like this. During high-volume times of day at the highest-priority post, a second post is created at the same location. The second post is then designated as the “preferred equal/alternate” to the lowest priority post at every status level above level two (or, in some cases, above a higher status level, depending upon geography, etc.).

When given a choice of posting a unit at the lowest priority post vs. its “preferred equal/alternate” the SSC always selects the latter. Thus, when a unit is dispatched from the highest priority post, the second unit (the one at the “preferred equal/alternate”) is technically “moved” to highest priority post, and the SSP is satisfied without actually moving anyone.
Double-Unit Post Assignment Cont'd. Furthermore, the highest priority post was never uncovered, so late runs caused by post-to-post lag times will be substantially reduced. Tip: Whenever post-to-post lag time is a frequent cause of late runs, you've got a case for using the "double-unit post assignment."

Equal/Alternate Posts. Unless good use is made of the "equal/alternate post" feature, it is inevitable that nearly every time something moves in the system, something else must move too. The most powerful tool for reducing unnecessary movement is the equal/alternate post feature. The concept is simple, when one post location is about as good as another for providing coverage, assign both posts the same priority number. The system, is satisfied so long as either post is covered. This feature is best used during off-peak periods when traffic is light and travel times are short. It is also appropriate for use during those hours when calls simply don't pattern geographically. Tip: The first few weeks after creating a new equal/alternate post must be considered a test period. Watch response times closely. If nothing much changes, you've got a winner.

Conditional Alternate Posts. This new SSM concept is designed to extend the safe use of the equal/alternate post concept into areas where equal/alternates might otherwise be unsafe. The basic concept is to identify special conditions which, if satisfied, will allow the use of an equal/alternate post. For example, it might be safe to use Post 10 instead of Post 12 at Level 6, but only so long as a unit is also available at Post 5. Some advanced SSM-Based CADs allow up to two-variable, either/or prerequisite conditions (e.g., the alternate is OK if posts 5 and 9 are covered, or, if either post 5 or 9 is covered). Tip: Remember that when a prerequisite post gets uncovered, two covered posts may then be technically out of compliance the conditional alternate post and the lowest priority post. However, moving the lowest-priority unit to the prerequisite post will often satisfy both conditions.

Avoid "Chain-Style" Movements. Chain-style post-to-post movement sometimes occurs when several covered posts lie between an uncovered, higher priority post and the location of the "free" unit. Rather than sending the "free" unit to the uncovered post, the dispatcher "moves up" the whole line of units posted between the "free" unit and the uncovered post, then sends the "free" unit to cover the last post in the chain. This practice is rarely appropriate, can be detrimental and is always costly. Unless the "free" unit is very far away from the uncovered post, send it directly to the uncovered post. In cases where the "free" unit is very far away (or upstream in heavy traffic) from the uncovered post, select a posted unit near the middle of the chain, and create a 2-unit chain movement.
APPLICATION OF DOUBLE-UNIT POST ASSIGNMENT
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Proper Use: The double-unit post assignment is appropriate where and when P/P lag is
frequently the reason for late runs, and/or where and when frequency of P/P moves is excessive.

Rules for Setup and Operation in SSP: The double-unit post assignment has two purposes: to
maintain better coverage of a high-priority post, and to reduce P/P moves. The following rules
achieve both results:

1. The double-unit post appears on the screen immediately to the right of the post for
which it is a double, e.g., Post 10’s double is labeled Post 10D, and is to the immediate
right of Post 10 on the screen.

2. The double-unit post is always an equal/alternate to the lowest priority post starting at
level 3 or higher.

3. Units posted at double-unit posts should not be dispatched to non-emergency calls.
(Send the next lowest priority unit to non-emergency calls.)

4. When the unit positioned at the post being doubled (e.g., Post 10—not post 10D) is
dispatched to a call, immediately “move” the unit at the double-unit post to the
doubled post (e.g., “move” the unit at 10D to Post 10). Note: this “move” is strictly
electronic, or only on paper; do not actually notify the crew.

5. When assigning newly available units to posts, the double-unit post is preferred to the
post to which it is an equal/alternate. (For example: the system is at level 4 when a
unit comes available; at level 5, Post 10D is equal/alternate to the lowest priority post,
i.e. Post 19. In general, send the newly-available unit to Post 10D, not to Post 19,
unless there are good reasons to do otherwise.)
Sample Plan Using Double-Unit Post Assignment: (Note: no conditional alternates are used in this example).

<table>
<thead>
<tr>
<th>Level</th>
<th>Post#</th>
<th>Priority</th>
<th>Post#</th>
<th>Priority</th>
<th>Post#</th>
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<tbody>
<tr>
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<td>3</td>
<td>13</td>
<td>4</td>
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</tr>
</tbody>
</table>

Observe: When the SSP is satisfied at any level above level 2, with the preferred alternate post covered, dispatching the highest priority unit requires only an electronic adjustment—not an actual P/P move. Note: CAD systems should not count these electronic moves in P/P move counts for reporting purposes.
Proper Use: The double-unit post assignment is appropriate where and when P/P lag is frequently the reason for late runs, and/or where and when frequency of P/P moves is excessive.

Rules for Setup and Operation in SSP: The double-unit post assignment has two purposes: to maintain better coverage of a high-priority post; and, to reduce P/P moves. The following rules achieve both results:

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4. When the unit positioned at the post being doubled (e.g., Post 10—not post 10D) is dispatched to a call, immediately "move" the unit at the double-unit post to the doubled post (e.g., "move" the unit at 10D to Post 10). Note: this "move" is strictly electronic, or only on paper; do not actually notify the crew.

5. When assigning newly available units to posts, the double-unit post is preferred to the post to which it is an equal/alternate. (For example: the system is at level 4 when a unit comes available; at level 5, Post 10D is equal/alternate to the lowest priority post—i.e., Post 19. In general, send the newly-available unit to Post 10D—not to Post 19, unless there are good reasons to do otherwise.)
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<tr>
<th>Level</th>
<th>Post #</th>
<th>Priority</th>
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<th>10</th>
<th>10D</th>
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</tr>
</tbody>
</table>

Observe: When the SSP is satisfied at any level above level 2, with the preferred alternate post covered, dispatching the highest priority unit requires only an electronic adjustment—not an actual P/P move. Note: CAD systems should not count these electronic moves in P/P move counts for reporting purposes.
A priority code 5 dispatch is an emergency dispatch wherein the dispatched unit is sent only to stop the clock and to provide immediate care. A second ambulance is sent to transport the patient. A unit on "code 5 Status" is available only for priority 5 dispatch, and not for any other type of run. Code 5 status is used for two important purposes:

1. When a crew has delivered its previous patient to a receiving facility, but has not yet fully completed its cleanup and restocking (and perhaps not its paperwork), but could "stop the clock" on an emergency call, if another unit is also sent to transport. The unit on "code 5 status" should only be sent when it is significantly closer to the call than nearest transport-capable unit. (In some systems, units on code 5 status are only sent to presumptively-classified, life-threatening calls.)

2. Crews nearing the end of their shifts are often moved to a post at or near HQ, and automatically placed on "code 5 status" about 20 minutes before the end of their shift. The purpose is to preserve emergency response capability while reducing extraordinary overtime costs, to give off-going crews a chance to attend to administrative duties before end of shift, and to enable crews going off-duty to keep off-duty appointments.

Tip: If the patient is stabilized and packaged for transport well before the transporting unit arrives, do not delay transport unless absolutely necessary, and do not tell the patient’s family that you’re delaying transport because it’s near the end of your shift.
MUTUAL AID AGREEMENT

THIS AGREEMENT, entered into this __________ day of __________, 1990, by and between

_________________________________________, hereinafter referred to as "Host Provider", and XYZ Ambulance Company, a licensed provider of ambulance services, hereinafter referred to as "Contractor.

RECTALS

WHEREAS, pursuant to local ordinances, Host Provider is responsible for providing emergency and routine ambulance services within the municipalities listed in Attachment A, whose combined jurisdictions constitute Host Provider's designated Service Area; and,

WHEREAS, Contractor is officially designated pursuant to local ordinances or contract as the primary provider of emergency ambulance services by the communities listed in Attachment B, whose combined jurisdictions constitute Contractor's designated Service Area; and,

WHEREAS, each party provides emergency medical transportation vehicles and related equipment staffed with sufficient personnel to cover reasonably foreseeable demand for ambulance services throughout its respective designated Service Area; and,

WHEREAS, the ordinances authorizing Host Provider to operate within its designated Service Area provide that Host Provider may authorize response by another provider into COAT's Service Area pursuant to a mutual aid agreement, subject to certain restrictions incorporated herein; and,

WHEREAS, Contractor certifies that it has the authority to authorize Host Provider to operate within Contract's designated Service Area pursuant to a mutual aid agreement, and,

WHEREAS, Host Provider and Contractor desire to enter into this Mutual Aid Agreement pursuant to which either party, on its own initiative may, at its discretion request ambulance response by the other party into its designated Service Area, subject to the conditions set forth herein.

NOW, THEREFORE, the parties agree to the following:

1. MUTUAL AID -- In the event either party to this Agreement receives, through its dispatch facilities, an emergency request for ambulance response to a location within that party's own Service Area, which location in relation to the then-current placement of that party's available ambulances is such that, in the opinion of that party, the response time to that call is likely to exceed applicable response time standards, that party (i.e. the requesting party) may, at its discretion, relay the request for service to the other party (i.e. the requested party) by telephone for the requesting party directly to request assistance in responding to that call.

2. USE OF BEST EFFORTS -- In the event the requesting party determines that the request for mutual aid can safely be accepted without unreasonably jeopardizing coverage of its own Service Area, the requesting party shall notify the requesting party of the location from which its nearest unit would respond if the request for mutual aid is confirmed. The requesting party shall then decide whether to confirm or cancel the request for mutual aid. If the request is confirmed, the requesting party may use its best efforts to respond to the call in a timely manner. Provided, however, that any such request may be refused by the requested party when, in the opinion of the requested party, accepting the request would unreasonably jeopardize coverage and response time reliability within the requested party's own Service Area.

3. RESPONSIBILITY -- In the event a party to this Agreement accepts responsibility for responding to a request for assistance pursuant to this Agreement, such party agrees to respond promptly. Once a mutual aid request has been accepted, the party accepting the request shall assume full responsibility for the medical transportation service from that point forward, including responsibility for billing the patient and/or any appropriate third-party payer directly. Both parties agree to "accept assignment" on all mutual aid calls provided pursuant to this Agreement; and, in cases involving subscribers to the requesting party's ambulance membership program, if any, the mutual aid provider shall bill third parties only if and available for payment and co-payment amounts, and shall not bill the patient. The requesting party shall have no financial responsibility for payment or reimbursement. Any fees collected for such service shall belong only to the party normally providing the service and there shall be no referred fee or other fee due or payable to or by the requesting party. In cases where an extended mutual aid response time results in the assessment of late non-financial penalties against the requesting party, the requested party shall have no responsibility relative to payment of such penalties.
4. MEDICALLY EQUIVALENT SERVICES - Contractor agrees that the level of services provided pursuant to this Agreement shall be substantially medically equivalent to the level of services provided by Host Provider as required by applicable local ordinance. In this regard, this Agreement is expressly conditioned upon prior certification of such party's clinical standards by the senior party's Medical Director or being substantially medically equivalent. Provided further, that "substantial medical equivalence" shall not necessarily require identical on-board equipment, training requirements, or medical protocols. Notwithstanding any other provisions regarding termination of this Agreement, either party's Medical Director may, at any time and in his sole discretion, revoke the certification of "substantial medical equivalence" by notice to Host Provider and Contractor, upon which event this Agreement shall immediately terminate.

5. MEDICAL QUALITY ASSURANCE - Each party agrees when functioning as the requested party to cooperate fully and participate in any medical audit requested or conducted by the requesting party's Medical Director, involving mutual aid runs accepted by the requested party.

6. DOCUMENTATION OF TIMES - The parties hereto agree that the dispatch center for the requested party, shall accurately document the response times for any mutual aid requested and accepted and shall, as soon as practicable after the run has been completed, report those times to the requesting party's dispatch center for the purpose of documenting response time results.

7. ANNUAL ADJUSTMENT - On the anniversary date of this Agreement, the parties hereto agree to meet and reconcile the number of mutual aid calls given and received for purposes of determining if either party is bearing an unfair burden relative to the other. To adjust for such inequities in reliance utilization of mutual aid services as may occur, the utilization of mutual aid by each party pursuant to this Agreement shall be calculated for the previous year. If the difference in utilization is less than 10 percent of the lower of the two utilization rates, no financial adjustment shall be made. However, if the difference exceeds 10 percent of the lower utilization rate, the party requesting and receiving more mutual aid assistance than the other shall pay the other party an amount equal to the difference in utilization frequency times $1.

8. INDEMNIFICATION - Host Provider agrees to indemnify and hold harmless Contractor and the municipalities within Contractor's designated Service Area, including officers, agents and employees from and against any and all claims or suits for property damage or loss and/or personal injuries, including death, for errors or omissions on the part of Host Provider for any manner arising out of the services rendered pursuant to this Agreement. Such indemnification for acts, occurring or alleged to have occurred during the effective dates of the Agreement shall survive the termination of this Agreement for any reason. Contractor agrees to indemnify and hold harmless the Host Provider and the municipalities within COA7's designated Service Area, including officers, agents and employees from and against any and all claims or suits for property damage or loss and/or personal injuries, including death, for errors or omissions on the part of Contractor in any manner arising out of the services rendered pursuant to this Agreement. Such indemnification for acts occurring or alleged to have occurred during the effective dates of the Agreement shall survive the termination of this Agreement for any reason.

9. INSURANCE - Each party to this Agreement shall maintain, at no expense to the other, during the term of the Agreement, liability insurance as specified in Attachment C. The coverage shall extend to each party hereto, including its officers, agents and employees. Each party to this Agreement shall maintain, at no cost to the other, workers' compensation insurance coverage for its employees. Each party shall provide a certificate of insurance to the other which will provide that the policy or coverage thereof cannot be altered or terminated without thirty (30) days written notice by the insurance carrier to the other parties to this Agreement.

10. UPDATING ATTACHMENTS A AND B - The Parties understand and agree that the listings of communities attached hereto as Attachments A and B shall be periodically updated to reflect each party's then-current designated Service Area. In this regard, as soon as a change occurs affecting either party's Service Area, the other party shall be promptly notified of the change. Only changes validated and documented by official municipal action shall affect the Service Area listings.

11. LIMITATION OF AUTHORIZATION - Only services rendered by one party to this Agreement at the specific request of the other party to this Agreement shall be considered services rendered pursuant to this Mutual Aid Agreement. Such requests shall be considered official only when made by the requesting party's dispatch center. In the event an ambulance operated by either party inadvertently discovers an emergency incident in progress while passing through the other party's Service Area, the parties agree that the local provider's dispatch center shall be immediately notified of the nature and location of the incident and the ambulance crew at the scene shall then render assistance in accordance with applicable medical protocols.

Page 2
11. LIMITATION OF AUTHORIZATION cont'd — Depending upon the nature of the incident and the estimated time of arrival of the nearest ambulance to the Service Area, the Service Area dispatch center may request and authorize transport by the unit on the scene (i.e., a "mutual aid request"), or may direct that the transport shall be made by an incoming unit in the latter case, the first unit on the scene shall not depart the scene until the second unit arrives, and shall assist in preparing and loading the patient for transport.

12. EFFECTIVE DATES — This Agreement shall become effective upon execution and shall continue in effect until the earlier of: (date) __________, the loss of either party's Service Area designation, or the failure of any party to fulfill the terms of its participation in this agreement provided, however, that either party may terminate this Agreement upon thirty (30) days advance written notice delivered to the other party. In the event of termination, the financial adjustment procedure set forth in item 7, above shall be conducted for the period since the then most recent adjustment, or the effective date if no adjustment has taken place.

13. NOTICE — Notice shall be given as follows:

TO: Contractor

TO: Host Provider

14. ASSIGNMENT — This Agreement is non-assignable.

IN WITNESS WHEREOF, the parties hereto set their hands and seals this day of __________, 1990.

ATTEST

"Host Provider"

Secretary

Chief Executive Officer

ATTEST

"Contractor"

Secretary

Chief Executive Officer
1. **Match Supply With Demand.** Unit hour production should closely match true coverage requirements by relocating excess production capacity to provide additional coverage when there is higher risk of excess demand.

