Diagnostic pathways and stage at diagnosis of cancer in military personnel: a retrospective analysis of 172 cases

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Abstract

Objective. To describe the relationship between the route to cancer diagnosis and recorded stage among military personnel.

Materials and methods. The retrospective series included 172 confirmed malignancies diagnosed during service from January 2014 to July 2024. Diagnostic routes were classified as routine examination or incidental detection, symptom-prompted presentation, and emergency presentation. Stage I–II and stage III–IV were compared descriptively. Reported correlations between diagnostic intervals and stage were retained from the source.

Results. Stage III–IV disease accounted for 106/172 cases (61.6%). Early-stage disease was recorded in 29/43 routine or incidental diagnoses (67.4%), 33/103 symptom-prompted diagnoses (32.0%) and 4/26 emergency diagnoses (15.4%). Lung cancer comprised 50 cases, stomach cancer 31 and colorectal cancer 24. Final confirmation occurred in military medical services in 72 cases and civilian services in 100. The reported correlation between symptom-period duration and stage was $\rho = 0.52$ (95% CI 0.39–0.63).

Conclusion. Later stage was more frequent after symptom-prompted and emergency presentation. The case series identifies diagnostic-pathway problems for further audit, but it cannot estimate cancer incidence, screening effectiveness or a mortality benefit.

Keywords: cancer diagnosis; military personnel; diagnostic pathway; stage at diagnosis; emergency presentation; retrospective study

Introduction

The route by which a malignancy reaches definitive diagnosis is a service-level characteristic distinct from tumour biology. A patient may be diagnosed during a routine examination, after symptoms prompt consultation or following an emergency. These pathways can be compared within a case series, provided their definitions remain consistent.

Population-based work on routes to diagnosis has demonstrated how routinely collected records can be organised to describe patient pathways [1]. Other studies show that route distributions depend on population and access to care, while tumour-specific analyses connect routes with treatment and outcomes [2,3]. Such evidence supports careful classification; it does not justify transferring foreign pathway proportions to a military population in Uzbekistan.

The present analysis concerns 172 malignancies confirmed during military service. Its purpose was to describe tumour distribution, stage and the recorded route to diagnosis. The analytical focus is the relationship between first presentation and disease stage, not estimation of occupational cancer risk or evaluation of a national screening programme.

Materials and methods

Design, setting and eligibility

The source describes retrospective review of cases diagnosed from January 2014 to July 2024. Records were assembled from military outpatient and hospital services and from civilian oncology documentation. Malignancy required histological or cytological confirmation during service. Cases diagnosed before service or after discharge, and records without the required information, were excluded according to the source methods.

The denominator is the 172 included cancer cases. A complete time-specific population at risk and person-years of service were not available. For this reason, the figures describe the composition of the case series and cannot be interpreted as incidence rates among serving personnel.

Diagnostic routes and stage classification

The first diagnostic route was grouped into three categories. Routine examination or incidental detection comprised 43 cases; symptom-prompted consultation comprised 103; emergency presentation comprised 26. The route classification concerns how the diagnostic pathway began. It is not identical to the institution where final confirmation was obtained.

For the route comparison, the source grouped stages I–II as earlier stage and stages III–IV as later stage. These are broad categories spanning different cancers. They do not imply identical prognosis across tumour sites, and lymphoma staging should not be described as a TNM category. Original staging systems and their editions require verification in a future record-level audit.

Additional variables

Age groups, tumour site and the level of final diagnostic confirmation were extracted from the aggregate tables. The source also reported diagnostic-interval correlations with stage. Symptom-period duration, the interval from first consultation to diagnosis and total diagnostic delay were kept as separately named variables. Their partly overlapping definitions prevent addition of the reported intervals into a new total.

A subsequent screening pilot in a different calendar period is described elsewhere in the source document. It was excluded from this manuscript because its population, purpose and denominators differ from those of the historical 172-case series. Results from that pilot were not used to claim a stage shift or screening benefit in the retrospective cohort.

