Use of Health Services

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During the China-US collaborative descriptive study of health services in Shanghai County, data about the use of health services were made available from a number of sources. The largest amount of information came from records and reports summarizing routinely or specially collected statistics representing each level of the health system. A second important source was the special health interview survey carried out in May 1981.[1] These two sources have been supplemented by surveys and observations of barefoot doctors which provide a small amount of less definitive but useful information.

A description of the health care systems of Shanghai County has been presented elsewhere.[2] To assist in interpreting the findings presented in this paper, however, the four major sources of care are briefly summarized as follows:

- Brigade health centers or town neighborhood clinics provide care to residents of their area, and clinics within factories or institutions provide care to workers and government functionaries;
- Commune or town hospitals provide both inpatient and outpatient care to residents of their areas, and to cases referred by health centers or clinics;
- County hospitals provide both inpatient and outpatient care to residents of their areas, and to referred cases or persons whose labor insurance or government fund covers care at the hospital;
- Clinics and hospitals in the city of Shanghai or adjacent counties provide care, generally on referral, but often through labor insurance or government fund coverage or contracts.

The following analysis divides health services use into three categories: ambulatory (outpatient and home) medical care services; inpatient (hospital) services; and preventive services. To achieve optimal levels of use, all three require the initiative of the population as well as the initiative of health service personnel. In Shanghai County, as in most other settings, however, the major initiative for preventive services lies with the health system, while use of medical care services is much more dependent on the initiative of individuals.

Ambulatory Medical Care Services

Ambulatory services throughout Shanghai County are readily accessible to the inhabitants. Table 1 summarizes the use of these services in 1980 by members of different systems of reimbursement. Visits listed include both those for primary care and referrals for specialty care. The latter, however, make up only about 4 per cent of the total 354,700 outpatient visits at the County Central Hospital, the most specialized facility in the county. For persons covered by the cooperative system, care provided outside the brigade should generally be on referral by the barefoot doctor. Most of these are referrals for general care to commune hospital outpatient departments. Since Shanghai City hospitals are readily accessible, complicated cases are usually referred into these services. Such referrals do not appear in this Table. Visits for dental care are included in these data and amounted to an estimated 7 per cent of all outpatient visits.

Most of the data in Table 1 were obtained using 1980 statistics provided by the county. Some estimates were made, however, using first quarter statistics for 1981 and results of a number of small surveys that studied the use of barefoot doctors. The population served by each system was known except for individuals working in commune-run enterprises and family members partially covered by public welfare and labor insurance. The number of commune-run enterprise members could not be determined and they are, therefore, included only in the total population. Using data from the health interview survey, the number of family members was estimated to be about one-third of the number of members with full coverage. Persons not covered by any system or those working in Shanghai City who are reimbursed through a city system provided by their work place are also included in the total population.

The estimated numbers of annual visits per person are relatively similar for the different systems, ranging from 8.5 for persons with labor insurance, to 10.3 for brigade cooperative members. The overall county average for the three major systems is 8.4 visits per person per year. The number of visits to facilities outside Shanghai County was not available, nor was it known what proportion of visits shown in Table 1 were made by nonresidents. However, the County Central Hospital estimates that 15 per cent of its use is by residents of its immediate area, which includes some city neighborhoods; and the household survey of two towns and two counties located near the city showed that 12 per cent of outpatient visits were made to city health services. Therefore, these two factors may tend to balance each other out.

The estimated number of annual visits per person is higher than the United States average of about five doctor visits per person per year,[3] or seven visits per year found in a suburban county near Washington, DC.[4]

A large number of minor visits to barefoot doctors or to clinics in the work place are not included in the above data. Many of these involve visits for injections, dressing changes, treatment of small injuries, or minor aches and pains which are not recorded or reported in overall statistics. Data from ten county or lower level factories yielded an overall county estimate of 20 such visits per year per worker. Data from municipally run factories located in the county indicated an annual average of 31 visits per worker. A number of the workers in these factories reside in the city, however. Similar data are not available for the general welfare system

TABLE 1—Estimated Ambulatory Medical Care Visits to Shanghai County Health Facilities According to Source of Reimbursement, 1980*