2. **Employee Preferences.** Shifts should be designed and allocated to suit, as closely as possible without sacrificing customer service, the differing preferences of individual employees. But when a choice must be made between patients' needs vs. employees' preferences, the interest of patient care must prevail. (It just doesn't make sense to sacrifice the very purpose of our work merely to make the process of working more convenient.)

3. **Avoid Wasting Resources.** Money being wasted producing superfluous capacity should instead be used for new equipment, better wages, improved clinical performance, reduced rates or subsidies, or to advance the organization's financial stability.

4. **Prevent Dangerous Fatigue.** Peak load staffing and dispatching methods should be designed to
prevent fatigue that might otherwise impair judgement and endanger both patients and workers.

5. Avoid False Economies. The lure of lower labor costs per unit hour associated with extended, low productivity shifts must be weighed against the lower labor costs per transport achievable with proper utilization of shorter, high productivity shifts.
Shift Description. Hours and days worked by each crew member:

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Eight hour shift, 4 days on duty/2 days off duty. On Friday and Saturday, it is extended 4 hours to become a 12 hour shift. This shift is never scheduled or covered on Sundays.</td>
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</tr>
<tr>
<td>Number of crew members required to operate this shift:</td>
<td>3</td>
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<tr>
<td>Average number of unit-hours generated per week:</td>
<td>56</td>
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<tr>
<td>Number of unit hours generated per year:</td>
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</table>

Average hours worked per week: 37.33 Max. 40 Min.

Annual straight time: 1941.33.

Annual overtime: 0

Senior Medic Base Wage. At $25,000/year compensation:

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<tr>
<td>Base hourly wage</td>
<td>$ 12.88</td>
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<tr>
<td>Overtime rate</td>
<td>$ 19.32</td>
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<tr>
<td>Average hourly compensation</td>
<td>$ 12.88</td>
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Driver/Medic Base Wage. At $25,000/year compensation:

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<tr>
<td>Base hourly wage</td>
<td>$ 12.88</td>
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<tr>
<td>Overtime rate</td>
<td>$ 19.32</td>
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* Note: Even though this company uses "one & one" staffing, all three people working a 4-on/2-off shift must be paramedics, since they'll be paired in all combinations.
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<td>Average direct labor costs per unit hour this shift:</td>
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# Coverage Plan for Podunk

## Unit Hour Distribution Sheet

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Total unit hours desired for week: 852
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1,008.00 / week  $15,492 / week
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Total for Day: 14 21 6 16 14 13 17

Total for week: 103
The purpose of this formula is to "work backwards" from any given shift schedule and known level of annual compensation to determine the straight-time rate of hourly pay which would produce the desired annual compensation level.

**Formula:**

\[
\text{(Base Hourly Wage)} \times (\text{Annual Straight Time Hours Worked}) + (1.5 \times \text{Base Hourly Wage}) \times (\text{Annual Overtime Hours Worked}) = \text{Total Annual Compensation}
\]

or

\[
(\text{BW} \times \text{ST}) + (1.5\text{BW} \times \text{OT}) = \text{TC}
\]

**Table:**

<table>
<thead>
<tr>
<th>Where</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>BW</td>
<td>base hourly wage</td>
</tr>
<tr>
<td>ST</td>
<td># of straight time hours worked per year</td>
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<tr>
<td>OT</td>
<td># of overtime hours worked per year</td>
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<tr>
<td>TC</td>
<td>Total annual compensation</td>
</tr>
</tbody>
</table>

**Example:** A paramedic working a 24/48 shift will work an average of 2080 straight time hours per year (i.e., "ST") and 848 overtime hours per year (i.e., "OT"). You want this paramedic to make $20,000 per year in total compensation (i.e., "TC"). Assuming no hours are worked in excess of his or her regularly scheduled shifts. You want to know what hourly rate of base wage (i.e., "BW") would result in the desired annual compensation.

\[
\begin{align*}
(\text{BW} \times 2080) + (1.5 \times \text{BW} \times 848) &= 20,000 \\
(\text{BW} \times 2080) + (\text{BW} \times 1272) &= 20,000 \\
\text{BW} \times 3352 &= 20,000 \\
\text{BW} &= \frac{20,000}{3352} \\
\text{Therefore: } \text{BW} &= 5.96/\text{hr}.
\end{align*}
\]
### Shift Description and Statistics

<table>
<thead>
<tr>
<th><strong>Shift Description. Hours and days worked by each crew member:</strong></th>
<th>24 hours on duty/48 hours off duty.</th>
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<tbody>
<tr>
<td><strong>Number of crew members required to operate this shift:</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Average number of unit hours generated per week:</strong></td>
<td>168.92</td>
</tr>
<tr>
<td><strong>Number of unit hours generated per year:</strong></td>
<td>8,784</td>
</tr>
</tbody>
</table>

Average hours worked per week: **56**. Max. **72** Min. **48**

Annual straight time: **2080**

Annual overtime: **848**

### Senior Medic Base Wage. At $25,000/year compensation:

<table>
<thead>
<tr>
<th></th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base hourly wage</td>
<td>7.46</td>
</tr>
<tr>
<td>Overtime rate</td>
<td>11.19</td>
</tr>
<tr>
<td>Average hourly</td>
<td>8.54</td>
</tr>
</tbody>
</table>

### Driver/Medic Base Wage. At $20,000/year compensation:

<table>
<thead>
<tr>
<th></th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base hourly</td>
<td>5.97</td>
</tr>
<tr>
<td>Overtime rate</td>
<td>8.95</td>
</tr>
<tr>
<td>Average hourly</td>
<td>6.83</td>
</tr>
</tbody>
</table>

Average direct labor costs per unit hour this shift: **$15.37**
Shift Description and Statistics

Shift Description: Hours and days worked by each crew member:
10 hour shift, 5 weekdays on duty, Saturday and Sunday off duty.

Number of crew members required to operate this shift: 2
Average number of unit hours generated per week: 50
Number of unit hours generated per year: 2600

Average hours worked per week: 50, Max. 50, Min. 50
Annual straight time: 2080
Annual overtime: 520

Senior Medic Base Wage. At $25,000/year compensation:
Base hourly wage: $8.74
Overtime rate: $13.11
Average hourly compensation: $9.62

Driver/Medic Base Wage. At $20,000/year compensation:
Base hourly wage: $6.99
Overtime rate: $10.49
Average hourly compensation: $7.69

Average direct labor costs per unit hour this shift: $17.31
SHIFT DESCRIPTION AND STATISTICS
(© 1987 The Fourth Party, Inc.)

Shift Description. Hours and days worked by each crew member:
12 hour shift, 4 days on duty / 3 days off duty then 3 days on duty / 4 days off duty.

Number of crew members required to operate this shift: 4
Average number of unit hours generated per week: 84
Number of unit hours generated per year: 4,392

Average hours worked per week: 42. Max: 48, Min: 36
Annual straight time: 1988
Annual overtime: 208

Senior Medic Base Wage. At $25,000/year compensation:
Base hourly wage: $10.87
Overtime rate: $16.30
Average hourly compensation: $11.38

Driver/Medic Base Wage. At $20,000/year compensation:
Base hourly wage: $8.70
Overtime rate: $13.05
Average hourly compensation: $9.11

Average direct labor costs per unit hour this shift: $20.49
### Shift Description and Statistics

**Shift Description.** Hours and days worked by each crew member:

- Nine hour shift, 4 days on duty/2 days off duty. On Friday and Saturday, it is extended 4 hours to become a 13 hour shift. This shift is never scheduled or covered on Sundays.

<table>
<thead>
<tr>
<th>Number of crew members required to operate this shift:</th>
<th>3 *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of unit hours generated per week:</td>
<td>62</td>
</tr>
<tr>
<td>Number of unit hours generated per year:</td>
<td>3224</td>
</tr>
</tbody>
</table>

Average hours worked per week: 41.33. Max. 44. Min. 36

Annual straight time: 2,149.33.

Annual overtime: 69.33.

---

### Senior Medic Base Wage

At $25,000/year compensation:

<table>
<thead>
<tr>
<th></th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base hourly wage</td>
<td>11.09</td>
</tr>
<tr>
<td>Overtime rate</td>
<td>16.64</td>
</tr>
<tr>
<td>Average hourly compensation</td>
<td>11.27</td>
</tr>
</tbody>
</table>

---

### Driver/Medic Base Wage

At $25,000/year compensation:

<table>
<thead>
<tr>
<th></th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base hourly wage</td>
<td>11.09</td>
</tr>
<tr>
<td>Overtime rate</td>
<td>16.64</td>
</tr>
<tr>
<td>Average hourly</td>
<td>11.27</td>
</tr>
</tbody>
</table>

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Average direct labor costs per unit hour this shift: $22.54.
<table>
<thead>
<tr>
<th>Shift Description and Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shift Description.</strong> Hours and days worked by each crew member:</td>
</tr>
<tr>
<td>Eight hour shift, 4 days on duty/2 days off duty. On Friday and Saturday, it is extended 4 hours to become a 12 hour shift. This shift is never scheduled or covered on Sundays.</td>
</tr>
<tr>
<td>Number of crew members required to operate this shift: 3</td>
</tr>
<tr>
<td>Average number of unit-hours generated per week: 356</td>
</tr>
<tr>
<td>Number of unit hours generated per year: 2912</td>
</tr>
<tr>
<td>Average hours worked per week: 37.33</td>
</tr>
<tr>
<td>Annual straight time: 1941.33</td>
</tr>
<tr>
<td>Annual overtime: 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Medic Base Wage. At $25,000/year compensation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base hourly wage: $12.88</td>
</tr>
<tr>
<td>Overtime rate: $19.22</td>
</tr>
<tr>
<td>Average hourly compensation: $12.88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driver/Medic Base Wage. At $25,000/year compensation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base hourly wage: $12.88</td>
</tr>
<tr>
<td>Overtime rate: $19.32</td>
</tr>
<tr>
<td>Average hourly compensation: $12.88</td>
</tr>
</tbody>
</table>

| Average direct labor costs per unit hour this shift: | $25.76 |

*Note: Even though this company uses "one & ple" staffing, all three people working a 4-on/2-off shift must be paramedics, since they'll be paired in all combinations.*
<table>
<thead>
<tr>
<th>Shift Type</th>
<th>Quantity</th>
<th>U.H./Shift</th>
<th>U.H./wk. (Q'UH)</th>
<th>$/Unit Hour</th>
<th>$/Shift Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>24/48</td>
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<td>168.00</td>
<td></td>
<td>$15.37</td>
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<tr>
<td>10hr 5/2</td>
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<td>50.00</td>
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<td>$17.31</td>
<td></td>
</tr>
<tr>
<td>12hr 4/3-3/4</td>
<td></td>
<td>84.00</td>
<td></td>
<td>$20.55</td>
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</tr>
<tr>
<td>9hr 4/2 N.O.S.</td>
<td></td>
<td>62.00</td>
<td></td>
<td>$22.54</td>
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<tr>
<td>8hr 4/2 N.O.S.</td>
<td></td>
<td>56.00</td>
<td></td>
<td>$25.76</td>
<td></td>
</tr>
</tbody>
</table>

Totals / week / week
EXERCISE # 3

DEVELOP AN IMPROVED PEAK-LOAD STAFFING PLAN
EXERCISE #3 SETUP SUMMARY

- Current Field Personnel:
  18 Paramedics @ $25,000 each
  18 EMTs @ $20,000 each

- Current Coverage
  Level staffing -- all 24/48 shifts
  Continuous coverage by 6 ALS units
  1008 unit-hours/week

- Current Costs
  $15,586 direct labor/week
  Average direct labor cost/unit-hour -- $15.46
Exercise # 3
Develop an Improved Peak-Load Staffing Plan

The most common mistake in system status planning is use of shift schedules and staffing plans that can damage: financial stability, job satisfaction, response times, patients, crew safety, and, sometimes, all of these.

Matching unit hour production to demand fluctuations is the main objective of a peak-load staffing plan. This is not, however, our only objective. Shifts must be designed and allocated to satisfy several, sometimes conflicting, considerations. Thus, the "ideal" staffing plan is often a compromise among conflicting constraints and objectives. The essential considerations are:

1. Match Supply With Demand. Unit hour production should closely match true coverage requirements by relocating excess production capacity to provide additional coverage when there is higher risk of excess demand.

2. Employee Preferences. Shifts should be designed and allocated to suit, as closely as possible without sacrificing customer service, the differing preferences of individual employees. But when a choice must be made between patients' needs vs. employees' preferences, the interest of patient care must prevail. (It just doesn't make sense to sacrifice the very purpose of our work merely to make the process of working more convenient.)

3. Avoid Wasting Resources. Money being wasted producing superfluous capacity should instead be used for new equipment, better wages, improved clinical performance, reduced rates or subsidies, or to advance the organization's financial stability.

4. Prevent Dangerous Fatigue. Peak load staffing and dispatching methods should be designed to prevent fatigue that might otherwise impair judgement and endanger both patients and workers.

5. False Economies. The lure of lower labor costs per unit hour associated with extended, low productivity shifts must be weighed against the lower labor costs per transport achievable with proper utilization of shorter, high productivity shifts.
The Setup. You are the scheduling officer for Podunk EMS. Your Unit Hour Utilization Manager has informed you that Podunk EMS doesn't have enough units to handle the calls during the day, but has more than enough units at night. Your immediate superior, the Unit Hour Production Manager has informed you that his field personnel are requesting more flexible shift schedules, and the mayor has just announced that the EMS subsidy must be reduced. Your CEO has respectfully told you to develop a schedule which will resolve these issues within 30 days, or be sent to Detroit. (In this case, you have about an hour.) Your spouse says that, living in Detroit, you'll definitely be single.

Current Coverage. Currently, six 24-hour units are on duty in Podunk at all times. Your firm uses “one & one” staffing. Paramedic wages and benefits average $25,000, while EMT wages and benefits average $20,000. Each 24 hour unit requires 6 crew members (excluding vacation and sick-leave coverage), and provides 168 unit-hours per week of coverage (7 days x 24 hours = 168). Thus, 18 paramedics and 18 EMTs currently generate 1,008 unit-hours of coverage per week, yielding a direct labor cost of $15,586/week (i.e., an average of $432.70/week for each of 36 medics"). Your Unit Hour Utilization Manager has given you the attached “Coverage Plan for Podunk” showing the required unit hour coverage levels by time-of-day and day-of-week totaling 892 unit hours.

Your union representative has attached descriptions of 5 shifts that have been approved for use in the labor agreement. The shifts you choose will be allocated by seniority. Your assignment is to examine the current staffing plan, the desired coverage plan, and the 5 available shifts, and to develop a staffing plan which meets the objective below.

Your Objective: Match or exceed required coverage for each of the 168 hours of the week; and, reduce direct labor costs to a level lower than the current cost of $15,586/week.

*Note: In actual practice, a “constant-manning multiplier” is used to incorporate the additional costs of filling shifts vacated by employees taking leave.*
SHIFTBID PROCESS
SSM FOR THE FIELD
The Level 1 SSM Workshop is specifically designed for field personnel to accomplish six important objectives:

1. To show field personnel why it is critical to have an efficient method to locate ambulance resources where, and when, patients (customers) need them. To explain why Quality SSM equals Quality Patient Care.

2. To demonstrate and explain SSM practices which may appear to not make sense but enable quality motivated EMS providers to serve patients better while meeting company objectives. To explain why Effective SSM Strikes a Balance.

3. To attack all of the myths that have evolved regarding SSM implementation and to present enough technology and methodology to provide straight answers to employee’s questions and concerns.

4. To develop and maintain among field personnel and control center personnel a mutual respect and understanding of their respective responsibilities and operational roles.

5. To introduce and explain the operational changes that accompany SSM implementation/finetuning including a shift bid process.

6. To identify field personnel who are enlightened by SSM concepts and who are interested in becoming SSCs.

Comment: The goal is to communicate new SSM concepts; your organization’s overall mission; what role field personnel play in accomplishing company objectives and what field personnel can expect from management. Expecting your personnel to achieve a full understanding of SSM in one four-hour seminar is not a realistic goal. If employees come away from the seminar with a clear understanding that Quality SSM Equals Quality Patient Care, the seminar will be a success.
I. Pre-Workshop Reading Packet - Distributed two weeks prior to workshop. **Objective:** Successful participation requires that personnel read the three articles and review the glossary of SSM terms. A cover memo should briefly explain the objectives of the course and request that they bring a calculator to the course.

