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# Rural Ambulance Economics

*Adapted from "Needed: A 'Low-volume Adjustment' for Medicare Prospective Payment to Small Rural Providers," by permission of the author, J. Graham Atkinson, D. Phil. For the full paper and a discussion of analytic strategies for introducing a low-volume adjustment, see the Capitol Area Rural Roundtable website: http://rhr.gmu.edu.*

Small rural providers can be substantially affected by fee schedules calibrated for urban norms, due to the way low volume and high fixed costs affect rural operating margins. This is often the case with rural ambulance service.

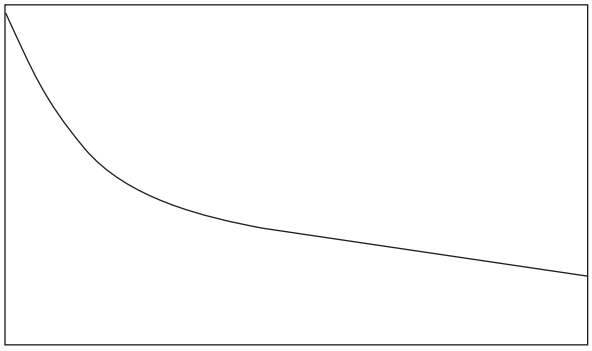
## Low volume affects unit costs

Almost all services have fixed costs associated with them. These are costs that are incurred and are relatively independent of the volume of service provided. For example, some equipment may be required whether one service is performed or one thousand services. Similarly, there are minimum staffing requirements, although these may be mitigated in some instances by sharing staff between services.

The fixed costs result in high costs per unit of service at low volumes. As volume increases, fixed costs are spread over a larger revenue base and unit costs are reduced. Also, as volume increases, the variable costs associated with the services may have a more dominant effect on per unit cost. Figure 1 is a standard picture illustrating this effect that appears in basic economic texts.

**Figure 1:** Cost per unit versus volume

Cost per unit



Volume of service (units)

This is usually an oversimplification of the actual variation of costs with volume, as the costs more often follow a step function, due to the incremental costs associated with providing each service - for example, supplies and utilities. Then when the existing resources reach their full capacity another staff person or piece of equipment has to be acquired, resulting in a sharp increase in the total costs, and an increase in the unit costs.

*(Continued)*

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## Ambulance Service

Ambulance service is a good example of this concept because it has relatively high equipment and staffing costs independent of the volume of service to be provided. If 24-hour availability is required, then an ambulance and staffing teams of two individuals are required for each shift.

Assume that the purchase cost of an ambulance is $100,000 and that it is depreciated over 10 years, for an annual capital cost of $10,000. Assume that the costs of 24-hour staffing are $240,000, and that supplies and gas cost $50 per run. The staffing and capital costs are incurred independent of the number of ambulance runs.

**The cost for 100 runs is:**

| | |
|---|---|
| Depreciation | $ 10,000 |
| Staffing, etc. | $240,000 |
| Supplies and gas | $ 5,000 |
| Total cost | $255,000 |
| **Cost per run** | **$ 2,550** |

**The cost for 1,000 runs is:**

| | |
|---|---|
| Depreciation | $ 10,000 |
| Staffing, etc. | $240,000 |
| Supplies and gas | $ 50,000 |
| Total cost | $300,000 |
| **Cost per run** | **$ 300** |

**The cost for 3,000 runs is:**

| | |
|---|---|
| Depreciation | $ 10,000 |
| Staffing, etc. | $240,000 |
| Supplies and gas | $150,000 |
| Total cost | $400,000 |
| **Cost per run** | **$ 133** |

At some point, the capacity of the single ambulance and team will be reached, then a second ambulance and team would be required. At that point the unit costs would take a jump, and then would decline again as volume increased further.

While this hypothetical example shows the dramatic effect of increasing volume on unit costs for a high fixed cost activity like ambulance service, similar effects are at work in almost all services.

## Emergency Departments and Laboratories:

A rural hospital required by Medicare to maintain and staff an emergency department 24 hours a day, may receive only a few visits per day. Most of the costs associated with operating the emergency department are fixed, so the cost per patient visit is high, and there is little that the hospital can do to reduce these unit costs.

The hospital laboratory must be staffed, even if the volume is not sufficient to occupy a lab technician full time. This can result in a high unit cost. As volume grows so that it cannot be managed by a single technician a second technician will be required, but again there may not be sufficient volume to occupy their time fully. This inevitable under-use of the staff will result in high costs per unit, but again there is little that a rural hospital can do to avoid the costs.