Health Facility	Source of Reimbursement				
	Public Welfare	Labor** Insurance	Cooperative System	Other***	Total
County Central Hosptial	42,800	209,600	43,700	58,600	354,700
Xin-Zhuang Hospital	40,400	84,000	15,600	7,200	147,200
TB Hospital	—	—	—	17,700	17,700
Mental Hospital	—	—	—	1,600	1,600
Commune Hospital (18)	74,100	395,300	766,000	16,800	1,252,200
Town Hospital (2)	400	165,700	—	—	166,100
Brigade Health Centers (238)	—	—	2,800,000	—	2,800,000
TOTAL	157,700	854,600	3,625,300	101,900	4,739,500
Population Covered****	16,000	100,500	351,000	—	565,000
Annual Visits per Person	9.9	8.5	10.3	—	8.4

*Primarily 1980 data supplemented by estimates using data from the first quarter of 1981.
**Includes commune level factory collective health plans. Visits to factory clinics are not included.
***Visits under other sources of reimbursement include those involving direct government payment, payment by individuals not belonging to any system, and physical examinations covered by the government or work place.
****The public welfare and labor insurance populations include partially covered family members who make up about 25 per cent of these groups according to the Health Interview Survey. The total population includes members of commune enterprises and institutions having collective systems not accounted for in the other columns, individuals not covered by any system, and individuals who work in municipal institutions, enterprises, and factories in the city and receive reimbursement through their place of work.

whose members may make use of clinics in their institutions. Finally, interviews and observations of barefoot doctors revealed that they see at least 10 minor cases for each 30 recorded visits in the brigade health centers or in homes. Using this estimate, an additional one million visits to barefoot doctors may be made per year, which if added to the 3,625,300 reported visits would yield 13.2 visits per person covered per year.

The sample household health interview survey carried out in two communes and two towns provides some additional insights into the use of ambulatory care services. Since it is from a limited area of the county and data were

TABLE 2—Use of Ambulatory Medical Care Services for Illness by the Health Interview Survey Population According to System of Reimbursement, May 1981

System of Reimbursement	Total Persons (N)	2-Week Prevalence of Illness (%)	Ill Persons Using Services (%)	Visits per User of Services (Visits)	Estimated Annual Visits per Capita (Visits)	Visits per 100 Days of Acute Disability (Visits)
Public Welfare—Full Coverage	492	21.8	76.6	1.3	7.5 (7.5)	60.3
Public Welfare—Partial Coverage	115	15.7	33.3	2.5	3.4 (4.9)	36.7
Labor Insurance—Full Coverage	930	16.6	84.4	1.6	5.7 (5.8)	40.2
Labor Insurance—Partial Coverage	234	5.6	61.5	1.9	1.7 (1.7)	37.3
Cooperative System—High Cost Brigades	645	11.2	86.1	2.0	4.9 (3.5)	80.0
Cooperative System—Low Cost Brigades	670	12.1	71.6	1.5	3.3 (3.9)	47.0
None	36	11.1	—	—	— (4.2)	—
TOTAL	3122	14.4	77.1	1.7	4.9	50.6

NOTE: Rates in parentheses are *expected* visits based on age and sex specific illness rates in each system, to which have been applied overall *average* age and sex specific consultation rates as determined in the household survey.

TABLE 3—Use of Different Sources of Ambulatory Medical Care Services for Illness by the Health Interview Survey Population According to System of Reimbursement, May 1981

System of Reimbursement	Total Visits	Per Cent of Total Visits					
		Barefoot Doctor	Institution or Factory Clinic	Commune or Town Hospital	County Hospital	City Hospital	Other
Public Welfare—Full Coverage	141	2.1	39.7	8.5	19.9	20.6	9.2
Public Welfare—Partial Coverage	15	—	20.0	—	46.7	—	33.3
Labor Insurance—Full Coverage	204	2.9	21.6	48.5	12.3	11.8	2.9
Labor Insurance—Partial Coverage	15	20.0	—	53.3	13.3	13.3	—
Cooperative System—High Cost Brigades	122	46.7	—	27.0	2.5	19.7	4.1
Cooperative System—Low Cost Brigades	86	51.2	1.1	34.9	3.5	3.5	5.8
None	—	—	—	—	—	—	—
TOTAL	583	19.4	17.8	31.2	11.7	14.1	5.8

collected during a two-week period in May 1981, it is difficult to compare its results directly with the overall county data, but it does provide interesting contrasts. Table 2 shows that the overall prevalence of reported illness in the survey population during a two-week period was a little over 14 per cent and that 77 per cent of persons with illness used some type of ambulatory services. More illnesses (as well as days of disability) occurred among persons covered by public welfare and labor insurance than among peasants under the cooperative system, with the exception of individuals receiving partial coverage under labor insurance, who reported few illnesses. The majority of these latter individuals were school children, who uniformly had fewer illnesses than the rest of the population. (The distribution of illness by age and sex in the different reimbursement systems has been reported elsewhere.[1])