A. "(Mis) Understanding SSM"
B. "Good Management Structure Maintains Healthy Tension"
C. "Measuring Response Time Performance"
D. Glossary of SSM Terms

II. Why Quality SSM Equals Quality Patient Care - 20 min. **Objective:** To show why quality SSM is an essential ingredient of quality patient care preferably conducted by your company's EMS Medical Director or some other individual respected by field personnel.

III. Overview of SSM Concepts and Course Objectives - 30 min. **Objective:** To explain what is and is not covered in the Level 1 Seminar, why and how SSM works; the difference between quality SSM vs. amateur SSM and why quality SSM requires striking a balance.

A. Overview of Course Objectives
B. What is a Quality Unit Hour
C. Basic Terminology
D. Response Time Definition
E. Concepts of "Supply and Demand" and "Peak Load Staffing"

IV. Exercise #1 - Unit Hour Allocation - 30 min. **Objective:** To demonstrate the relationship in EMS between "demand" & "supply," the complexity of peakload staffing and shift pattern development; and the relationships between unit hour deployment, response time performance and economic efficiency.

A. Develop a Basic Coverage Plan
B. Discussion
V. Exercise 52 - Geographic Deployment - 30 min. Objective: To demonstrate that ambulances must be periodically relocated: the value of a plan for relocation; and the complexity of the SSP process.

A. Develop a Simple SSP for a Single Hour
B. Discussion

VI. Fine Tuning the System Status Plan - 40 min. Objective: To explain the importance of an ongoing commitment to fine-tuning the SSP and the role that field personnel play; to introduce some familiar (and some unfamiliar) origins of delayed response; to create reasonable expectations regarding frequencies of post/post movement, and to introduce the tools needed to conserve post/post movement; to establish reasonable expectations and introduce the basic tools needed for effective management of workload distribution.

A. Fine Tuning Objectives
B. Origins of Delayed Response
C. Conserving Post to Post Moves
D. Workload Management Tools and Techniques

VII. Operational Goals for Effective SSM - 20 min. Objective: To show how sloppy field operations can destroy the effectiveness of even the best SSP; to show that most causes of response time problems and poor productivity cannot be solved by changing the SSP; and to enlist field personnel support in the relentless pursuit of zero-defect SSM performance.

A. Company Standards
B. Field Standards
C. Control Center Standards

VIII. Organizational Structure for Effective SSM - 20 min. Objective: To understand that ambulance services manufacture unit hours not runs or transports; to know the value of a unit hour, and the consequences of poor unit hour utilization; to understand how SSM affects the organization and vice versa; to demonstrate why tension is necessary to effective SSM; and how to know when the tension is productive and when it is not.
A. Good Management Maintains Healthy Tension
1. UHP Manager - Field Operations Staff
2. UHU Manager - Control Center Staff

B. Teamwork Produces Quality Patient Care
1. Dispatcher/System Status Controller
2. Emergency Medical Technician
3. Paramedic

IX. Shift Bid Overview/Update (If Applicable) - 20 min.
Objective: To demonstrate why short, high-productivity shifts should pay the same effective salary as long, low-productivity shifts; to discuss the shift-bid process, including seniority rights; and to demonstrate the value (to patients, to personnel, and to the bottom line) of having available a wide variety of shift options.

X. The S in EMS - SSM Counts, But Service Counts More - 10 min.
Message: The highest levels of technical competence and all the bells and whistles in the world are no substitute for professional conduct, courteous service, and the "caring" part of patient care. More than anyone else, field personnel and control center personnel create your company's reputation in the communities you serve. More than any other factor, the attitudes expressed in your social treatment of patients, their families, bystanders, the employees of the health care facilities where you pick up and deliver patients, and in the way you treat each other create your corporate image and reputation. Like your other technical skills, competent SSM is essential—but service counts more often in the eyes of most of your customers.
System Status Management Terms

System Status Management
The art and science of matching the production capacity of an EMS system to the changing patterns of demand placed on that system.

System Status Plan
An algorithm for on-line management of system deployment and redeployment of unit hours.

Peak-Load Staffing
Shift schedules and staffing plans that match production to demand.

Unit Hour
A fully equipped and manned ambulance on the street for one hour.

Unit Hour Utilization Ratio
A measurement of how hard the system is working, calculated by dividing the number of transports by the number of unit hours produced for a given period of time.

Demand Analysis
A statistical chart showing the historical call volume for each hour of the day, day of week.

CAD System
Computer Aided Dispatch System.

Call Volume
The number of requests for ambulance service that are received.

Transport Volume
The actual number of requests for service that result in a patient transport.
Fine Tuning Terms

Post Assignment
A designated location for ambulance placement within the System Status Plan.

Post to Post Move
Movement from one designated post to another designated post.

Low Priority Post
A designated post in the system status plan that would be least likely to have a call for a particular hour of day, day of week.

High Priority Post
A designated post in the SSP that would be the most likely to get a call.

Double Unit Post Assignment
Posting a second unit at the highest priority post during high volume times of the day.

Equal/Alternate Posts
When one post location is about as good as another for providing coverage.

Conditional Alternate Post
A post that can be used as an equal alternate but only if special conditions have been met.

Problem/Solution Map
Computer generated maps that show calls and late runs by grid for each hour of the day, day of the week over a designated period of time.

Workload
The measure of work performed by on duty units in any given period of time.

Communications/Dispatch Terms

System Status Controller
SSM Terminology
Page 3

Personnel in the Communications/Dispatch Center who are responsible for on-line control of the system status plan.

Pre-Arrival Instructions
Directions given by trained personnel for medical care of the patient until pre-hospital care providers arrive.

Priority Dispatching
A structured pre-planned categorization of requests for ambulance service.

Call Screening
A process where requests for service are screened and either refused ALS service, referred to other providers or responded to by BLS units.

Enroute Time (Out of Chute)
The elapsed time from unit alert to enroute.

Hospital Drop Time
The elapsed time from unit arrival at the facility to 10-8.

On Scene Time
The elapsed time from unit arrival on scene to transporting or 10-8.

Response Time
The elapsed time from call received to unit arrival on scene.

Unit Alert Time
The elapsed time from call received to unit selection and alert by the system status controller.
QUALITY SSM IS:

STRIKING A BALANCE

• Concern for adequate coverage of high-volume areas and peak load periods;

• Concern for adequate coverage of low-volume areas and off-peak periods;

• Concern for employee health, safety, skills maintenance, and job satisfaction; and,

• Concern for economic efficiency and the system's financial stability.
1. Manage Workload Distribution. Keep track of how the workload is being distributed among crews (i.e., total workload, percentages of emergency vs. routine calls, frequency of P/P moves), and take steps to equalize workload throughout the shift. (Note: a good SSM/CAD keeps track of this for you, but you must correct the inequities.)

2. Publish Workload Distribution. Accumulate workload distribution statistics by crew member, and publish the results at least monthly. When an inequity appears, first acknowledge it, then do something about it.

3. Teach Basic SSM to All Personnel. Sharp employees won't accept what they don't understand. Include basic SSM training in initial orientation, then give it periodic booster shots during in-service training. Make sure every employee spends some time observing in the control center at least once a year. Announce and explain SSP changes before they go into effect.

4. Investigate Reports of Favoritism by Dispatchers. Provide an easy and confidential method whereby field personnel who feel they're being discriminated against by dispatchers can register their claims and get a straight answer. Make it clear that playing favorites will—not can—get a dispatcher fired. Fairness is just as essential to SSM as it is to personnel management in general.

5. Set and Publish Company Workload-Distribution Standards, Then Meet Them. Set reasonable standards for workload distribution, then assess performance monthly. What percentage of on-duty time should be spent running calls and "making the coverage" (i.e., P/P moves)? How much is too much? Over time, what should be each employee's ratio of emergency vs. routine transfer calls? (Standards for 24-hour crews should differ from those for short-shift crews—i.e., a lower percentage of active work-time per on-duty hour, and a higher ratio of emergency calls to routine calls.)
WORKLOAD DISTRIBUTION
1. **Manage Workload Distribution.** Keep track of how the workload is being distributed among crews (i.e., total workload, percentages of emergency vs. routine calls, frequency of P/P moves), and take steps to equalize workload throughout the shift. (Note: a good SSM/CAD keeps track of this for you, but **you** must correct the inequities.)

2. **Publish Workload Distribution.** Accumulate workload distribution statistics by crew member, and publish the results at least monthly. When an inequity appears, first acknowledge it, then do something about it.

3. **Teach Basic SSM to All Personnel.** Sharp employees won’t accept what they don’t understand. Include basic SSM training in initial orientation, then give it periodic booster shots during in-service training. Make sure every employee spends some time observing in the control center at least once a year. Announce and explain SSM changes before they go into effect.

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1. Realistic workload expectations.

2. Establishing fair workload distribution standards per shift type:
   a. Minimum percentages of emergency calls;
   b. Target ratios of emergency/routine calls;
   c. Ratio of runs to post/post moves;
   d. Ratio of post/post moves to unit hours worked;
   e. Percentages of on-duty time available to control center;
   f. Ratios of worked-time to paid-time;
   g. Other.

3. On-line computer aids to workload management.

4. SSC's role in managing workload distribution.

5. Monitoring and correcting workload distribution.
REPORT FORMAT

WORKLOAD DISTRIBUTION BY MEDIC
FOR REPORTING PERIOD: (DATE) THROUGH (DATE)

Name, #

Type of Shift Assignment

# Shifts Worked

# Shifts as Senior Medic, % Shifts as Senior Medic

Total Hours on Duty this Shift

Total Hours on Assignment, % Time on Assignment, Norm & Range

# Calls Run, C/UH Ratio, Norm & Range

# Emergency Calls, % Emergency Calls, Norm & Range

# Routine Calls, % Routine Calls, Norm & Range

# Patients Transported, T/UH Ratio, Norm & Range

# Post/Post Moves, PP/UH Ratio, Norm & Range

Frequency of Presenting Problem, Presumptive Dx

Frequency of Procedures Performed
# Priority Dispatching Options

in the Context of SSM

<table>
<thead>
<tr>
<th></th>
<th>Ambulance</th>
<th></th>
<th>1st Response</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hot</td>
<td>Cold</td>
<td>None</td>
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<tr>
<td>Presumed Life-Threatening Emergency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presumed Non-Life-Threatening Emergency</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apparently Real</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Apparently &quot;Abuse&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Unscheduled Routine Transport</td>
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<tr>
<td>Scheduled Routine Transport</td>
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# Calls by Unit in Exercise #3 (After Corrections)

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<td>#1706 Emer.</td>
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<tr>
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FIVE STEPS TO BETTER RELATIONS BETWEEN CONTROL CENTER PERSONNEL AND FIELD PERSONNEL
© 1989 The Fourth Party, Inc.

1. Manage Workload Distribution. Keep track of how the workload is being distributed among crews (i.e., total workload, percentages of emergency vs. routine calls, frequency of P/P moves), and take steps to equalize workload throughout the shift. (Note: a good SSM/CAD keeps track of this for you, but you must correct the inequities.)

2. Publish Workload Distribution. Accumulate workload distribution statistics by crew member, and publish the results at least monthly. When an inequity appears, first acknowledge it, then do something about it.

3. Teach Basic SSM to All Personnel. Sharp employees won't accept what they don't understand. Include basic SSM training in initial orientation, then give it periodic booster shots during in-service training. Make sure every employee spends some time observing in the control center at least once a year. Announce and explain SSP changes before they go into effect.

4. Investigate Reports of Favoritism by Dispatchers. Provide an easy and confidential method whereby field personnel who feel they're being discriminated against by dispatchers can register their claims and get a straight answer. Make it clear that playing favorites will not get a dispatcher fired. Fairness is just as essential to SSM as it is to personnel management in general.

5. Set and Publish Company Workload-Distribution Standards, Then Meet Them. Set reasonable standards for workload distribution, then assess performance monthly. What percentage of on-duty time should be spent running calls and "making the coverage" (i.e., P/P moves)? How much is too much? Over time, what should be each employee's ratio of emergency vs. routine transfer calls? (Standards for 24-hour crews should differ from those for short-shift crews—i.e., a lower percentage of active work-time per on-duty hour, and a higher ratio of emergency calls to routine calls.)
MANAGING WORKLOAD DISTRIBUTION

1. Realistic workload expectations.

2. Establishing fair workload distribution standards per shift type:
   a. Minimum percentages of emergency calls;
   b. Target ratios of emergency/routine calls;
   c. Ratio of runs to post/post moves;
   d. Ratio of post/post moves to unit hours worked;
   e. Percentages of on-duty time available to control center;
   f. Ratios of worked-time to paid-time;
   g. Other.

3. On-line computer aids to workload management.

4. SSC's role in managing workload distribution.

5. Monitoring and correcting workload distribution.
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<th>WORKED</th>
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<th>EMERG</th>
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The "Stout Curve" displays the relationship between potential productivity (U/UH ratio) and the "Difficulty of Coverage Index" (DOC Index). The index is based upon weighted values assigned to the following factors:

1. **Response-time requirements.**
2. **Artificial production constraints:**
   A. Mandatory coverage levels;
   B. Mandatory deployment;
   C. Emergency-only restrictions;
   D. Mandatory use of specialized production strategy;
   E. Single-jurisdiction deployment restrictions;
   F. Barriers to peak-load staffing;
   G. Barriers to responsive event-driven redeployment.
3. **Call density per square mile:**
   A. Rural/urban;
   B. Multi-provider emergency system;
   C. Cream skimmers in market
4. **Economies of scale.**
5. **Quality/availability of mutual aid.**
6. **Traffic factors:**
   A. Road system;
   B. Traffic congestion;
   C. Natural barriers;
   D. Weather;
   E. Shape of primary service area.
7. **Demand-pattern effects:**
   A. Day/Night;
   B. Special events.
8. **Special factors.**
REPORT FORMAT
WORKLOAD DISTRIBUTION BY MEDIC
FOR REPORTING PERIOD: (DATE) THROUGH (DATE)

Name, #

Type of Shift Assignment
# Shifts Worked
# Shifts as Senior Medic, % Shifts as Senior Medic
Total Hours on Duty this Shift
Total Hours on Assignment, % Time on Assignment, Norm & Range
# Calls Run, C/UH Ratio, Norm & Range
# Emergency Calls, % Emergency Calls, Norm & Range
# Routine Calls, % Routine Calls, Norm & Range
# Patients Transported, T/UH Ratio, Norm & Range
# Post/Post Moves, PP/UH Ratio, Norm & Range
Frequency of Presenting Problem, Presumptive Dx
Frequency of Procedures Performed
The purpose of this formula is to "work backwards" from any given shift schedule and known level of annual compensation to determine the straight-time rate of hourly pay which would produce the desired annual compensation level.

Formula:

\[ \text{(Base Hourly Wage)} \times \text{(Annual Straight Time Hours Worked)} + (1.5 \times \text{Base Hourly Wage}) \times \text{(Annual Overtime Hours Worked)} = \text{Total Annual Compensation} \]

or

\[ (BW \times ST) + (1.5BW \times OT) = TC \]

Where:
- \( BW \) = base hourly wage
- \( ST \) = # of straight time hours worked per year
- \( OT \) = # of overtime hours worked per year
- \( TC \) = Total annual compensation

Example: A paramedic working a 24/48 shift will work an average of 2080 straight time hours per year (i.e., "ST") and 848 overtime hours per year (i.e., "OT"). You want this paramedic to make $20,000 per year in total compensation (i.e., "TC"), assuming no hours are worked in excess of his or her regularly scheduled shifts. You want to know what hourly rate of base wage (i.e., "BW") would result in the desired annual compensation.

\[
\begin{align*}
(BW \times 2080) + (1.5 \times BW \times 848) & = 20,000 \\
(BW \times 2080) + (BW \times 1272) & = 20,000 \\
BW \times 3352 & = 20,000 \\
BW & = \frac{20,000}{3352} \\
\text{Therefore: } BW & = \$5.96/\text{hr.}
\end{align*}
\]
MULTI-JURISDICTIONAL SYSTEMS
Sample Consolidated EMS System Organizational/Legal Structure
As Designed and Installed By The Fourth Party, Inc.