Statistical approach

Categorical data are presented as counts and percentages, with explicit route-specific denominators. Percentages in the figures are calculated directly from the reported counts. Spearman coefficients and their confidence intervals are reproduced from the source without a new patient-level model. No adjusted comparison of the three diagnostic routes was available.

The data were supplied as aggregate research results. Record linkage, missing-data assessment, interval definitions and staging could not be independently verified. The manuscript therefore separates descriptive associations from conclusions requiring population denominators, longitudinal outcomes or a controlled screening comparison.

Results

Age and stage composition

Table 1. Age and stage distribution of the 172 recorded cases

Characteristic	Cases, n	Cases, %
Age 18–29 years	12	7.0
Age 30–39 years	41	23.8
Age 40–49 years	73	42.4
Age ≥50 years	46	26.7
Stage I–II	66	38.4
Stage III–IV	106	61.6

Percentages were calculated from the reported counts, n = 172, and rounded to one decimal. Age categories and stage categories form separate distributions; their rows must not be summed together.

The largest age category was 40–49 years. Together, patients aged at least 40 years accounted for 119 of 172 cases (69.2%). The proportion is a characteristic of this series; it does not quantify age-specific cancer risk because the age structure of the serving population is not supplied.

Later-stage disease accounted for approximately three fifths of the cases. This aggregate includes cancers with different natural histories, diagnostic tests and staging conventions. The value is useful for a service audit but is not a common biological severity score.

The original age table contains an open upper category and editorial comments about the maximum service age. The manuscript retains the documented ≥50-year category without inventing an upper age boundary. Individual age ranges should be checked during author review.

Tumour-site distribution

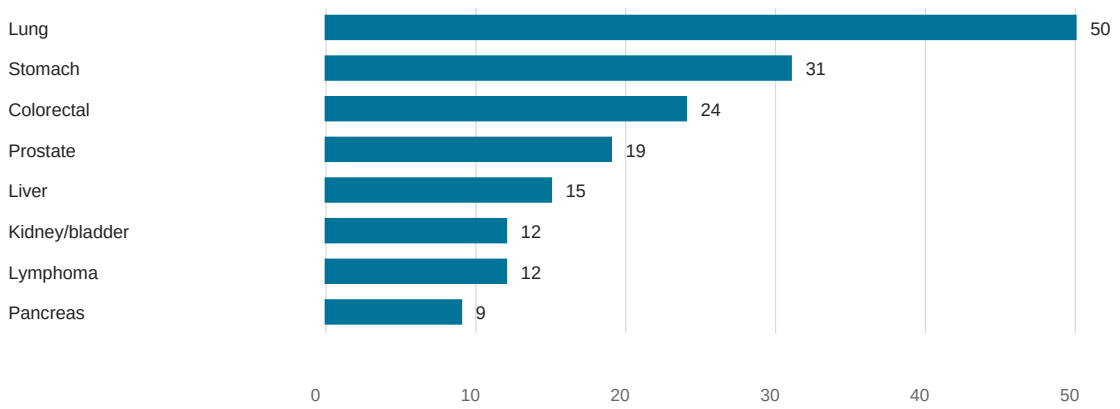


Figure 1. Distribution of tumour sites in the retrospective series.

The eight categories sum to 172. Kidney and bladder cancers remain combined because the supplied table did not separate their counts.

Lung, stomach and colorectal cancer were the most frequent recorded tumour groups. Together they accounted for 105 cases. This concentration helps define which diagnostic pathways need site-specific review, but it does not establish that military service caused their occurrence.

The mixture of tumour sites is also relevant to route interpretation. For example, a diagnosis made during investigation of symptoms may arise from a different clinical process than an incidental finding on imaging. Without a route-by-site table, the extent to which tumour mix accounts for the stage differences cannot be estimated.