As shown in Table 2, the use of services by ill persons followed a somewhat different pattern, with the three highest rates occurring among the fully covered individuals and the "high" cost cooperative system (77–86 per cent using services) in contrast to partially covered individuals and the "low" cost cooperative system (33–72 per cent). Only a small number of individuals were not covered by any system (1.2 per cent of the population); they did not use any services during the two weeks even though a few of them were ill. The number of visits to health services by the individuals who sought care averaged 1.7 visits per user during the two weeks (range 1.3 to 2.5). Assuming the total number of visits during the two weeks reflects the average rate of use throughout the year, multiplying this number by 26 and dividing by the survey population yields an estimated annual per capita number of visits. Members of the "high" cost cooperative system and the fully covered labor and welfare members used services substantially more often (4.9 to 7.5 visits per year) than the "low" cost cooperative members or partially covered individuals (1.7 to 3.4 visits per year). In order to show the effects of differences in age, sex, and prevalence of illness between reimbursement systems, expected visits were calculated taking these factors into account, using the overall average rate of visits for each age and sex group as determined in the household survey. In this case, only the "high" cost cooperative system members were found to exceed their expected number of visits, while partially covered public welfare and "low" cost cooperative

TABLE 4—Use of Hospitals in Shanghai County, 1980*

Hospital	Beds	Admissions	Per Cent Occupancy Rate	Average Length of Stay (Days)	Admissions per 100 Outpatient Visits
County Central	335	5,634	81.6	17.7	1.6
Xin-Zhuang	140	2,864	77.3	13.8	1.9
TB	100	450	57.5	46.6	2.5
Mental	70	130	70.6	138.8	8.1
Commune (16)	589	15,654	49.5	6.8	1.3
TOTAL	1,234	24,732	63.1	11.5	1.4

*Primarily 1980 data supplemented by estimates using data from the first quarter of 1981.

TABLE 5—Estimated Admissions to Hospitals in Shanghai County According to Source of Reimbursement, 1980*

Hospital	Source of Reimbursement				
	Public Welfare	Labor** Insurance	Cooperative System	Other***	Total
County Central	282	676	3,211	1,465	5,634
Xin-Zhuang	270	270	2,324	—	2,864
TB	—	—	—	450	450
Mental	—	—	—	130	130
Commune (16)	470	2,660	12,524	—	15,654
TOTAL	1,022	3,606	18,059	2,045	24,732
Population Covered****	16,000	100,500	351,000	—	565,000
Annual Admissions per 1000 Population	63.9	35.9	51.5	—	43.8

*Primarily 1980 data supplemented by estimates using data from the first quarter of 1981.
**Includes commune level factory collective health plans.
***Admissions under other sources of reimbursement include those involving direct government payment and payment by individuals not belonging to any system.
****The public welfare and labor insurance populations include partially covered family members who make up about 25 per cent of these groups according to the Health Interview Survey. The total population includes members of commune enterprises and institutions having collective systems not accounted for in the other columns, individuals not covered by any system, and individuals who work in municipal institutions, enterprises, and factories in the city and receive reimbursement through their place of work.

members and individuals with no reimbursement system were shown to use less services than expected. These estimated rates are considerably lower than those shown in Table 1, possibly indicating that the survey was carried out during a period of low use of services.