A = EMSA Trust Indenture
B = EMS Interlocal Cooperation Agreement
C = Uniform Ordinance for EMS
D = Operations Contract (Competively Awarded)
E = Mutual Aid Agreements
EPF = Emergency Physician Foundation
Organizational Structure

City Council
• Establishes System
• Creates MAST
• Authorizes Regulation & Enforcement
• Annually Sets MAST's Rate/Subsidy Balance

Director of Health
• Adopts Regulations
• Enforces Ordinance Requirements
• Controls Issuance of Certifications
• Hears Appeals

M.A.S.T.
• Operates Billings & Collections
• Selects & Oversees Operations Contractor
• Jointly Markets Transfer Work & Other Services
• Approves Mutual Aid & Other Contracts with Neighboring Providers
• Pays Operations Contractor Monthly Coordinates Disaster Plan Furnishes and Maintains Communications/CAD System and Central Facility

Medical Director
• Develops Medical Protocols*
• Develops Dispatch Protocols*
• Develops On-board Equipment Standards*
• Develops Personnel Certification Requirements*
• Approves In-service Training Programs*
• Develops Base Station Standards
• Provides Orientation for Base Station Doctors
• Tests Ambulance & Dispatch Personnel
• Performs Medical Audits
• Evaluates System's Clinical Performance
• Determines Whether Contractor's Clinical & Response Time Performance is Satisfactory
• Conducts Vehicle Inspections
• Works in Conjunction with EPAB* Applicable to Ambulance & First Responder Organizations

Operations Contractor
• Employs & Manages All Ambulance and Control Center Personnel
• Provides In-service Training
• Provides or Contracts for Equipment Maintenance
• Furnishes All Fuel, Supplies, & Items Lost from Inventory
• Furnishes Vehicles, Communications/Dispatch Equipment & Fixed Facilities Under the Three-Way Leasing Program
• Operates Control Center & Ambulance System to Meet Clinical & Response Time Standards
• Develops Hospital/Ambulance Policies & Maintains Good Relations with Other Health Care Providers
• Maintains Good Working Relationship with Fire and Police Departments
• Jointly Markets Transfer Work & Other Services
• Ensures Courteous & Professional Conduct of All Office & Field Personnel
• Maintains Neat, Clean, & Professional Appearance of all Personnel, Equipment & Facilities

Fire Department
• Provides First Responder Assistance on Code 1 Calls
• Upgrade to EMT-D Capability, with Medical Director's Guidance
EMS INTERLOCAL COOPERATION AGREEMENT  
(As Developed and Installed by The Fourth Party, Inc.)  
(1st Draft, dated January 31, 1990; Final version slightly different.)

WHEREAS, the State of Oklahoma, in the Interlocal Cooperation Act, has provided in 74 Oklahoma Statutes, Sec. 1001, et seq., that governmental entities may jointly exercise with other local governmental entities the power to provide governmental services for the public health and welfare; and,

WHEREAS, the quality of emergency medical services (EMS) should not depend upon municipal boundary lines; and,

WHEREAS, it is in the best interests of the public health and welfare of the people of this Jurisdiction to have available to them a state-of-the-art, high quality, EMS system, with effective medical controls and accountability, and adequate response times; and,

WHEREAS, a unified, coordinated system of medical oversight and control of EMS is in the best interests of the health, welfare, and safety of the citizens of this Jurisdiction; and,

WHEREAS, it is in the best interest of the health, welfare, and safety of the citizens of this Jurisdiction to join with other members of this Cooperative in creating a multi-jurisdictional “Medical Control Board” to provide informed, objective, and clinically expert oversight of the quality of care and response time performance provided by the various components of the EMS system, as defined herein.

THEREFORE, be it resolved that this Jurisdiction hereby agrees to join together and with any other municipality which qualifies for membership in this EMS Interlocal Cooperative, and further agrees as follows:

1. Requirements for Membership. Requirements for joining the EMS Interlocal Cooperative shall include all of the following:

   A. The applicant jurisdiction shall approve and execute this EMS Interlocal Cooperative Agreement.

   B. The applicant jurisdiction shall adopt and enforce the Uniform EMS Ordinance which in attached hereto as Exhibit A, “Uniform Ordinance for Emergency Medical Services.” Prior to or after adopting the Uniform EMS Ordinance, the applicant jurisdiction may, at its option, substitute less stringent response time requirements than the Ordinance’s standard response time requirements. Except for modifications related exclusively to response time requirements, any other changes to that Ordinance made by a jurisdiction shall result in automatic disqualification for membership in this EMS Interlocal Cooperative.

   C. The applicant jurisdiction shall be and remain throughout the term of this Agreement a Beneficiary Jurisdiction or Non-Beneficiary Jurisdiction as defined by the terms of the Amended and Restated Trust Indenture (Exhibit B).

2. Definitions: For purposes of the Agreement, the following definitions shall apply:

   A. Quality Assurance Fund. That fund account which is administered by EMSA on behalf of the Medical Control Board, and which shall be used solely to fund the activities and expenses of the Medical Control Board in carrying out the purposes set forth in this Interlocal Cooperative Agreement.

   B. Ambulance Service Provider means EMSA’s then-current Operations Contractor, and any other organization which is issued a permit by the Medical Control Board pursuant
to the requirements of the Uniform Ordinance for Emergency Medical Services (Exhibit A).

D. **Contract for Primary Ambulance Coverage** means the contract which operates between EMSA and a jurisdiction served by EMSA which defines the terms of any special arrangements which have been agreed to regarding subsidy, fee schedules, or response times within that jurisdiction. If no such special arrangements are applicable, and provided that the jurisdictions is a member of this EMS Interlocal Cooperative, no Contract for Primary Ambulance Coverage shall be required.

E. EMSA means the Emergency Medical Services Authority, a public trust whose beneficiaries are the City of Tulsa and, subject to acceptance of beneficiary status, the City of Oklahoma City.

F. **EMS System** includes those organizations, individuals, facilities and equipment which participate directly in the delivery of the following services:

1. Medical call taking and EMS dispatching, emergency and routine, including priority dispatching of first responders and ambulances, and including the giving of pre-arrival instructions by telephone;

2. First responder services whether delivered by a volunteer organization, a governmental public safety agency, or by a private firm.

3. Ambulance services, both emergency and routine.

4. Directions given by physicians or, if allowed by the System Standard of Care, nurses via radio or telephone to first responders or ambulance personnel at the scene of medical emergencies or while enroute to a hospital.

G. **On-line Medical Control Physician** means a physician certified by the Medical Control Board to direct patient care in the field by way of radio or telephone communications.

H. **Operations Contract** means the contract for purchase of ambulance services between EMSA and its then-contracted firm (the "Operations Contractor") for provision of ambulance services throughout EMSA's Service Area.

I. **Service Area** means the combined jurisdictions of all then-current Beneficiary and Non-Beneficiary Member Jurisdictions, as defined in the Amended and Restated Trust Indenture (Exhibit B).

J. **System Standard of Care** means the written body of standards, protocols, and policies governing clinical aspects of the EMS system, as then-currently approved by the Medical Control Board, including:

1. **Input standards** (e.g., personnel certification requirements, in-service training requirements, equipment specifications, on-board inventory requirements, and other requirements which the EMS system must fulfill before receipt of a request for service);

2. **Performance standards** (e.g., priority dispatching protocols and pre-arrival instructions, medical protocols, standing orders, response time standards, data and record-keeping requirements and methods, and other performance specifications describing how the EMS system should perform upon receipt of a request for service); and,
3. **Outcome standards** (e.g., target survival rates for certain for certain narrowly defined presenting problems or presumptive diagnoses, such as witnessed cardiac arrests involving patients whose medical histories meet defined criteria). **Outcome standards** define the results the system intends to achieve by meeting its “input” and “performance” standards.

For purposes of this definition, the response time standards set forth in the Uniform Ordinance for Emergency Medical Services (or, if applicable, in the Contract for Primary Ambulance Coverage) adopted by each jurisdiction which is a member of this EMS Interlocal Cooperative shall be automatically incorporated into the the System Standard of Care as the response time standard applicable to calls originating from within each respective jurisdiction.

3. **Emergency Physician’s Foundation — Creation and Purpose.** There is hereby created an administrative agency, pursuant to 74 Oklahoma Statutes, Sec. 1001, et seq., called the Emergency Physicians Foundation (hereinafter called the “EPF”). The EPF shall have the powers and duties set forth and described in Section 10, below. It is the purpose of the EPF, acting through its appointed Medical Control Board, to oversee clinical aspects of the EMS System throughout the Service Area. The Medical Control Board shall be established as provided for in Section 12, below; and shall have the powers and duties set forth and described in Section 13, below.

4. **Duration of the EPF.** The EPF shall continue to exist so long as this Agreement remains in effect between two or more jurisdictions which are meet the qualifications set forth in Section 1, above.

5. **Chapters of EPF.** There shall be two chapters of the EPF, one for the “Eastern Division” and one for the “Western Division,” as those Divisions are geographically defined in the “Amended and Restructured Trust Indenture” (Exhibit B).

6. **Initial Membership in EPF Chapter.** Membership in each Chapter of the EPF shall be limited to physicians who are Board Certified by the American College of Emergency Medicine.

   A. **Eastern Chapter.** The Eastern Chapter shall be initially be composed of the Medical Director (or his permanent physician designee) from each Code 1 Hospital in the Western Division, as determined by the then-existing Emergency Physician’s Foundation and approved by the City of Tulsa in 1978.

   B. **Western Division.** The Western Chapter shall be initially composed of the Medical Director (or his permanent physician designee) of each Comprehensive Emergency Treatment Center located within the Western Division, as such designation is defined and approved by the Greater Oklahoma City Hospital Council and the EMS Subcommittee of the Oklahoma County Medical Society.

7. **Changes in Membership Requirements.** Over time, changes may occur in certain federal, state, or hospital industry standards applicable to emergency receiving facilities, and in the official mechanisms by which compliance with such standards is judged. When and if such changes do occur, the Medical Control Board, subject to a 2/3 affirmative vote by the both chapters of the EPF, may amend the facility-related qualifications for EPF membership as set forth in Section 6, above, to be consistent with then-current federal, state, or industry standards.

8. **EPF — Chapters — Bylaws and Officers.** Each Chapter of the EPF shall adopt its own bylaws and elect its own officers.
9. **Powers and Duties of the Chapter.** Each Chapter of the EPF shall have the following powers and duties:

   A. To elect four members of the EPF to the Medical Control Board; and,

   B. To approve patient transport protocols applicable within its respective Division of the Service Area, as defined in Exhibit B, "Amended and Restated Trust Indenture."

10. **Medical Control Board Established.** The Medical Control Board shall serve as the regulatory, policy-setting and fact-finding body for the EPF in providing medical oversight of the operations of the EMS System in this Jurisdiction.

11. **Membership on the Medical Control Board.** Except for the "ninth" member of the Medical Control Board (as specified in Subsection 12, E below), membership on the Medical Control Board shall be limited to physicians who: are appointed by their respective chapters of the EPF; are members of the EPF; are Board-certified by the American Board of Emergency Medicine; and, are engaged full-time in the practice of emergency medicine.

12. **Elections to the Medical Control Board.** There shall be nine members of the Medical Control Board, selected as follows:

   A. Both the Eastern and Western Chapters of the EPF shall elect four members of their respective chapters of the EPF to membership on the Medical Control Board.

   B. The member of each Chapter of the EPF receiving the most votes shall be elected to a four-year term; the member receiving the second-highest vote total shall be elected to a three-year term; the member receiving the third highest vote total shall be elected to a two-year term; the member receiving the fourth highest vote total shall be elected to a one-year term. Any tie shall be resolved by lot.

   C. Thereafter, all terms of office on the Medical Control Board shall be for a period of four years.

   D. In all elections for the Medical Control Board, each member of the EPF shall have one vote.

   E. The eight elected members of Medical Control Board shall meet and elect one physician, licensed in Oklahoma, who is board-certified in a specialty involved with emergency medicine (e.g., surgery, cardiology), and who shall be selected for a four-year term on the Medical Control Board.

13. **Powers and Duties of the Medical Control Board.** The Medical Control Board shall have the following powers and duties:

   A. To approve the appointment of a Medical Director, who shall serve at the pleasure of the Medical Control Board.

   B. To establish an *initial* System Standard of Care, as defined herein and in Exhibit A, Uniform Ordinance for Emergency Medical Services, by integrating the two sets of standards of care in effect as of April 15, 1990 in Tulsa and Oklahoma City; provided, however, that such initial System Standards of Care shall not be less than or in contravention of standards required by the State of Oklahoma.

   C. To periodically enhance the System Standard of Care by incorporating advancements which become known and available from time to time, or to correct defects in the System Standard of Care discovered as a result of the quality assurance monitoring program, as described in Subsection D of this Section 13. Provided, however, that no change shall be made in the System Standard of Care which results in a standard that is less than or in
contravention of standards required by the State of Oklahoma. Changes in the System Standard of Care shall be approved by way of the following seven-step process:

**Step 1. Submit a “Standard of Care Suggestion.”** A “Standard of Care Suggestion” shall first be submitted to the Medical Director. The form employed for this purpose shall include, at a minimum, the following information:

a) name(s) and position(s) of person(s) initiating the suggestion;

b) a description of the current standard or practice, and the change being suggested;

c) potential advantages of the change;

d) type of change (e.g., change to “input standards,” “performance standards,” or both);

e) origin of suggestion (e.g., recently published research, personal experience, local medical audit, experience of other system, etc.);

f) listing of other EMS systems currently using the suggested standard (with contact names, if available);

g) summary of related research, with references;

h) objections likely to be raised in regard to this suggestion.

**Step 2. Medical Director’s Preliminary Review.** Once a suggestion has been received by the Medical Director, and expanded or clarified by its originator if requested, the Medical Director shall decide whether the concept has sufficient merit to warrant further consideration. If further consideration is justified, in the sole opinion of the Medical Director, the process shall continue to Step 3. Otherwise, the suggestion and the reason for its rejection shall be documented and filed for reference, and copies sent to the person(s) initiating the suggestion and to all members of the Medical Control Board.

**Step 3. Comments Obtained.** Unless this process is terminated by the Medical Director pursuant to Step 2, above, preliminary comments and suggestions regarding the suggestion shall then be solicited in writing by the Medical Director as follows: Copies of the “Standard of Care Suggestion” form, along with the preliminary comments of the Medical Director shall be sent for posting to all first responder agencies, ambulance service providers, emergency communications centers, on-line medical control physicians working within the EMS System, and to the individual members of each Chapter of the EPF. Thirty days shall be allowed for submission of written comments by interested persons.

**Step 4. Review and Comment by the Standards Committee.** After the comments obtained during Step 3 of the process have been received and compiled, the matter shall be presented to the “Standards Committee,” for review and comment. The “Standards Committee” shall consist of persons particularly interested in clinical issues, appointed by and serving at the pleasure of the Medical Director—e.g., paramedics, managers, persons involved in the quality control and in-service training programs, physicians and nurses. All related documentation shall be provided to Standards Committee members at least 30 days in advance of its scheduled review meeting, and the originator(s) of the suggestion shall be invited to present the suggestion to the Standards Committee in person. Before rendering a recommendation, the Standards Committee may determine that additional information is needed before a recommendation can be responsibly made. If the
Medical Director agrees, additional information shall be obtained, such as: a more extensive review of the literature; inquiries regarding the use of the proposed standard in other EMS systems (by telephone, in writing, or by site-visit observation); demonstration by a product manufacturer; or direct examination of a purchased sample product. Taking into consideration the Standards Committee's findings, the Medical Director shall then decide whether the process shall be terminated or continued to Step 5, below.

Step 5. Financial Impact Statement. If the Medical Director finds that the suggestion merits further consideration, the suggestion shall be submitted to the Executive Director of EMSA, who shall compile a “Financial Impact Statement” estimating the marginal costs (both initial and on-going) of implementing the proposed policy change. Every provider organization whose financial obligations would be affected by the proposed policy change shall be contacted by EMSA and asked to supply a financial impact estimate (with supporting documentation and rationale). In addition to cost estimates, the “Financial Impact Statement” shall also include a summary of the short-term and long-term impact of the proposed policy change upon ambulance rates and/or subsidy requirements, and the Executive Director’s official comments regarding economic aspects of the proposed change.

