

SPECIES IN DANGER

RHINOCEROS HORN AND TIGER BONE IN CHINA:

AN INVESTIGATION OF TRADE SINCE
THE 1993 BAN

J. A. MILLS
A TRAFFIC NETWORK REPORT

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Front cover photograph: Gateway to market
in Wengong, a small town in Jiangxi
Province, China.

Photo credit: Anon.

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Edited by

J.A. Mills



A musk and Tiger-bone plaster of the type seen during market surveys in China in 1995



CONTENTS

Acknowledgements	v
Executive summary	vi
Background	1
Population and conservation status of wild rhinoceros and Tiger populations	1
China's use of rhinoceros horn and Tiger bone in medicine	1
Related conservation action	3
Introduction	4
Section 1: market surveys	5
Methods	5
<i>Literature review of pre-ban market surveys for rhinoceros horn and Tiger bone</i>	5
<i>Retail market surveys, from 1994 to 1996</i>	5
Results	10
<i>Literature review of pre-ban market surveys for rhinoceros horn and Tiger bone</i>	10
<i>Availability of raw rhinoceros horn and rhinoceros horn powder in businesses, from 1994 to 1996</i>	11
<i>Availability of raw rhinoceros horn and rhinoceros horn powder in medicine markets, from 1994 to 1996</i>	13
<i>Prices and quantities of rhinoceros horn and rhinoceros horn powder, from 1994 to 1996</i>	13
<i>Availability of raw Tiger bone in businesses, from 1994 to 1996</i>	16
<i>Availability of raw Tiger bone in medicine markets in 1994 and 1995</i>	16
<i>Availability of Tiger-bone wine and Tiger-bone plaster in businesses, from 1994 to 1996</i>	16
<i>Availability of Tiger-bone wine and Tiger-bone plaster in medicine markets in 1994 and 1995</i>	19
<i>Availability of manufactured Chinese medicines, other than Tiger-bone wine and plaster, claiming to contain Tiger bone and/or rhinoceros horn, from 1994 to 1996</i>	20
<i>Availability of manufactured Chinese medicines possibly containing Tiger bone and/or rhinoceros horn, from 1994 to 1996</i>	25
Discussion	30
Section 2: survey of pharmaceutical manufacturers	33
Methods	33
<i>1991 survey</i>	33
<i>1995 survey</i>	33
Results	33
<i>1991 survey</i>	33
<i>1995 survey</i>	34
<i>Pharmaceutical companies offering alternatives to Tiger-bone medicines</i>	35
Discussion	37
Section 3: survey of awareness of, and attitudes to, the ban	
and of Government attempts to publicize and enforce the ban	38
Methods	38
Results	38
<i>Official notification of, and media reporting of, the ban</i>	38
<i>Awareness of the ban</i>	39
<i>Attitudes towards the ban</i>	39
<i>Reports of enforcement of the ban</i>	41

Discussion	42
Conclusions	43
Recommendations	44
Enforcement and regulation	44
Public awareness	45
Substitutes	45
International co-operation	46
Notes	46
References	47
Appendix 1	49

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EXECUTIVE SUMMARY

In May 1993, in response to international conservation concern about the threat to rhinoceroses and Tigers posed by commercial trade, the State Council of the People's Republic of China issued a ban on trade in rhinoceros horn, Tiger bone and their medicinal derivatives. This ban included the removal of these items from the official pharmacopeia of China, and the cessation of all manufacture and commercial trade within China.

To ascertain the effectiveness of this ban, TRAFFIC conducted surveys of China's retail market in 1994, 1995 and 1996, as well as a mail survey of pharmaceutical manufacturers in 1995. While in China, TRAFFIC investigators gathered anecdotal information about the Government's means of implementing the ban and the level of awareness of the ban in China's traditional Chinese medicine (TCM) community.

This report presents the findings of these four post-ban investigations, all of which were carried out by Chinese-speaking investigators of Chinese descent. Trends are examined to the extent possible, though very little pre-ban market information is available for making plausible "before and after" comparisons.

In the three post-ban surveys of the retail market in China, investigators researched availability of three categories of prohibited items: 1) raw rhinoceros horn and rhinoceros horn powder; 2) commercially-packaged Tiger-bone wines and plasters; and, 3) other manufactured traditional Chinese medicines containing rhinoceros horn and/or Tiger bone.

In 1994, rhinoceros horn or horn powder was seen in 7.6% of the 170 businesses (shops, and hospital and clinic pharmacies) in which horn was requested and with 6.5% of the approximately 154 medicine-market vendors surveyed that year. Commercially packaged Tiger-bone wines or plasters were seen in 8.7% of the 208 businesses in which they were requested in 1994 and with 3.9% of approximately 154 medicine-market vendors surveyed. Other types of manufactured Chinese medicines claiming to contain rhinoceros horn and/or Tiger bone were seen in 10.8% of the total of 442 businesses visited in 1994.

In 1995, the availability of such prohibited items remained low. There was an increase from 1994 in the percentage of cases where rhinoceros horn or horn powder was seen (to 8.5% of businesses where horn was requested and 12% of medicine market stalls visited), but an apparent decrease in availability of commercially packaged Tiger-bone wine and plasters (seen in 7.2% of businesses where requested and at 2.6% of medicine-market stalls visited). However, investigators noted several formulas similar to Tiger-bone plasters and wines on the market in 1995, which may have contained Tiger-bone, although not declaring so. Manufactured Chinese medicines, other than wines and plasters, labelled as containing rhinoceros horn and/or Tiger bone were seen in 10.7% of the total of 355 businesses visited in 1995.