One could speculate whether the variation in rates of use represents over-utilization and under-utilization of services or true differences in the health of the population groups studied. The last column in Table 2 is an attempt to provide a partial assessment of the relative need for services. Assuming that disability (being confined to bed or having to restrict one's normal activities) is a measure of severity of illness and, therefore, also a measure of the need for health care, the number of visits per 100 days of disability can be used as a relative measure of the extent to which this need is satisfied. This index in the surveyed population ranged from a low of 37 visits per 100 disability days for partially covered welfare and labor insurance members to 80 for members of the "high" cost cooperative system. In contrast, in 1974, low income persons in the US had an index of 20, and high income persons had an index of 39.[5] If the US data are accepted as a reasonable comparison, the need for services is certainly being met in Shanghai County, and there is evidence of possible over-utilization in some groups.*

Table 3 shows the source of care for visits by different reimbursement groups in the survey population. Barefoot doctors were the single most important source of care in the cooperative systems, but 50 to 60 per cent of care in these systems was from other sources, in contrast to the overall county figure of 23 per cent of visits to non-barefoot doctor sources by cooperative system members (see Table 1). Obviously, the pattern of use of different levels of care must be quite different in these two communes than in other communes in the county. The majority of non-barefoot doctor visits was to commune hospitals, but the "high" cost system—being closer to the city, and wealthier—had 20 per cent of its visits to city services in contrast to only 4 per cent for the "low" cost system. Both the welfare and labor insurance members used factory or institution clinics, but the former used county and city sources much more since the sample for this group came almost entirely from an area adjacent to the County Central Hospital and the city. Over 50 per cent of the labor insurance sample was drawn from a town served by a commune hospital, therefore, its use of this facility was much higher than any of the other groups. An interesting comparison can be made between the labor insurance members in this town and the members of the "low" cost cooperative system (the former are in the middle of the latter group's commune). Both have about the same distance to travel to the county hospital and city services. However, the labor insurance members' proportionate use of these two sources of care is over three times that of the "low" cost cooperative members who have to individually bear some or all of the cost at the county or city level.

In many areas of the world, seasonal variations of use have been noted relative to disease prevalence patterns and periods of intense demands for labor in agricultural communities. Exact data are not available at the brigade level, but interviews of barefoot doctors indicated that August and September are months of intense use of services, while April and May are often the months of lowest use. This pattern is somewhat different from that at the commune hospital or county hospital level. The monthly number of visits to a commune hospital outpatient department from January 1980 through May 1981 was studied. The peak use was in July and September but, unlike the brigades, low use months were

*The overall Shanghai County index of 51 visits per 100 days of disability essentially remains unchanged (52) when visits and disability rates are adjusted to a 1978 sample US population.[3]

TABLE 6—1980 Hospital Admission Information from the Health Interview Survey Compared with Total County Admissions

Source of Reimbursement	Total Persons	Persons Admitted	Total Admissions	Total Hospital Days	Average Length of Stay	Admissions per 1000	Hospital Days per Capita
Public Welfare—Full Coverage	492	19	27	849	31	55 (50)	1.7
Public Welfare—Partial Coverage	115	1	1	7	7	9 (22)	0.1
Labor Insurance—Full Coverage	930	41	49	1,160	24	53 (47)	1.2
Labor Insurance—Partial Coverage	234	6	6	45	8	26 (29)	0.2
Cooperative System—High Cost Brigades	645	28	28	346	12	43 (41)	0.5
Cooperative System—Low Cost Brigades	670	23	25	307	12	37 (41)	0.5
None	36	1	1	10	10	28 (37)	0.3
Total Survey	3,122	119	137	2,724	20	44	0.9
Total County*	565,000	NA	24,152	245,692	10	43	0.4

*Excludes admissions to the TB and Mental Hospitals

Note: Admission rates in parentheses are calculated *expected* rates based on the age and sex distribution of the reimbursement systems and average admission rates by age and sex.

January and February with about 60 per cent of the number of visits in the peak months. This pattern is also seen at the county level but with less overall variation. One possible explanation for the differences between the seasonal pattern of brigade services and commune and county services may be that the latter mostly reflect seasonal variation in illnesses while agricultural demands exert more of an effect on the use of barefoot doctors at the brigade level.

Inpatient Services

The number of hospital admissions in Shanghai County amounted to only 1.4 per cent of the total number of outpatient visits (Table 4). However, as is documented in another paper in this series,[6] hospital inpatient services make up about one-third of medical care costs in the county. The 20 hospitals in the county with inpatient facilities provided almost 25,000 admissions during 1980 and averaged over 60 per cent occupancy, with an overall length of stay of 11.5 days (the length of stay is about 10 days if the TB and mental hospitals are excluded). The county level hospitals had higher occupancy rates and longer lengths of stay than commune hospitals, reflecting the difference in the severity of illness in patients admitted and the difference in their service areas. The regional nature of the county hospitals also is borne out by the higher admission rates per 100 outpatient visits than those of commune hospitals.