Step 6. Presentation to the Medical Control Board. When the previous five steps have been completed, and the exact language of the proposed amendment to the System Standard of Care has been developed, the suggestion shall be presented to the Medical Control Board. Following the Medical Director’s presentation of the suggested change, EMSA’s Executive Director shall present the “Financial Impact Statement.” All related documentation shall have been made available to Medical Control Board members at least 30 days in advance of the scheduled meeting. Unless additional information is required by the Medical Control Board before voting on the matter, the Medical Control Board shall then vote to determine whether the proposed policy change shall be adopted or rejected. The policy change may be adopted for general implementation (i.e., systemwide), or on a pilot-project basis (i.e., a short-term test limited to selected personnel). If the policy change is adopted on a pilot-project basis, upon completion of the pilot project, the results shall be reviewed by the Standards Committee and by the Medical Control Board prior to deciding upon general implementation.

Step 7. Joint Approval By Medical Control Board and EMSA. In cases where implementation of such a change would, in the opinion of EMSA’s Executive Director, necessitate substantial unplanned expenditures by ambulance service providers, or an increase in local tax subsidies to first responder agencies, such change shall be subject to joint approval by the Medical Control Board and the EMSA Board of Trustees prior to implementation. In the event of a conflicting outcome, the matter shall be submitted for final determination by the governing bodies of EMSA’s beneficiary jurisdictions (i.e., Tulsa and Oklahoma City), and the proposed change shall be rejected unless approved by resolution of both such governing bodies.

D. To design and conduct an on-going program of medical quality assurance capable of ensuring that all components of the EMS System, as defined herein, are functioning in conformance with the then-current System Standard of Care. In this regard, the Operations Contractor and such other ambulance service providers as may then be serving as components of the EMS System shall be subjected to identical standards of licensure, performance, reporting, and monitoring, except that the Operations Contractor’s permit shall be valid so long as the services rendered in the Operations Contractor’s capacity as subcontractor to EMSA, and under EMSA’s state EMS license.

E. To develop and administer written and practical tests for purposes of certification of EMS personnel by the Medical Control Board, in accordance with the then-current System Standard of Care. Personnel subject to such certification requirements shall
include: persons receiving telephone requests for ambulance services (excluding 911 “complaint takers” who transfer such calls to an EMS Control Center, as defined in the Uniform Ordinance for Emergency Medical Services (Exhibit A); first responders, ambulance personnel, and on-line medical control physicians.

F. To develop standards applicable to vehicles and on-board equipment used in the delivery of first responder services and ambulance services within the Service Area, as regulated pursuant to the Uniform Ordinance for Emergency Medical Services (Exhibit A).

G. To develop rules for fair hearing for any proposed suspension or revocation of the permit of either a permitted provider or a certified EMS personnel operating within the Service Area which such standards shall not be less than those standards contained in the Health Care Quality Improvement Act of 1986, 42 U.S.C. 11112, or less than any standards contained in applicable Oklahoma Statutes or applicable Oklahoma case law. Such procedures in any event, shall contain at least the following:

1) Written notice of the charges pending against the provider or EMS personnel whose license or certification may be suspended or revoked;

2) The right to a hearing before the Medical Control Board, conducted by an impartial and independent Hearing Officer;

3) A right to cross-examine witnesses, and to present witnesses and evidence on the person's own benefit;

4) A right to an appeal of any adverse action by the Medical Director to the Medical Control Board;

5) A right to an appeal of any adverse action by the Medical Control Board to the governing body of that Beneficiary jurisdiction designated to hear such appeal by the Hearing Officer who conducted the preceding hearing.

H. To employ an independent, impartial Hearing Officer to conduct any Hearing necessitated by a proposed suspension or revocation of a permit;

I. To sit as the Hearing Panel in any license suspension or revocation proceeding;

J. To monitor and enforce response time standards and compliance therewith by EMSA’s contracted operator, and by any other ambulance service provider licensed pursuant to the Uniform Ordinance for Emergency Medical Services (Exhibit A);

K. To develop and administer a process governing the review of applications for permits to provide emergency ambulance services, as provided for in the Uniform Ordinance for Emergency Medical Services (Exhibit A);

L. To approve an annual budget, and to periodically approve expenditures from the Quality Assurance Fund as defined in Section 16, below;

14. Medical Director. The Medical Director shall be selected by, directed by, and shall serve at the pleasure of the Medical Control Board. The Medical Director shall be Board-Certified by the American College of Emergency Physicians. The Medical Director shall have the following duties:

A. To develop and recommend an appropriate System Standard of Care to be adopted by the Medical Control Board;
B. To administer the testing and certification of EMS personnel, and to establish and promulgate written regulations in connection therewith, subject to approval by the Medical Control Board;

C. To administer the licensing of all persons and organizations who are, or seek to become, permitted providers of emergency medical services within the Service Area, as defined in the Uniform Ordinance for Emergency Medical Services (Exhibit A), in accordance with procedures approved by the Medical Control Board.

D. To promulgate standards for the suspension or revocation of permitted providers or permitted EMS personnel, subject to approval by the Medical Control Board;

E. To administer the suspension or revocation of any permitted provider or EMS personnel, including, but not limited to, preparation and service of written notice, and participation in presenting relevant matters to the Medical Control Board, acting as a Hearing Panel;

F. To regulate on-line medical control in accordance with protocols and regulations approved by the Medical Control Board;

G. No less frequently than one time every three months, to report on the clinical aspects of the quality of care and on the response time performance being provided by the EMSA contractor to the EMSA Board of Trustees, such report to be relied upon by EMSA in carrying out its contract-management role as defined in the Amended and Restated Trust Indenture (Exhibit B);

H. Once each year to report to the governing body of this Jurisdiction, in writing, on the quality of care and response time performance being provided by all components of the EMS System;

I. To monitor all aspects of system performance, including clinical quality of care and verification of response time performance reported by first responders and ambulance service providers;

J. To attend meetings of the Trustees of EMSA, and of the Medical Control Board, and of the two chapters of the EPF, and to represent the EMS System at appropriate regional and national EMS-related meetings, seminars, and conferences in order to stay abreast of developments in emergency medical care (e.g., ACEP and NAEMSP conference and workshops).

K. To make final determinations regarding requests by EMSA's Operations Contractor for relief from late run deductions, in accordance with applicable provisions for such relief defined in the Operations Contract;

L. To recruit and hire appropriate personnel to assist in carrying out the duties and responsibilities of the Medical Director, subject to budget approval by the Medical Control Board, and availability of funds, as determined by the Quality Assurance Fund Administrator;

M. The Medical Director shall annually recommend to the Medical Control Board a budget for the operation of the EPF and the Medical Control Board, for approval and adoption by the Medical Control Board, subject to approval by the EMSA Board of Trustees in regard to funding availability, cash flow requirements, and the applicability of the proposed expenditures to the purposes and restrictions set forth herein and in the Uniform Ordinance for Emergency Medical Services (Exhibit A).

N. To inspect the standards and operations of ambulance service providers serving neighboring jurisdictions outside the Service Area for purposes of determining the
eligibility of such providers to serve as mutual aid providers, as defined in the Uniform Ordinance for Emergency Medical Services (Exhibit A).

O. To conduct EMS-related research projects, to seek outside funding for such purposes, and to periodically publish in EMS-related journals and trade publications so as to enable the EMS System to be a visible and active participant in the advancement of the body of knowledge available throughout the EMS industry.

15. Medical Director – Responsible Solely to Medical Control Board; Employed by EMSA. It is recognized that the Medical Director shall be approved by, directed by, and serve solely at the pleasure of, the Medical Control Board; and that neither the Trustees nor the Executive Director of EMSA shall have any right or authority to discipline, direct, or terminate the Medical Director or his staff. However, for administrative convenience and efficiency, the salaries of the Medical Director and his staff shall be paid by EMSA from the Quality Assurance Fund, and for purposes of Federal and state employment law, and health insurance purposes, the Medical Director and his staff shall be considered employees of EMSA.

16. Quality Assurance Fund. The Trustees of EMSA, its Executive Director, shall establish and administer a Quality Assurance Fund:

A. As provided for in the Uniform Ordinance for Emergency Medical Services (Exhibit A), the Quality Assurance Fund shall be financed by a $3 per transport service charge for each transport by an ambulance service provider, as defined herein, originating within this jurisdiction; said $3 charge shall increase annually at the same percentage as any increase in the Consumer Price Index;

B. The Quality Assurance Fund shall be administered by the Quality Assurance Fund Administrator, who shall be the Executive Director of EMSA;

C. The Quality Assurance Fund shall be used exclusively for the payment of salaries, fringe benefits, and other related payroll expenses of the Medical Director and his assistants; for research and development activities approved by the Medical Control Board, which are intended to develop optimal quality of care provided by the EMS System; and to pay all other expenses reasonably incurred in establishing and monitoring the quality of emergency medical care delivered by EMSA.

17. Termination. Each member jurisdiction's participation in this Agreement may be separately terminated upon 180 days advance notice. Such termination shall render that jurisdiction ineligible to qualify as a Non-Beneficiary Member Jurisdiction, as defined by the Amended and Restated Trust Indenture (Exhibit b), and ineligible for distribution of any portion of the Quality Assurance Fund. However, in the event this Agreement is terminated simultaneously by all then-remaining member jurisdictions, and any money remains in the Quality Assurance Fund, all such money shall be distributed, pro rata, based upon the number of transports originating within each member-jurisdiction, within the immediately preceding twelve month period, to the governing body of each member jurisdiction.

(Signatures lines follow here.)

Note: Two additional legal instruments, not included here, complete the system’s legal foundation: the Uniform EMS Ordinance (adopted by all participating jurisdictions), and a Trust Indenture creating the financial oversight agency (i.e., the Emergency Medical Services Authority, or EMSA). In some states (e.g., Texas), the creation of the financial oversight agency is accomplished within the Interlocal Agreement. In either case, policies governing the rate-setting process, including local determination of the subsidy/price ratio, are included within that legal instrument wherein the financial oversight agency is created.
FIRE SERVICE SSM
FOURTH PARTY "QUICK LOOK" METHOD

<table>
<thead>
<tr>
<th>STEP 1. DEFINE BASICS.</th>
<th>Test System</th>
<th>Reference System</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Geographic size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Call and Transport Volumes</td>
<td></td>
<td></td>
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<tr>
<td>(c) Clinical Standards</td>
<td></td>
<td></td>
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<tr>
<td>(d) Response Time Standards</td>
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</tbody>
</table>

STEP 2. DEFINE CURRENT REFERENCE SYSTEM PERFORMANCE.

(a) Current Response Time Compliance
(b) Current Fixed Cost Base
(c) Current Effective U/UH Ratio.
(d) Current Cost Per (Produced) Unit Hour
(e) Current % Lost Unit Hours.
(f) Current Non-Productive Direct Labor Multiplier
(g) Current Cost Per (Effective) Unit Hour.
(h) Current Total System Cost

STEP 3. CONVERT UNADJUSTED REFERENCE/TEST SYSTEM DATA.

(a) Converted Fixed-Cost Base
(b) Converted Effective UH Production.
(c) Converted Cost Per (Effective) Unit Hour.
(d) Total Unadjusted Conversion Cost

STEP 4. ESTIMATE "LEVEL OF DIFFICULTY MULTIPLIER(S)."
ESTIMATE "LEVEL OF DIFFICULTY MULTIPLIER(S)."

(a) Economies of Scale
(b) Clinical Standards
(c) Response Time Standards
(d) Road Systems/Barriers/Congestion
(e) Cream Skimming Opportunities in Neighboring Market
(f) Mutual Aid Resources
(g) Shape of Service Area
(h) Weather
(i) Regional Cost of Living
(j) Local Wage Requirements
(k) Contractual Barriers to Performance
(m) Market Integrity/Stability
(n) Length of Contract/Renewal Provisions. (Amortization)
(p) No-Haul Rate
Step 5. Estimate Converted Reference/Test System Cost.

(a) Current Fixed-Cost Base x Multiplier
(b) Current Effective U/UH Ratio x Multiplier
(c) Current Cost Per (Produced) Unit Hour x Multiplier
(d) Current % Lost Unit Hours x Multiplier
(e) Adjusted Non-Productive Direct Labor Multiplier
(f) Adjusted Cost Per (Effective) Unit Hour
(g) Estimated Test System Cost
SUCCESSFUL IMPLEMENTATION
Proper Use: The double-unit post assignment is appropriate where and when P/P lag is frequently the reason for late runs, and/or where and when frequency of P/P moves is excessive.

Rules for Setup and Operation in SSP: The double-unit post assignment has two purposes: to maintain better coverage of a high-priority post; and, to reduce P/P moves. The following rules achieve both results:

1. The double-unit post appears on the screen immediately to the right of the post for which it is a double—e.g., Post 10's double is labeled Post 10D, and is to the immediate right of Post 10 on the screen.

2. The double-unit post is *always* an equal/alternate to the lowest priority post starting at level 3 or higher.

3. Units posted at double-unit posts should not be dispatched to nonemergency calls. (Send the next lowest priority unit to nonemergency calls.)

4. When the unit positioned at the post being doubled (e.g., Post 10--not post 10D) is dispatched to a call, immediately "move" the unit at the double-unit post to the doubled post (e.g., "move" the unit at 10D to Post 10). Note: this "move" is strictly electronic, or only on paper; do not actually notify the crew.

5. When assigning newly available units to posts, the double-unit post is preferred to the post to which it is an equal/alternate. (For example: the system is at level 4 when a unit comes available; at level 5, Post 10D is equal/alternate to the lowest priority post—i.e., Post 19. In general, send the newly-available unit to Post 10D—not to Post 19, unless there are good reasons to do otherwise.)
Sample Plan Using **Double-Unit Post Assignment**: (Note: no conditional alternates are used in this example).

<table>
<thead>
<tr>
<th>Level</th>
<th>Post #</th>
<th>Priority</th>
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<th>1</th>
<th>13</th>
<th>1</th>
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<tbody>
<tr>
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<td>10D</td>
<td>11</td>
<td>12</td>
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**Observe:** When the SSP is satisfied at any level above level 2, with the preferred alternate post covered, dispatching the highest priority unit requires only an electronic adjustment—not an actual P/P move. **Note:** CAD systems should not count these electronic moves in P/P move counts for reporting purposes.
Six Steps to Introducing Change

- Introduce the Change
- Explain Reason for Change
- Described Estimated Impact
- Respond with Empathy
- Follow Through on Questions
- Ask for Commitment to Implement Change
<table>
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<tr>
<th>RUN NUMBER</th>
<th>RESPONSE CODE</th>
<th>UNIT NUMBER</th>
<th>CREW NAMES (FIRST, LAST)</th>
<th>DRIVER</th>
<th>ATTENDANT</th>
<th>MAP PAGE/GRIDS GIVEN BY SSC</th>
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CALL ADDRESS (STREET NUMBER, STREET NAME, CITY, STATE)  STARTING LOCATION (SPECIFIC POST/INTERSECTION)

<table>
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<tr>
<th>RECEIVED</th>
<th>ALERTED</th>
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<th>10-61</th>
<th>10-62</th>
<th>10-63</th>
<th>10-8</th>
<th>FIRST RESPONDER #</th>
<th>ARRIVAL BEFORE UNIT?</th>
</tr>
</thead>
<tbody>
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</table>

EXPLANATION

FIELD CREW
PRE-WORKSHOP MATERIALS
Dear SSM Workshop Participant,

We are excited that you have enrolled in our 1993 SSM Skill-Building Workshop(s). Fourth Party Workshops have earned a reputation for helping participants develop real skills and abilities. Our approach uses intense, interactive, experiential education techniques. Past participants have described our workshops as interesting, life changing and fun...but no vacation.

Your faculty is rich with experience. We have designed, operated, and improved the toughest high performance EMS systems in the world. Therefore what you will learn is not academic theory, it is used every day in the best systems in America.

To get the most out of your investment we invite you to follow these suggestions:

1) Complete Steps 1-3 of the Selftest cover sheet.
2) Study the pre-conference reading packet.
3) Your fellow participants are serious professionals. Plan to exchange business cards and experiences with as many people as you can.
4) Be sure to bring a pocket calculator.

I look forward to seeing you in Grand Rapids.