Route of presentation and recorded stage

Table 2. Stage distribution within each diagnostic route

Route	Total, n	Stage I–II, n (%)	Stage III–IV, n (%)
Routine / incidental	43	29 (67.4)	14 (32.6)
Symptom-prompted	103	33 (32.0)	70 (68.0)
Emergency	26	4 (15.4)	22 (84.6)
All routes	172	66 (38.4)	106 (61.6)

Percentages are calculated within each route. The table is descriptive; no adjusted causal comparison or screening-effect estimate was available.

The routine or incidental group had the largest proportion of early-stage diagnoses. Later-stage disease predominated in the symptom-prompted and emergency groups. The emergency category contained only 26 cases, so its proportion is particularly sensitive to a small number of observations.

Routine examination and incidental detection were combined in the original classification. The category must not be relabelled as organised screening. An incidental tumour discovered during an unrelated investigation is not necessarily a screen-detected malignancy.

These route-specific differences describe an association at diagnosis. A comparison of survival or mortality would require follow-up time, tumour-site adjustment and attention to lead-time and length biases. None of those analyses can be reconstructed from the present cross-tabulation.

Stage composition across diagnostic routes

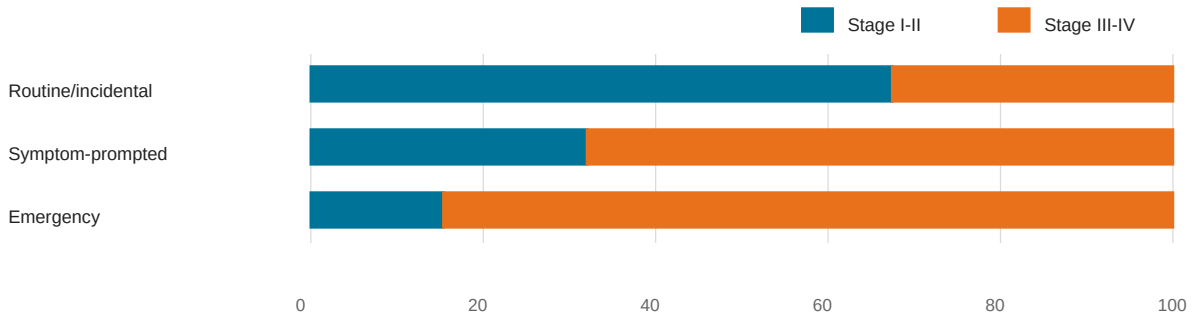


Figure 2. Stage composition within the three routes to diagnosis.

Denominators are 43, 103 and 26. Each bar totals 100%; bar length does not represent the number of cases in that route.

The difference in stage composition is substantial descriptively, but the route groups were not randomly formed. Symptom severity, tumour location and patient or clinician decisions influence which route is recorded. These factors may be related to stage before the pathway category is assigned.

The practical interpretation is therefore a need to examine the sequence of consultation, investigation and referral in individual cases. The data alone cannot identify a single missed opportunity or establish that moving every emergency diagnosis into a routine route would produce the same early-stage proportion.

Diagnostic intervals and level of confirmation

Table 3. Reported correlations between diagnostic intervals and stage

Interval	Spearman ρ	95% CI
Symptom-period duration	0.52	0.39–0.63
First contact to diagnosis	0.33	0.18–0.47
Total diagnostic delay	0.48	0.34–0.60

All reported p values were <0.001. Interval definitions overlap and should not be summed. Correlations were retained from the source, not recalculated.