As with outpatient services, use of inpatient services varied depending on the system of reimbursement (Table 5). The amount of use by members of different systems was determined in a manner similar to that used to estimate outpatient visits by system. The admission rates per year per 1,000 population were 36 for labor insurance members (full and partial coverage), 52 for cooperative members, and 64 for public welfare members (full and partial coverage), with a county average of 44. Overall county rates for the TB and mental hospitals were 0.8 and 0.2 per 1,000 respectively. Public welfare members made proportionately greater use of county hospitals with admission rates to these facilities two to three times that of other residents. The admission rate for labor insurance members based on hospital statistics is very similar to the rate of 37 per 1,000 workers estimated from records maintained by 14 factories sampled in a special study.

Individuals interviewed in the household survey of two communes and towns were asked to recall all hospitalizations they had in 1980. As shown in Table 6, the overall rate of admission of 44 per 1,000 is almost identical to that determined from hospital admission statistics of 43 (excluding the TB and mental hospitals). A balancing out in the overall county statistics of referral admissions to city hospitals and county admissions of nonresidents may explain the comparability of the two sources of data, since the survey findings included admissions to city hospitals. In the survey data, marked differences were noted between partially and fully covered members of the welfare and labor insurance systems, and some differences were found between the two cooperative systems. When "expected" visits were calculated, based on age and sex differences in the different systems, some of the variation in admission rates was accounted for, but there still persisted greater use than expected among the fully reimbursed members of labor and government systems and "high" cost cooperative members and less use than expected among all other groups.

The average length of hospital stay in the surveyed population was almost twice that of the overall county figure (20 days instead of 10). Cooperative members stayed about 12 days per admission compared with 24 days for fully covered labor insurance members, and 31 days for fully covered welfare members. Partially covered members of the latter two groups averaged only about one week per admis-

TABLE 7—Use of Maternal and Child Health Services in Shanghai County, 1980

Type of Service	Number	Per Cent
Antenatal Services		
Births in county facilities	4,035	100.0
No antenatal care	134	3.3
Care started in 3rd or 4th month	812	20.1
Care started in 5th or 6th month	1,808	44.8
Care started in 7th, 8th, or 9th month	1,281	31.8
Number of visits	25,100	—
Deliveries		
Total births to county women	8,305	100.0
Births in hospitals outside county	4,270	51.4
Births in county hospitals	3,927	47.3
Births attended by barefoot doctors	108	1.3
Well-Baby Visits		
Number of visits (Two communes)	3,675	

sion. Days in the hospital per year per person (last column in Table 6) were 0.5 for cooperative members, 1.2 for fully covered labor insurance members, and 1.7 for fully covered public welfare members. The overall surveyed population had a higher average number of hospital days per person compared with the total county figure. This is due, in part, to the fact that there are proportionately fewer cooperative members in the survey than are found in the total county population and, in part, to the inclusion of more serious stays in city hospitals in the survey population whereas such admissions were excluded from the county statistics.

Comparisons with US data show that Shanghai County residents are hospitalized much less frequently (4.4 per cent or 4.0 per cent when standardized to the 1978 US population) than the US average of around 14 per cent of the population per year.[3] However, the US population, similar to the Shanghai County survey population, averaged about one day per year in a hospital. Thus, Shanghai County residents use outpatient services more frequently than the US population but are admitted to hospital less frequently. However, once in the hospital, Shanghi County residents stay longer than US patients. These differences may be due to differences in treatment practices, types of admissions, or the efficiency of the two systems.

Preventive Services

Accounting for the use of preventive services is a more complex task than measuring the use of medical care. There are many types of services, some of which do not involve individual contacts. The services frequently take place in the field where recording of each contact is more difficult. In spite of these problems, there is an extensive amount of data available in Shanghai County about immunization coverage, family planning use, screening programs for various diseases, etc. In this paper, the use of certain maternal and child health (MCH) services are presented to illustrate some of the other measures of use of preventive services by the population of Shanghai County.