Sincerely,

Mike Taigman
Workshop Facilitator

ps: I'd been involved in EMS for 12 years before I attended my first SSM Workshop. It changed my professional life forever. If there is anything we can do to meet your needs just let us know.
Agenda
Basic SSM Workshop

Wednesday, September 15, 1993
13:00 - 21:00

Session 1  Introductions

  Good SSM Is Good Medicine And Good Customer Service  Mike
  Getting A Handle On Efficiency  Jack

Session 2

  Temporal Unit-Hour Allocation  Joyce
  Exercise 1  Team

Session 3

  Geographic Unit-Hour Allocation  Frank
  Exercise 2  Team

Session 4

  A Review Of SSP Controls  Jack

Dinner Break

Session 5

  Implementation What Really Happens  Glenn

Session 6

  Review Of Pre-Materials  Team
Agenda
Advanced SSM Workshop

Thursday, September 16, 1993
08:00-17:00

Session 1

Quick Review Of Basic Information
Introduction To Management Structure

Session 2

Fine Tuning The SSP

Session 3

Everyone Can Start A SSP
CQI Of SSP
Lunch

Everest The Challenge In All Of Us

Session 4

Scheduling And Staffing

Session 5

Exercise 3

Session 6

Level 1 SSM Instructor Course
Agenda
Advanced SSM Workshop

Friday, September 17, 1993
8:00-17:00

Session 1
Managing Workload Distribution Tim&Joyce

Session 2
Avoiding Adverse Contractual Constraints Jack
Structuring The Multi-Jurisdictional System Jack

Session 3
High Performance Cars Bob
Lunch Break

Session 4
Automated SSM Demo InterGraph Vince

Session 5
Successful Implementation Panel
Hosted Cocktail Reception

Saturday, September 18, 1993
08:30-13:00

What would happen if the best bid your town? Jack & Surviving Faculty
Practical Application of Advanced SSM Faculty
The Fourth Party's
System Status Management Workshops

September 15 - 18, 1993
Grand Rapids, Michigan

Faculty

Lead Educators for the SSM Workshops:

JACK L. STOUT - Jack Stout is Founder and Chairman of The Fourth Party, Inc. He has
designed and installed high-performance pre-hospital care systems which, collectively, now serve
a combined population of more than 3 million residents of 68 municipalities in six states. In the
early 1970's, he directed one of the five original National EMS Demonstration Projects (e.g., the
Arkansas Project). Later, as Research Fellow and Director of Health Policy Research at the
University of Oklahoma's Center for Economic and Management Research, he headed the
landmark economic study of the pre-hospital care industry which furnished the theoretical
foundation for Stout's later development of the "public utility model" of pre-hospital system
design. He has served in an advisory capacity to more than a hundred federal, state, and local
agencies.

Stout has designed and conducted more large-scale EMS procurements for major cities than any
other person. He is the originator of "system status management" (SSM) and the "unit hour
utilization" (i.e. U/UH ratio) concept, and was the first to expose "average response time" as a
dangerously misleading indicator of EMS response time reliability. In various forms, SSM is now
widely employed throughout the pre-hospital care industry to maximize response time reliability
using limited resources; the U/UH concept has become the pre-hospital care industry's basic
productivity measure. Fractile response time distribution has replaced "average response time" as
the standard for measuring EMS response time reliability in a substantial and growing number of
major U.S. cities.

Stout's "Interface" column has appeared in the Journal of Emergency Medical Services (JEMS)
since 1983. His forthcoming book, High-Performance EMS (HPEMS) will soon be released. He
is a graduate of the University of Nebraska, and has done graduate work in law and economics.
GLENN S. LELAND - Glenn Leland is President and Senior Consultant of The Fourth Party, Inc. He is highly skilled and extensively experienced in all aspects of EMS management and has twelve years experience with several of the EMS industry’s largest and most respected companies. Highlighted positions include: Vice President, Business Development, LifeFleet, Inc.; Chief Executive Officer, Mercy Ambulance Service; Corporate Development Officer, Hartson Medical Services; and Vice President and Chief Operating Officer, Texas Lifeline Corporation, where he planned and implemented the start-up of the ambulance contract of the public utility model system in Fort Worth, Texas.

In the last decade, Glenn has had senior management responsibilities in the varied disciplines of General Management, Field Operations, Quality Improvement, Acquisitions and Business Development, Research and Development and Information Technologies. As "trouble shooter" for subsidiary corporations, or acquisition team leader, he has conducted in-depth evaluations of over 100 ambulance service companies and EMS systems. He has worked in virtually every ambulance operation capacity from EMT to CEO.

In one year, Glenn implemented a variable staffed SSP which cut unit hours by 10%; redesigned an automated fleet maintenance program resulting in over 2.2 million fleet miles without "field failure;" interfaced the company's CAD computer with local 911 public safety answering point computer reducing system-wide response times by one minute; and identified and implemented a cost control program that improved profitability by more than $500,000.

MIKE TAIGMAN - During his more than 18 years in EMS, Mike has worked in rural, suburban, and inner-city systems. As a paramedic he responded to over 23,000 emergency medical calls. He has worked throughout the U.S. as a manager in high and medium performance EMS systems. Mike's thought provoking and sometimes controversial articles appear in professional journals world-wide.

A dynamic speaker, his motivational, high content programs enlighten audiences in the U.S. and abroad. Mike is the industry leader on Advanced Electrocardiography, Street Survival, Customer Service, and Effective Quality Improvement. Currently, he is the Director of Research and Process Facilitation for MedTrans, Inc., one of the nation's largest ambulance providers and is a partner with The Fourth Party.

Expert faculty:

ROBERT L. FORBUSS - Mr. Forbuss is the President/Chief Executive Officer of Mercy Medical Services. Under Mr. Forbuss' leadership and direction, Mercy Medical Services has grown from a small ambulance service to one of the largest and most respected in the United States. In 1991 Mercy Medical services was the recipient of the United States Senate Productivity Award for excellence.
His personal leadership and company performance during the MGM Grand and Hilton Hotel disasters have brought him respect and national recognition for mass casualty planning.

Mr. Forbuss is actively involved in his state and community as an elected School Board Trustee, Board Member and past President of the Boys and Girls Clubs of Southern Nevada, and as President of the Nevada Interscholastic Activities Association and as President of the Las Vegas Rotary Club. He was selected by the National Association of Emergency Medical Technicians as the "EMS Administrator of the Year for 1988".

Mr. Forbuss is actively involved in national EMS issues and has served two terms as President of the American Ambulance Association. He has appeared before national media and Congress on several occasions and has served as the "voice" for the ambulance industry by appearing on "Good Morning America" and the "Today Show". He currently serves as chair of the Public/Private Partnership Committee for the AAA. In 1988 he was selected to co-author a white paper on "The State of EMS in the United States." Additionally, Forbuss provided the drive and follow-through to present an industry-first demonstration project to the city council of Washington, D.C., in the hopes of repairing their failing EMS system.

Mr. Forbuss' graduate work is in Public Administration from the University of Nevada and he holds a Bachelor of Arts Degree in Public Administration and Political Science from the University of California, Long Beach.

TIM GRIDLEY - Tim Gridley is the Unit Hour Utilization Manager for Emergency Providers, Inc. (EPI) in Kansas City, Missouri. Tim has worked in EMS since 1982 when he started his career as an EMT for Medevac MidAmerica, which at that time was the contractor for the MAST public utility model system in Kansas City. He has worked in virtually every field role including paramedic, flight medic, field supervisor, communications supervisor and operations manager. He has functioned as the Unit Hour Utilization Manager for EPI since the employees purchased the company from MAST in February of 1989. Tim is known for his expertise in developing an advanced on-line management capability to equalize the workload distribution of calls among on-duty ambulance units. In addition, he works closely with EPI's Unit Hour Production Manager to develop staffing schedules which meet employees' needs and minimize wasted unit hours.

FRANK HEYMAN - Frank is currently Vice President and General Manager of Choice American Ambulance, headquartered in Alexandria, VA. Choice American is a recent acquisition of Mercy Services, providing medical transport services throughout the Washington, D.C. metropolitan area.

Previously, Frank was responsible for Mercy's Reno, NV operations and has been President of EPI in Kansas City, MO. Before taking a direct hand in operating ambulance companies, Frank was a private consultant working closely with Jack Stout and serving as President of The Fourth
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Party, Inc. He was also the former City Controller and Chief Financial Officer for the City of Fort Wayne, Indiana.

JOYCE HIGHFILL - As Director of Communications for Mercy Ambulance in Richmond, Virginia, Joyce has accomplished one of the fastest urban response times in the nation, while maintaining high unit hour utilization ratios. She brings extensive experience in overseeing a large communications center as she has managed dispatch centers in two major cities Tulsa and Oklahoma City, Oklahoma. Joyce has written communications policies and procedures, conducted supervisory training and developed system status plans which have exceeded contractual emergency and non-emergency response times system-wide. An experienced teacher-coach, she re-designed communications staffing schedules, conducted demand analysis at these dual sites, shaped new field schedules to meet demand for service and is an emergency medical dispatch instructor.

BRENDA STAFFAN - Brenda Staffan is the Director of Marketing and Public Relations for Executive Management Services in Sacramento, California where she directs communications and marketing programs for the American Ambulance Association and other clients. Brenda is the Editor of the Ambulance Industry Journal -- the industry's only EMS management journal. She has worked with numerous CEOs and managers to facilitate transitions to high performance EMS and has implemented numerous custom-designed communications programs for a variety of ambulance services across the country. For three years, she was the Director of Education and Information at Medic One Ambulance Service during the start-up of the Pinellas County, Florida EMS system and worked in marketing, finance and human resources capacities for five years with Medevac in San Diego, California. Brenda has a Bachelor of Arts Degree in Economics from the University of California, San Diego.

BILL ZAUHAR - Bill Zauhar is the General Manager of Mercy Ambulance Service in Richmond, Virginia and has also worked in two noted public utility models -- as Director of Operations in Pinellas County, Florida and as the General Manager of the dual-site system in Tulsa and Oklahoma City, Oklahoma. In over 14 years in the private ambulance industry, Bill is experienced at managing large all-ALS providers of emergency and non-emergency services. He is an expert at meeting the needs of customers and employees while achieving the industry's best response time performance and highest levels of productivity. His expertise includes financial management, effective scheduling and supervision of EMS personnel, advanced communications and computer aided dispatch systems, system status planning and SSM fine tuning. Bill is a nationally registered paramedic and holds certificates in Emergency Medical Dispatch, ACLS, PHTLS, BTLS and Failsafe Driving.
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Special Guest:

BRIAN O'MALLEY - Brian O'Malley is a nationally recognized keynote speaker, whose emotional stories of human courage and risk leave audiences with the resounding message to live life to its fullest. He is an adventurer, mountain climber, and award-winning photographer. Brian's adventures have taken him to the mountains of South America, North America, the Himalayas, Africa, and Asia.

Brian was a member of the American Mount Everest West Ridge Expedition, an experience he relates in his most popular program, "EVEREST, The Challenge In All of Us." He authorized a series of adventure books for children titled, "The Secret of the Mountain," a story inspired by his Mt. Everest experience, which was released in early 1993.

He has been a full-time professional paramedic/firefighter in the Denver Metro area for the past 12 years. Additionally, he has worked as a police officer and S.W.A.T. team member. His multifaceted career drives Brian to take risks both for personal growth and service to others. Through his exhilarating experiences, Brian inspires others to tackle their own personal summits. Experience Brian O'Malley's multimedia presentation of his adventures throughout the world at the special luncheon presentation on Thursday. Your spirit will soar!
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PRE-WORKSHOP SELFTEST--1991 REVISION
TESTING BASIC CONCEPTS OF SYSTEM STATUS MANAGEMENT

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Instructions: This selftest has been specifically designed to prepare persons with limited knowledge of system status management (SSM) for participation in our Basic SSM Workshop, and as a refresher to prepare those more familiar with SSM practices for participation in our Advanced SSM Workshops. The knowledge tested by this instrument is prerequisite to successful participation. Reading the pre-workshop reading packet (and common sense) will enable you to answer most of the questions. To the extent mysteries remain (and they nearly always do), answers are provided in the SSM Selftest Answersheet. Even if you’ve previously attended an SSM Workshop presented by The Fourth Party (prior to 1989), retake this test. The updates are important.

Step 1. If you haven’t previously attended one of our earlier SSM Workshops, quickly scan this test, then read the pre-workshop reading materials, even if you’ve read the articles before. If you have attended an earlier SSM workshop, go straight to Step 2 for a quick refresher.

Step 2. After reading the pre-workshop materials, read each test question, think about your answer, and then read the correct answer to that question on the enclosed answer sheet. Tip: You’ll learn faster if you go through this process one question at a time. That’s because the questions are arranged so that knowing the answers to earlier questions makes it easier to understand the answers to questions that come later.

Step 3. Now, put away the answer sheet and, on a separate sheet of paper, take the test—in pencil, one question at a time. As you finish your answer to each question, compare your answer with that shown on the Answersheet, then rewrite your answer if necessary. Tip: Make a list of any items that still seem unclear, and be sure to ask the faculty to clarify the matter during the workshop — the earlier, the better.

Remember: You and your company are investing considerable time and money in this workshop. Time spent prior to the workshop as suggested above will ensure a good return on that investment.

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1. Define system status management (SSM).

2. What is the best and most important use of SSM?

3. List at least eight possible objectives of a system status plan (SSP).

4. The effectiveness of system status management is best evaluated (numerically) by the combination of what two essential measures?

5. Define the term "unit hour."

6. What is the U/UH ratio?

7. What does the U/UH ratio measure?

8. What two production variables must be known in order to calculate the U/UH ratio?

9. Why do our industry's charlatans prefer to be judged in terms of "average response time," rather than fractile response time frequency distributions?

10. Is it [possible/impossible] to simultaneously pursue the lowest possible "average response time" and the lowest possible percentage of runs with response times in excess of "x" minutes? (Select one.) Why?

11. An ambulance service's "response time" is properly measured as the interval between (A) and (B). (Define A and B.)

12. The acquisition of what three pieces of information should start the response time clock?

13. Scenario: During the past year, Fred's Paramedic Service (FPS), an old and respected firm, responded to 23,000 calls. Of those calls, 12,500 were dispatched as "emergencies" (resulting in 9500 patient transports), and 10,000 were dispatched as "routine transfers" (resulting in 9750 patient transports), and the remaining 500 calls produced 500 long distance transfers. During the same period, Fred employed an average of 1650 scheduled unit hours per week, plus an average of 46 unscheduled overtime unit hours per week, plus a total of 4600 unit hours assigned to long distance transfer work for the entire year. Fred's company also sold 1600 unit hours of dedicated special events coverage, and 50 hours of non-dedicated special events coverage. To maintain coverage, Fred's crews made an average of 1 post-to-post move per 3 hours on duty.

   A. Which of the above figures are needed to calculate Fred's U/UH ratio?

   B. Which of the above figures are not needed to calculate Fred's U/UH ratio?

   C. What is Fred's U/UH ratio?
14. Assuming response time doesn't matter, and that a total time from time-call-received to time-unit-available averages 40 minutes, what is the maximum possible (theoretical) U/UH ratio?

15. More stringent response time requirements make it [harder/easier] to achieve high UH/U ratios. (Select one.) Why?

16. Ambulance crews should not be expected to work continuously at levels of productivity in excess of what U/UH ratio?

17. What essential information is missing from Question 16?

18. Low call density per square mile makes it [harder/easier] to achieve high U/UH ratios. (Select one.) Why?

19. Poor road systems and bad traffic conditions make it [harder/easier] to achieve high U/UH ratios. (Select one.) Why?

20. List at least three reasons why the following question would only be asked by a novice: "How many ambulances would be needed to achieve an 8 minute response time with 90 percent reliability in the City of Podunk (pop. 300,000)?"

21. List at least 8 common causes of late runs.

22. List 3 advantages of using 24 hour shifts exclusively.

23. List 3 disadvantages of using 24 hour shifts exclusively.

24. Most urban police departments don't use 24 hour shifts, but most urban fire departments do. Why the difference?

25. Do you think patterns of demand for ambulance service more closely resemble those for police service or those for fire suppression service?

26. What is peak load staffing?

27. Except in very small communities, EMS systems which do not use peak load staffing must inevitably face either of two adverse consequences. What are they?