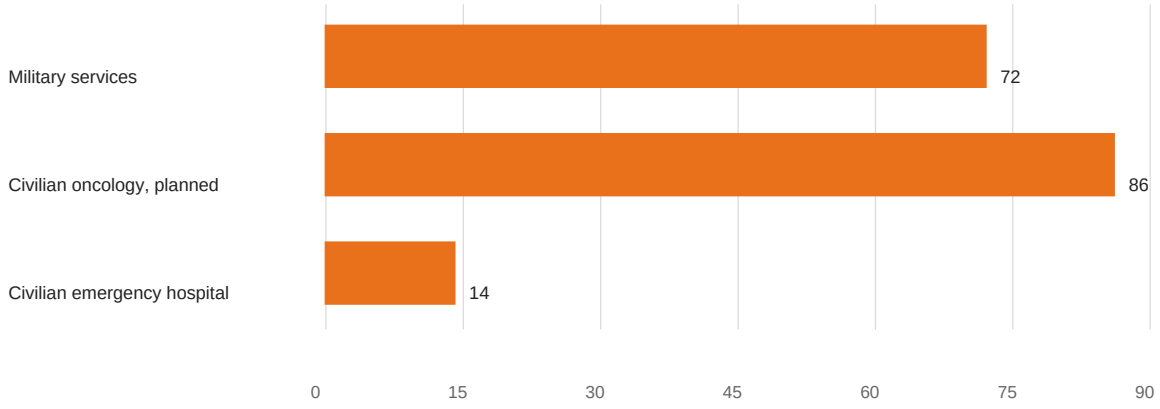


Figure 3. Institution at which final diagnosis was confirmed.

These categories concern final confirmation, not the initial route. Thus, 14 emergency-hospital confirmations and 26 emergency presentations are different classifications.

Discussion

The principal observation is that later-stage disease was more frequent after symptom-prompted or emergency presentation than after routine or incidental detection. This is a descriptive service finding. It should not be restated as proof that screening improved stage distribution, because the source combined routine examination with incidental findings and did not include a screening control population.

Routes-to-diagnosis research provides a method for organising the sequence of contacts across health services [1]. Its usefulness depends on explicit definitions and reliable linkage. In the present series, the first route and the final institution answer different questions. Treating the two as interchangeable would incorrectly alter the emergency denominator.

Population-based research also indicates that route distributions are context-dependent [2]. Tumour-specific studies, including work on hepatocellular carcinoma, have examined route associations with treatment and mortality [3]. Those designs illustrate the additional information needed to move beyond the current stage cross-tabulation. They do not establish mortality effects for this mixed military case series.

The correlation of longer diagnostic intervals with later stage is consistent with an important service concern, but causation remains uncertain. Aggressive tumours can produce severe symptoms quickly, while slow-growing disease may have a longer interval before recognition. A single correlation does not separate delay-related progression from differences in tumour biology or symptom recall.

Limitations

The study is retrospective and case-based. It lacks the population denominator needed for incidence estimates and does not include survival or cancer-specific mortality. Case ascertainment across military and civilian services may be incomplete. Staging conventions, diagnostic technology and referral arrangements could have changed during the decade-long observation period.

Route comparisons were not adjusted for tumour site, age or other case-mix factors. Symptom-onset dates may be imprecise, and interval definitions require reconciliation. The excluded pilot cannot resolve these limitations because it concerned a different population and period. Record-level pathway review is necessary before evaluating specific service changes.

Conclusion

In the 172-case series, stage III–IV cancer predominated overall and was particularly frequent after emergency presentation. Routine or incidental diagnoses had a larger early-stage share. The findings support a structured audit of diagnostic routes and referral intervals, but they do not estimate incidence, screening effectiveness or survival benefit.

Declarations

Data provenance. All case counts and correlation estimates derive from the supplied retrospective research tables. The subsequent screening pilot was excluded. No synthetic records were created.

Ethics and consent. The ethics committee name, the approval number and the approval date, the permission for secondary use of clinical records, the anonymisation procedure and any consent waiver require author confirmation before submission.

Author information, funding and competing interests. The authors' names follow the supplied manuscript and the co-author information supplied for publication. The official English affiliation, corresponding e-mail, author contributions, funding sources and competing interests require confirmation.

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