Table 7 summarizes the information on MCH services. About half of all births to Shanghai County residents occur in city facilities; the remainder take place in commune or county hospitals except for about 1 per cent delivered by barefoot doctors. Only 3 per cent of women delivering in the county in 1980 received no antenatal care, while 65 per cent started antenatal care before the seventh month of their pregnancy. These women received a total of about 25,000 antenatal visits, about 6.2 visits per woman. If a woman starts care in the third month of her pregnancy, she should have 13 antenatal visits according to the currently prescribed schedule of visits in the county.

Well-baby clinics have been established in 14 communes and one town. There are two well-baby clinics at the county hospital level and two at the brigade level. In total, these 19 clinics potentially serve 81 per cent of preschool children. In areas with clinics, various schedules of visits have been established. In two communes with well-baby services, data available for 1980 show that 3,675 well-baby visits were made. Assuming five routine well-baby clinic visits in the first year of life, and two visits in the second year, an ideal number of well-baby visits can be calculated for the population covered. Since essentially all visits were for children up to the age of two years, an estimate of the per cent of expected visits actually achieved could be made. Using the birth rate in these communes, the ideal number of visits is 4,250 for children in their first year and 1,700 for those in their second year. The actual visits were 62 per cent of the ideal. Although not shown in the Table, all levels of school are well covered by health services. One example of such coverage is the daily visits by barefoot doctors to each creche or kindergarten in their brigades.

During the health interview survey, the use of selected preventive health services during a two-week period was determined.[1] For all preventive services studied, the frequency of contacts indicated a very high level of outreach into the community by the preventive services in the sample areas.

Summary and Conclusions

The coverage and volume of ambulatory care services, inpatient care, and preventive services in Shanghai County appear very adequate, in some cases exceeding the levels of a developed country such as the US. There are substantial variations in use, depending on the degree to which medical care is reimbursed. The impact of such differences would be an appropriate topic for further investigations.

The health information system of Shanghai County is constantly improving. A recently instituted (January 1981) health statistics reporting mechanism involving all commune and county hospitals will provide a wealth of data. Similar reporting from the brigade, lane, factory clinic, or collective level is not currently available, although pilot record systems are being tried out. Simplified reporting systems involving barefoot doctors and workers in these clinics, either on a routine or sample basis, may be warranted. Separation of reported health service utilization information by system of

reimbursement would provide a useful basis for monitoring these systems. Some of the use of services outside the county could also be accounted for by maintaining more detailed records of the visits and admissions to city facilities which are reimbursed by each system. At present, except for reportable infectious diseases and selected reasons for admissions to hospitals, information on the types of illnesses for which people seek care is not routinely collected. Analysis of data from two brigades[7] and the household survey,[1] reported separately, provides some information for the first time in this area.

Collection of all these data on a routine basis would require considerable effort. The household survey has demonstrated its usefulness for obtaining much of this same information and might be an attractive alternative if carried out periodically. Surveys, as the experience in the pilot effort in Shanghai County has shown very clearly, also require extensive well planned efforts. A combination of routine statistics and selected sample surveys is probably the ideal solution which should evolve. It is hoped the current experiences with the present data systems, the pilot household survey, and the analysis and examination of the information collected through the collaborative efforts of the County Health Bureau and the School of Public Health will be important steps in this developmental process.

REFERENCES

1. Parker RL, Gong YL, Shan LG, Huang DY, Hinman AR: The sample household health interview survey. Am J Public Health (supplement) 1982; 72:65–70.
2. Xe XF, Huang DY, Hinman AR, Parker RL: Introduction to Shanghai County. Am J Public Health (supplement) 1982; 72:13–18.
3. Givens JD: Current estimates from the health interview survey: United States-1978. DHEW Pub. No. (PHS) 80-1551. Washington, DC: Govt Printing Office, 1979.
4. Montgomery County Department of Health Systems Planning: Survey results: Takoma Park-East Silver Spring household health needs survey. Montgomery County (Maryland) Government, June 1980.
5. Andersen R: Health status indices and access to medical care. Am J Public Health 1978; 68:458–463.
6. Hinman AR, Parker RL: Costs of Care. Am J Public Health (supplement) 1982; 72:83–88.
7. Cai JW, Li YG: Analysis of illness records for members of two production brigades. Am J Public Health (supplement) 1982; 72:62–64.