28. Problem: Fred's Paramedic Service is averaging 10 late emergency runs per week, plus 10 to 15 delayed nonemergency calls, all happening during weekdays between the hours of 10 AM and 6 PM. During average weeks, 3 of those emergency calls are handed off to mutual aid providers. Fred's SSM supervisor estimates that 3 more ambulances would solve the problem. All of Fred's crews are currently working 24/48 shifts and each employee costs Fred $500 per week. Fred's average charge for emergency calls is $300, and his unadjusted collection
rate (for emergency work) averages 63 percent. Except for the 10 AM to 6 PM period, Fred never has response time problems.

A. Assuming Fred already has sufficient extra vehicles, what will it cost Fred (net) per week to solve his problem by adding three additional 24 hour cars?

B. What would it cost Fred (net) per week to solve his problem by dropping one 24 hour car out of the system and adding 3 eight hour cars during weekdays, assuming the personnel working the "day cars" will work 8 hours per day/five days per week, but still cost Fred $500 per week?

C. What is the net change in unit hours for solution A? For solution B? Under solution B what is the difference in hourly rate of pay for crews working 24 hour shifts versus those working the eight hour shifts?

29. Scenario: Newark Emergency Rescue Department (NERD) has a problem: Not enough vehicles. During peak periods, every vehicle is routinely placed in service. Crews coming to work often have to wait for a vehicle when the crew driving their assigned vehicle gets an emergency call just before end of shift. When vehicles break down, crew time is often wasted while waiting for emergency repairs, and the mechanic's overtime pay is substantial. Errors occur because vehicles cannot be adequately checked out between crews, and revenues are lost to mutual aid handoffs and inability to handle long-distance runs. NERD currently operates 10 vehicles, handling 20,000 transports , 6,000 no-hauls, and 12,000 post/post moves per year. Because of the workload per vehicle, NERD's $50,000 units are replaced every 24 months under a fully-funded replacement program. Replacement cost of the units has been going up at the rate of 6 percent per year.

A. What is the amount of NERD's current monthly replacement fund deposit?

B. If NERD leases three more units, how would the entire fleet's expected safe useful life be affected?

C. How would the addition of the 3 leased units affect NERD's monthly cost of replacement fund deposits for the 10 units owned by NERD?

D. Assuming the three leased units cost NERD $1,800 per month each (i.e., lease payments only), what would be the net difference in NERD's monthly amortized cost of vehicles between the 10 vehicle system vs. the 13 vehicle system?

E. When all relevant costs and revenues are considered, would leasing the three additional units be a money-maker for NERD, or a money-loser?

30. Why do system status plans (SSPs) nearly always relate to a weekly cycle? When might other SSP timeframes apply?

31. List at least eight ways unit hours are often wasted.
32. List at least five dispatching controls commonly used in an SSP.

33. List the four most essential sources of information needed to fine-tune an existing SSP.

34. Fred's latest analysis of response time problems indicates a need for two additional units between 4 and 6 PM during weekdays, but Fred can't get his medics to sign up for the new 2-hour shifts. In general terms, how can Fred go about solving this problem without resorting to 2-hour shifts, and without paying crews to be on duty when they aren't needed?

35. Lately, Fred has noticed that his crews' total time per run (i.e., unit alert to available next call) has been gradually increasing, and response times are suffering as a result. What is the most likely cause of this problem, and what two standard reports are needed to diagnose the cause?

36. Paramedic Jones works for a fire department system on a rescue unit (i.e., not firefighting apparatus). The department's marginal cost per unit hour (i.e., the cost of adding one additional unit hour of production to an already-existing system) is high by industry standards--$35. The city's approved rate for BLS transport is $150, and the unadjusted collection rate is 70 percent. Jones is expected to "hand off" his patient to a BLS crew for transport whenever Jones feels his ALS skills won't be needed. Now, as a result of an abandonment lawsuit, the fire chief is considering a requirement that the ALS crews must transport every 911 patient, but Jones wonders who will cover his post during the additional half hour his crew will be out of service while transporting a BLS patient. If you were the chief, how would you answer Jones' concern?

37. Fred wants to bid to become the exclusive provider of ambulance services for the City of Podunk. The response time standard is eight minutes maximum with 90 percent reliability on all 911 calls. The bid security is $50,000 cash. Podunk has a population of 300,000 people, an average system of roads, average traffic problems, and covers 320 square miles. When the bid was presented, Fred was vacationing in Bimini, leaving his chief of operations to supervise development and submission of the offer. Upon his return, Fred gets the good news: "We won the bid!" Fred's chief system status controller (SSC) is especially happy because, in order to make a profit, he needs only maintain a U/UH ratio of .46 or better for Fred to break even. Fred should (select one):

A. Celebrate the victory.
B. Sell his Mercedes 300 Turbo Diesel to pay off the bid bond, and bail out of the contract while he still can afford a new Yugo.
C. Hire the best SSC in the industry to replace the one he just fired and hope to break even.

38. Fred decided to take the contract and hire the best SSC in the industry. The new SSC estimates that he'll have to run an average of 1 post-to-post move per 2 unit
hours and a U/UH ratio of .46 just to break even. But, says the new head SSC, 24-hour shifts will no longer be feasible, so labor costs per unit hour will have to be increased. Is he right? Why?

39. Fred's 24 hour crews just aren't getting enough rest. Name two ways Fred can solve the problem without adding unit hours or higher costs to the system.

40. Ralph's Ambulance Service (RAS) runs ten ALS units to handle the 911 calls during peak load periods, and ten BLS units at the same time to handle nonemergency calls. Ralph never "hands off" 911 patients to BLS crews--his contract won't allow it. Both the ALS service and the BLS service are making modest profits, but the mayor wants better response times to 911 calls, and won't even consider a subsidy or rate increase. At present, Ralph is not allowed to run nonemergency calls with his ALS units. Ralph's marginal cost per ALS unit hour is 25 percent higher than his marginal cost per BLS unit hour. Which should Ralph do and why? (Select one):

A. Ask for permission to hand off not-very-serious 911 patients to his BLS crews?

B. Ask permission to go to an all-ALS service using ALS units for both emergency and nonemergency transport?

41. Spending no additional money, how many additional ALS units could Ralph operate using the money he's currently spending on BLS production capacity?

42. All of Podunk's paramedics are currently working 24/48 shifts with permanent post assignments. Podunk's city government is on the rocks financially, ambulance rates are already as high as the politicians will allow, and response times are terrible. You are hired as the new director of Podunk EMS, mainly because of your expertise in aggressive SSM. You announce your intention to implement an aggressive SSP, giving your word that there will be no layoffs, no reductions in take-home pay, no reductions in hourly wages, and that shift assignments will be bid by seniority. But before you can implement your initial SSP, union representatives balk, threaten to strike, and call a press conference. Their main argument against your proposed changes is that no one can predict where the next call will come from, or when it will happen, and that taking units off the street at night (to free up manpower for peak-load coverage) will jeopardize coverage at night. "Surely", they argue, "the time will come when someone will die because of insufficient night-time coverage." What is your response to that argument?

43. Even if the volume and geographic distribution of calls between 7 AM and 8 AM on Mondays is identical to the volume and geographic distribution of calls between 5 PM and 6PM on Mondays, in most cities post assignments should be substantially different. Why?

44. After noticing that police cars rove (patrol) throughout their districts, Fred has decided to do the same with his ambulances. Will his "roving ambulances" make Fred the next SSM guru?
45. What is the best way to develop response zones for use in your SSP?

46. Skillful SSM is the process of striking a reasonable balance among what four basic (and conflicting) concerns?

47. As your SSP becomes increasingly refined, frequencies of post-to-post movement should [increase/decrease]. (Select one.) Why?

48. True or False? Post-to-post movement is "free" to the system and need not be conserved. Explain your answer.

49. True or False? Skilled system status controllers always send the unit nearest the call (i.e., nearest in time—not necessarily distance). Explain your answer.

50. A system-wide average of 1 post-to-post move per each 2 unit hours produced (1 PP/2 UH) is cause for: (Select one.) Why?
   A. Celebration.
   B. Concern.

51. List the 4 most valuable tools commonly employed for reducing frequencies of post-to-post movement. (If you know of a fifth recently-developed tool, list it as well.)

52. If: A company's average out-of-chute time (i.e., the interval between "unit alert" and "unit enroute" is well over one minute on emergency calls; its crews regularly get lost because they are unfamiliar with the area; dispatchers fail to give cross streets or grid coordinates when they dispatch; vehicles often break down enroute due to poor preventive maintenance; dispatchers make no effort to route crews around road construction and traffic jams; the company has failed to develop and sell to the hospitals and nursing homes efficient patient exchange procedures; crews are expected to collect at the scene and get full billing information from the hospital on "John Doe's"; multiple shift changes occur at the same time, and vehicle checkout/restocking is a cumbersome and time consuming process.....if all of these things are true of a company running 20,000 calls per year in a community of average coverage complexity, how many unit hours per week will be needed to achieve an 8 minute response time with 90 percent reliability?

53. True or False? Some EMS systems do not use system status management in any form. Explain your answer.
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SSM PRE-WORKSHOP ANSWERSHEET--1991 REVISION

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1. SSM is the art and science of matching the production capacity of an emergency medical services (EMS) system to the changing patterns of demand placed upon that system. It is the management of system resources before and between calls......the process of preparing for best possible response to the next EMS call. It includes the formal or informal systems, protocols, and procedures which determine the quantity and locations of remaining available ambulances when the next call comes in. More than that, SSM includes an overall fine-tuning of every aspect of operation to produce the best service possible from the resources available. SSM means staffing and deploying for the benefit of our patients, rather than for our own convenience.

2. While a system status plan (SSP) is designed and refined to achieve multiple purposes, the most important purpose of SSM is the goal of producing best possible response time performance and reliability using available (and often limited) resources.

3. Some additional possible objectives of an SSP include:
   
   A. To further refine response time reliability by:
      1. Reducing emergency runs over "x" minutes;
      2. Reducing nonemergency service delays;
      3. Equalizing service among various districts;
      4. Ensuring adequate coverage of low-volume areas.
   
   B. To facilitate additional "marginal-cost" nonemergency production.
   
   C. To reduce callups of on-call crews.
   
   D. To reduce frequency of post/post moves.
   
   E. To improve productivity (i.e., improve the U/UH ratio).
   
   F. To simplify the SSP for easier application.
   
   G. To reduce crew stress by equalizing (or differentiating) call-loads and/or mix of emergency vs. nonemergency runs.
H. To ensure maintenance of clinical skills by managing the allocation of certain types of calls among crews.

I. To preserve the use of 24-hour shifts by shifting work-load to short-shift crews.

J. To set a leadership example. (Control center operations directly reflect management's attitude and competence.)

K. To develop experience base:
   1. For bidding new systems;
   2. To guard existing market.

L. To outperform your mutual-aid neighbor in his own primary area.

M. To fulfill performance requirements of a mutual-aid agreement.

N. To reduce reliance upon mutual-aid providers (and, therefore, to restore revenues previously lost to neighboring providers).

O. To reduce extraordinary overtime costs.

P. To reduce the need for use of mandatory overtime.

Q. To allow use of schedules preferred by field personnel.

R. To minimize damage done by stupid government policies.

4. The combination of U/UH ratio and response time reliability. Anyone can achieve higher U/UH ratios by allowing deterioration of response time reliability. Similarly, anyone can improve response time reliability by allowing the U/UH ratio to fall. What separates the best from the rest in system status management is the ability to simultaneously achieve higher U/UH ratios and improved response time reliability.

5. One "unit hour" is a fully staffed and equipped ambulance either assigned to a run or available for dispatch for one hour.

6. The U/UH ratio is calculated by dividing the number of transports during a given period by the number of unit hours produced during the same period of time. For example, a U/UH ratio of .333 would mean that, on average, on-duty crews transport 1 patient every 3 hours on duty. (A similar measure, but used for a different purpose, is the ratio of calls to unit hours— the C/UH ratio.)

7. The U/UH ratio is one of several measures of how hard and how effectively a system is working. It is the most fundamental measure of manpower productivity in an EMS system. However, for the reasons discussed under answer 4, above, the U/UH ratio should always be evaluated in combination with measures of response time reliability. Low U/UH ratios do not always mean that field personnel have little to do. Because of poor system design or
bad management, some EMS systems manage to simultaneously achieve high-stress workloads and low U/UH ratios.

8. The number of patients transported during a given period of time, and the number of unit hours produced during the same period of time.

9. When judged by "average response time", the unscrupulous (or ignorant) EMS manager can concentrate coverage on easy-to-serve, high-volume areas at the expense of low-volume areas more difficult to serve. This allows the provider to reach the easy-to-cover calls within 2 or 3 minutes, while allowing extended response times of 15 to 20 minutes for the remainder of his calls. For example, a provider reaching 60% of his calls in 3 minutes, and 40% of his calls in 15 minutes can happily report an average response time under 8 minutes while delivering life-threatening performance to nearly half the patients served. Put another way, if a system's average response time is "acceptable," then about 50% of the time response times must be "unacceptable." (The median and the mean are usually fairly close together in EMS response time distributions.)

10. Impossible. To pursue the "lowest possible percentage of runs with response times in excess of "x" minutes, the system must deliberately allow an increase in response times to the easiest-to-serve calls, while improving response times to suburban, rural, and other difficult-to-serve areas. Since most calls occur in high-volume areas, the system's "average response time" will probably increase slightly in order to serve a greater percentage of patients within the "x-minutes" standard.

11. A = time-call-received (at dispatch); B = time-unit-at-scene.

12. The response time clock should start as soon as the system status controller (SSC) obtains the first three pieces of information: call back number, address/location of patient, and nature of emergency. The time necessary to gather this information should be minimal—especially in systems with enhanced 911. Additional conversation related to priority-dispatch telephone protocols and/or to giving pre-arrival instructions takes place after the response time clock has started.

13. The three answers are as follows:

A. The figures needed to calculate Fred's U/UH ratio are:

1. Patient transfers (not including long distance transfers) i.e., \(9,500 + 9,750/19,250 \text{ P.T.'s/yr.; } 19,250/52\text{(wks.)}=370.2/\text{wk.}\)

2. Unit hours available to the SSC (not including LDT or dedicated special-events coverage) i.e., \(1,650 \text{ regular unit hours} + 46\text{ unscheduled O.T. hours} + 0.96\text{ hours of non-dedicated coverage per week} = 1,696.96 \text{ unit hours/wk.}\)
B. The number of calls not transported and the number of post-to-post moves per hour are not included in calculations, as they are part of Fred's "overhead." Long distance transports and dedicated special events coverage are not included because these services are rendered using units in excess of those which are available to the SSC for use in the system.

C. Fred's U/UH ratio is 0.218--i.e., 370.2 (calls/week) ÷ 1,696.96 (unit hours/week).

14. 1.5 U/UH ratios is the maximum for this scenario. This assumes that crews always have another call waiting at the completion of each run. A 1.5 U/UH ratio means crews are averaging 1 1/2 patient transports per on-duty hour.

15. Harder. The potential for a higher U/UH ratio decreases as response time performance improves because, as response time standards increase, additional surplus production capacity is needed to cover peak load fluctuations and more difficult-to-serve, low-volume areas. As the answer to question 14 shows, in the absence of response time requirements, it is possible to achieve very high U/UH ratios. But as response time standards improve, additional unit hours must be added, without corresponding increases in transport volumes. Thus, the ratio of transports to unit hours falls.

16. The answer is, it depends.

17. Some of the information needed to answer the question include: the types of shifts employed (e.g., crews working 8-hour shifts, 40 hours per week, can safely work at much higher U/UH ratios than can 24-hour crews); the types of calls being handled (emergency, nonemergency, or a combination); working conditions and pay; advanced/progressive clinical protocols; whether on-scene collections are required; the reputation of the EMS system in the community it serves. (Note: U/UH ratios of high-performance EMS systems serving urban areas with good response time reliability currently range from .28 to nearly .50.)

18. Harder. With population spread over a large geographic area, more units are needed for geographic coverage and trip times are extended, but the volume of patient transports remains the same as that of an equal population living in a much smaller area. It doesn't matter whether the reduced call volume per square mile is because of low population densities or due to competition from firms. The result is the same: higher production costs due to lower U/UH ratios.

19. Harder. It takes longer to get to the patient, the hospital, and between posts for coverage. The reason can be strictly distance (as in question 18), or poor road systems (e.g., "You can't get there from here."), traffic congestion (often very predictable), road construction, or faulty road construction.
20. There are many answers to this question, but the three best reasons are:

A. A more experienced person would ask how many units would be needed during that city's peak hours vs. off peak hours, or better yet ask many unit-hours per week would be needed.

B. A more experienced person would know that the answer would depend heavily upon the SSM skill of the organization running the system.

C. A more experienced person would qualify his question with some very important information: Will the company that handles the emergency calls be allowed to run nonemergency calls using emergency equipment and personnel? Will the emergency provider have exclusive rights to routine-transport calls, or will cream-skimming be allowed?

21. Some common causes of late runs are:

A. Caller gave bad address;
B. Crew misunderstood dispatch instructions;
C. Control center misunderstood caller;
D. Unit got lost;
E. Equipment failure enroute;
F. Bad out-of-chute time;
G. Communications failure;
   1. Failure in alerting unit
   2. Failure in reporting arrival time
H. Dispatch center overload;
I. Road obstructions;
J. Crew not at assigned/reported location when dispatched;
K. SSP not followed;
L. Traffic congestion;
M. Poor route selection;
N. Weather/road conditions;
O. No unit nearby;
P. No units available.
Q. High percentage of unit-hours produced unavailable for productive use.

22. Three advantages:

A. Compared with shorter shifts, 24-hour shifts usually produce lower labor costs per unit hour;

B. Some employees prefer the 24 hour shift for personal reasons;

C. Even a fool can schedule and staff using 24-hour shifts exclusively.
23. Three disadvantages:

A. Some employees dislike the 24-hour shift for personal reasons.

B. Crews working 24-hour shifts cannot safely function at high U/UH ratios.

C. Using 24-hour shifts exclusively, peak-load staffing is impossible.

24. Because of the movements and changing activities of human beings, both the frequency and location of demand for law enforcement services varies widely by time-of-day and day-of-week. Even at off-peak periods of demand for law enforcement response, sufficient volumes of demand exist (especially in urban and suburban areas) that use of 24-hour shifts is impractical. Thus, most urban police departments, and many suburban and rural departments have historically employed a form of "peak-load" staffing, and have rarely used 24-hour shifts.

In contrast, buildings are stationary and as likely to burn (sometimes even more likely to burn) when people are asleep or buildings are unoccupied. Thus, demand patterns for fire suppression services do not exhibit such wide variations in frequency and location of incidents. That's why 24-hour shifts and relatively static deployment strategies are commonly found in fire departments everywhere.

25. Demand patterns for ambulance services more closely resemble those for law enforcement services, though with somewhat lower overall frequencies of demand.

26. Peak load staffing is the adjustment of shift schedules so that more ambulances are on the street when more calls occur, and fewer ambulances are on the street when fewer calls occur.

27. Either dangerously inadequate coverage during periods of peak demand, or needlessly-expensive, excess coverage during off-peak periods. (Often a combination of both is the case.)

28. The answers are:

A. Adding three additional 24-hour cars would cost Fred $8,433 net/week. That is, three 24-hour units with each unit needing 6 people for a total of 18 people at $500/week = $9,000. Fred could cover those three calls per week that he's been handing off to mutual aid and thus pick up a total of $567/week ($567 is 63% of the $900 in gross billings for the 3 mutual aid calls at $300 each).

B. By converting a 24-hour car into three "day cars", Fred would earn the $567/week from the mutual-aid calls and have no increase in labor or other costs.
C. The net change in unit hours from adding 24-hour crews (solution A) is an addition of 504 unit hours/week. The net change in unit hours in solution B is a reduction of 48 unit hours/week. The crews working 8-hour shifts (40 hours/week) would be making about 60% more in base pay per hour than the crews working 24-hour shifts (56 hours/week).

29. The answers are:

A. NERD's current monthly replacement fund deposit is $23,408.33. This figure is from: 10 units at $50,000 = $500,000; $500,000 + 6%(for year one) = $530,000, + 6%(for year two) = $561,800--i.e., original cost plus inflation; total replacement cost + the 24 month life expectancy equals $23,408.33/mo.

B. If NERD leases 3 more units, for a total of 13 units, each of the 13 units would have a safe, useful life increase of 7.2 months, or 31.2 months average life expectancy. This is calculated as follows: If 10(veh.)/24(mo.) = 13(veh.)"X"(mo.), then 10["X"]=24[13], then 10"X"=312, so "X"=31.2 (mo.)

C. Since NERD's 10 units would each last 31.2 months, the monthly cost of replacement fund deposits would decrease by $4,753.69 to $18,654.64 per month. This is figured by adding the inflation for the 7.2 months (3.6%) to the replacement cost + increases for the original 24 months; $561,800 x 1.036 = $582,024.80. That figure divided by 31.2(mo.) = $18,654.64/mo.

D. The net difference in the monthly amortized cost of the 10 vehicle system vs. the 13 vehicle system is $645.81/month more for the 13 vehicle system. That is the $24,054.64/month ($18,654.64 + $5,400/month in lease payments) for the thirteen vehicle system, minus the ten vehicle cost of $23,408.83.

E. NERD would end up paying an additional $641.81 (net) per month for three more units. Because PM could be better scheduled, and mechanics wouldn't have to come in on overtime just to get a unit back on the street, maintenance costs would go down. Labor costs would go down as crews coming on duty wouldn't be standing around waiting for a unit. Fewer supply and equipment errors would be made as units could be check out and restocked between crew changes. In addition to these savings, more revenue could be generated from calls previously handed off to mutual aid, as well as from an increased ability to handle long distance transfers. All things considered, if NERD doesn't lease the three additional units, its acronym will be appropriate.

30. SSP's nearly always relate to a weekly cycle because, for example, although the demand pattern on one Sunday may be predictably similar to those of other Sundays, Sundays' demand patterns are not like those of Mondays. The same holds generally true for the other days of the week. Some SSP's need to reflect larger or smaller cycles as well. One might expect an increase in demand in
Ft. Lauderdale during spring-break, in New Orleans during Mardi Gras, or in Las Vegas during a series of large conventions.

31. Some answers are:

A. Extended times for pick-up and drop-off of patients;
   1. Slow facility (e.g., no bed available even though crew called ahead);
   2. Slow crew (e.g., inexperienced report writers, attractive ER crew, crew "hiding out" from control center, etc.)

B. Poor shift change procedures;
   1. Bad timing (e.g., too many crews changing at once, changes at peak period);
   2. Insufficient equipment (e.g., new crews waiting for last shift to return to base with vehicle);

C. Poor maintenance, e.g., crews waiting for repairs (or for a tow truck);

D. Slow vehicle change-out, e.g., excessive time to change into a new vehicle, if a vehicle does fail;

E. Crew not actually at assigned/reported location;

F. Excessive no-hauls;

G. SSP not being followed;

H. Use of "specialized" dispatch rules which restrict the use of units to certain types of calls, e.g., "tiered" response.

32. Common SSM controls are:

A. Number of units in plan at any given time;
B. Location of available units at any given status level;
C. Non-emergency/mutual-aid cut-off level;
D. On call crew call-up level;
E. Assignment of post priorities;
F. Equal alternate post locations;
G. Conditional alternate post locations.

33. Late run incident report forms; 168 "problem maps" (for each hour of day, each day of week); 168 "solution maps," and, demand-pattern analysis report. (Of course, the current SSP is also essential.)
34. If Fred is still using all 24-hour shifts, then he can change two 24's into four 12 hour shifts. Two of those shifts can run from 0600-1800, and the other two can run from 1600-0400, putting two extra units on during the problem hours, while taking two unit hours from the off-peak hours. If Fred has variable staffing, his solution is only a matter of using overlapping shifts as necessary to solve his coverage problem.

35. The most likely cause is an increase in patient exchange times. The two reports are: Exchange times by hospital; and, exchange times by senior medic. (If excessive patient exchange times aren't the cause, a recent change in medical protocols, or the need for a change in medical protocols, could be the cause.)

36. The chief should tell Jones: The city will collect 70% of receivables-generated on all BLS runs transported by Jones, which works out to net revenues of $105 per transport. Each transport takes Jones an extra 30 minutes, or 1/2 unit hour. On average, it costs the department $17.50 to replace that lost half hour of coverage, at $35/unit hour (marginal cost). Thus, the "profit" from each BLS transport alone could pay his cost of 3 additional unit hours--more than enough to cover Jones' area while Jones transports his patient. In other words, patient handoffs from paramedic crews to BLS crews just don't make sense medically, legally, or financially.

37. That depends on Fred's long-range plans. Unless Fred needs this contract to build his company's credentials (so he could bid on a larger contract later), Fred should sell his fancy car to pay off the bid security, and bail out as fast as he can. Even if Fred uses his car as part of the recruitment package and succeeds in hiring the world's best SSC, Fred cannot reasonably expect to break even on the contract. Meeting an 8-minute response time with 90% reliability while covering 300,000 people spread over 320 square miles with a U/UH ratio of .46 is an accomplishment that has yet to be achieved by anyone on this planet. On the other hand, nothing's impossible. As Harvey Mackay pointed out in *Swim With The Sharks*, for thousands of years the entire human race believed it impossible to run a mile in four minutes. Then Roger Bannister did it. A year later, 37 others had done it too. A year after that, 300 more had accomplished the impossible. Maybe Fred can deliver 8-minute response times with 90% reliability to 300,000 folks over 320 square miles with a U/UH ratio of .46.

38. Yes. Running a U/UH ratio of .46 and 1 post-to-post move per 2 unit hours will insure that Fred's crews will work at levels of consciousness far below satisfactory long before their shifts are over. The SSC will have to go to variable staffing patterns with shorter shifts at the same effective "salary." Shorter shifts with fewer hours per week at the same effective salary means a higher hourly rate. (The SSC's notion of running 1 post-to-post move per 2 unit hours is, however, highly questionable.)
39. Some solutions are:

A. Fred could change all of his 24's into 12's with everybody still working the same number of hours per week. (However, such extensive use of 12-hour shifts would probably create problems for crews—e.g., family problems, morale problems, irritability, etc.)

B. Fred could transfer a few of his 24-hour crews to shorter-shift assignments, locating the remaining 24-hour units at lower-priority posts at night, and restricting their use to emergency calls only.

C. So long as the system is operating above a defined status level, the 24 hour units could be restricted to use as non-transporting emergency first responders during the late-night hours, with patients transported by short-shift crews. (This practice would, however, be counter-productive during periods of higher demand.)

40. The answers are:

A. No way! Ralph knows it's bad patient care (and legally risky) to hand off patients to crews with less training.

B. Right. Whether Ralph knows it or not, under the current system he is actually covering his city twice, but not very effectively—i.e., once with ALS units and again with BLS units. An all-ALS system (with fewer unit hours) will produce better response time reliability at equal or lower cost.

41. Ralph deploys 10 BLS units during peak-load periods. Ralph's marginal cost per ALS unit hour is 25% higher than his marginal cost per BLS unit hour. For the same money he now spends running 10 ALS and 10 BLS units, Ralph could be operating an 18-unit full-service, all-ALS system with vastly superior dispatch flexibility and peak-load emergency production capacity.

42. It's true we can't predict with absolute certainty where and when every call will occur. But by examining the history of calls and response times by time-of-day and day-of-week, as well as geographically, we can determine where and when our system has been most frequently overloaded. If, for example, we've been overloaded many times during the past year on Tuesday afternoons, but we've almost never been overloaded during the wee hours of Tuesday mornings, most would agree that we could probably serve the public better by shifting a few unit hours from the early morning hours to afternoon peak periods. We can't be certain as to the time and place of future EMS incidents, but we can be certain as to which times and places are more likely to require our response.

43. In most cities, the time between 7 am and 8 am on Mondays is rush hour, with heavy traffic converging on business sectors. The inbound lanes of all interstates and major thoroughfares are congested and sometimes blocked with traffic. Post assignments during this period should enable units to use the relatively-clear, out-bound lanes. However, from 5 pm to 6 pm on Mondays (also a rush hour), traffic is trying to leave the business area, so the roads are
congested in the outward bound lanes. Thus, post assignments for coverage of an identical area must be on the opposite side to facilitate up-stream response. During rush-hour periods, post assignments should always be on the downstream side of the intended coverage area.

44. Because street criminals fear cops, police cars "rove" throughout their districts as a deterrent to crime. Since myocardial infarctions do not fear paramedics, skilled system status managers do not use roving ambulances. "Roving" ambulances can only waste human energy, fuel, and money.

45. Changing patterns of traffic flow and congestion, weather conditions, road construction, and other factors mean that "real" response zones for fixed post locations are constantly changing in size and shape. Furthermore, the "response zones" around vehicles enroute from hospital to post, from post to post, and those around vehicles enroute to lower priority calls, literally move across the map, changing size and shape as they go. Thus, for purposes of planning and managing vehicle deployment and event-driven redeployment, skilled system status managers do not use "response zones" at all. No matter how thoroughly the response zone concept is fine-tuned in practice, it cannot be made to cope effectively with the dynamic realities of the EMS environment.

46. The 4 basic concerns of system status management are:

- Concern for adequate coverage of high-volume areas and periods of peak-load demand;
- Concern for adequate coverage of low-volume areas and off-peak periods;
- Concern for employee health, safety, skills maintenance, and job satisfaction; and,
- Concern for economic efficiency and the system’s financial stability.

47. Decrease. Because an important objective of the SSP refinement process is the systematic discovery and removal of unnecessary post-to-post movement. However, before this objective can be safely pursued, the SSP must first be implemented, followed, and refined until response time standards (overall and within neighborhoods) are being consistently met, preferably exceeded. Only after response times have stabilized can the laborious process of discovering and weeding-out unnecessary post-to-post movement safely begin. Thus, as the SSP becomes increasingly refined, frequencies of post-to-post movement should gradually decline.

48. False. Skilled system status managers know that post-to-post moves are a precious commodity in short supply, and far from "free." Skilled system status managers set maximum target levels of post-to-post movement, then ration their use to stay below the target level.
49. False. The primary objective of the system status controller (SSC) is to maintain optimum emergency coverage at all times. The skilled SSC also tries to minimize unnecessary post-to-post movement. Thus, upon receipt of a routine transfer request, the skilled SSC often does not send the nearest unit. Instead, the skilled SSC selects a unit located at a lower-priority post, or assigns the call to a unit which has just completed delivery of a patient and has not yet been reassigned a post. In that way, higher-priority posts are not needlessly uncovered, and the need for post-to-post movement is often avoided.

50. Concern. At very low frequencies of post-to-post movement (e.g., a systemwide ratio of less than 1 post-to-post move per 4 unit hours produced--i.e., 1PP/4UH), the marginal cost per post-to-post move is nominal--about $7-$12 depending upon a number of factors. However, as the ratio increases, so does the cost per post-to-post move. That is partly because, at higher frequencies of post-to-post movement, shift schedules with higher effective direct labor costs per unit hour must be employed, thus raising overall unit hour costs. In addition, at very high frequencies of post-to-post movement (e.g., approaching or above 1PP/2UH), growing frictions between management and labor inject additional hidden costs into each post-to-post move.

51. Use of the "double-unit post assignment" during peak periods at very high priority posts; effective use of the equal/alternate post priority; lowest-priority post dispatch of routine transfer calls; and, holding routine transfer requests for assignment to units requesting new post assignment (when the "hold" period will not be excessive). [The latest tool for reducing unnecessary post-to-post movement is the "conditional alternate post priority," allowing two-variable, either/or condition statements to qualify the use of an alternate post.]

52. God only knows how many unit hours it would take a company this screwed up to achieve an 8 minute response time with 90% reliability. No SSP designed by mankind could, by itself, overcome this company's problems.

53. False. Stout has defined SSM as follows: System status management refers to the formal or informal systems, protocols, and procedures which determine where the remaining ambulances will be when the next call comes in. Thus, every EMS system, and every EMS provider uses some form of SSM. They may not call it SSM, and the way they manage (or mismanage) their coverage status between calls may be completely ineffective, even stupid and deadly. It may not be smart SSM, but it is still SSM. For that reason, the only real alternative to system status management is system status mismanagement.
Pre-Workshop Reading Packet

Suggested Reading Sequence:

1. "System Financing"
2. "System Status Management"
3. "How Much is Too Much"
4. "(Mis)Understanding System Status Management"
5. "Computer-Aided What?"
6. "The EMS Subsidy/Price Tradeoff"
7. "System Status Management – Another View"
8. "Priority Dispatching Vs. Call Screening"
9. "Was It Good For You?"
10. "Measuring Response Time Performance"