In 1996, there was again an apparent increase in the percentage of businesses where rhinoceros horn or rhinoceros horn powder was seen (to 12.5% of those where horn was requested), but the level of availability decreased at medicine markets, (where horn or powder were seen with 10.6% of medicine-market vendors). There was an apparent further decrease in availability of Tiger-bone wines and plasters in businesses (seen in 2.9% of businesses where requested; wines and plasters were not surveyed for at medicine markets in 1996) and there was little change recorded in the level of other manufactured Chinese medicines purporting to contain rhinoceros horn and/or Tiger bone (seen in 13.6% of the total of 280 businesses in 1996).

When interpreting all these findings it is important to note that variations over time may be attributable merely to chance, as retail outlets were not selected in a manner that would provide statistically correct comparisons over the three years, 1994-1996.

TRAFFIC's 1995 mail survey of pharmaceutical manufacturers in China duplicated methods used in a 1991 survey conducted by World Wide Fund for Nature (WWF) Hong Kong and TRAFFIC Japan. Where the focus of the 1991 mail survey was on use of derivatives of several endangered species, the 1995 survey focused solely on use of Tiger bone. In 1995, 207 companies were contacted, 32 of which replied, four (13%) of which offered to sell medicines containing Tiger bone. Two of these four expressed willingness to manufacture new medicines containing Tiger bone.

Reports, both official and anecdotal, supported by the fact that raw rhinoceros horn and rhinoceros horn and Tiger-bone products were never present in more than 13.6% of outlets, of any category, surveyed in any one year, indicate that the Government of China made substantial effort to implement the ban of May 1993. While TRAFFIC investigators did not use quantitative scientific methods to measure awareness of the ban, they noted that more than half of the TCM sellers contacted in 1994 were aware of the ban. In other years also, about half of all sellers asked for a prohibited medicine or ingredient expressed awareness of the ban. Despite Government efforts to communicate the ban, however, some vendors in every year were willing to sell medicines which they realized were banned. Several of these merchants claimed that they were simply trying to rid themselves of old stock, although a few claimed to have new stock available.

Taken together, the results of these surveys could indicate that China has been highly successful in implementing the domestic ban on trade in rhinoceros horn, Tiger bone and their medicinal derivatives. Lack of pre-ban surveys of the trade prevent this or any other conclusions about availability before *versus* after the ban. What is more important, and of immediate conservation concern, is the fact that even a low level of availability exists in the world's most populous country - a country that depends, at least in part, on TCM to provide health care to 1.3 billion people. If poaching stands behind the source of rhinoceros horn and Tiger bone in China, the world's remaining rhinoceros and Tiger populations could not supply even a small residual demand in that country for long. Therefore, the report concludes that, as a matter of urgency, the Government of China must act to stop residual trade in the medicinal derivatives of rhinoceroses and Tigers, and investigations must be launched to ascertain the origin of those products that remain available on both the retail and wholesale market in China.

BACKGROUND

Population and conservation status of wild rhinoceros and Tiger populations

There are five extant species of rhinoceros. Approximate population estimates for species in the wild are: 7500 White Rhinoceroses *Ceratotherium simum*; 2500 Black Rhinoceroses *Diceros bicornis* (Emslie, 1996); 2000 Greater One-horned Rhinoceroses *Rhinoceros unicornis*; 70 Javan Rhinoceroses *Rhinoceros sondaicus*; and 300 Sumatran Rhinoceroses *Dicerorhinus sumatrensis* (Foose and van Strien, 1997).

Poaching to supply illegal trade of rhinoceros horn for traditional Chinese medicine (TCM) and for the manufacture of dagger handles in the Middle East has been a major factor in the decline of rhinoceros numbers (Leader-Williams, 1992; Milliken *et al.* 1993; Menon, 1996; Anon, 1993b).

Three of eight Tiger subspecies were extinct by the 1980s, and numbers of some of the remaining five are declining at an alarming rate (Nowell and Jackson, 1996). It is estimated that a maximum of 7700 Tigers remained in the wild in 1996, including the following calculations of wild populations by subspecies: 4500 Bengal Tigers *Panthera tigris tigris*; 150-200 Siberian Tigers *P.t. altaica*; 30-50 South China Tigers *P.t. amoyensis*; 600 Sumatran Tigers *P.t. sumatrae*; and 1050-1750 Indo-chinese Tigers *P.t. corbetti* (Nowell and Jackson, 1996).

Like rhinoceroses, Tiger populations are being reduced partly as a result of poaching, in the case of Tigers, to supply illegal trade in Tiger bone for TCM and Tiger skins for ornamental use (Nowell and Jackson, 1996; Mills and Jackson, 1994; Anon., 1995; Plowden and Bowles, 1997).

All rhinoceros species and the Tiger are listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and are therefore banned from international commercial trade, as are their parts and derivatives. In addition, items labelled as being a part or derivative of a species included in the CITES appendices are treated as such, according to a decision taken at the fifth meeting of the Conference of the Parties to CITES, in Buenos Aires, Argentina, now enshrined in *Resolution Conf. 9.6* (Anon., 1996). Moreover, rhinoceroses and Tigers are protected under the national legislation of most range states.

In spite of protective measures in force at the time, poaching of both Asian and African rhinoceroses continued virtually unabated through the 1980s (Milliken *et al.* 1993, Anon., 1993a), and most populations were critically depleted by the beginning of the 1990s (Kemf and Jackson, 1994a). At the same time, poaching of Tigers was increasing, and Tiger population surveys had resulted in alarmingly low estimates (Jackson, 1993).

China's use of rhinoceros horn and Tiger bone in medicine

TCM and western medicine are practised side by side and complement one another in China's national health care system. Western medicine primarily uses commercially produced drugs, which may be made from synthetic materials (referred to elsewhere in this report as "western medicines"). In TCM, however, illnesses are treated with medicines made from raw plant and animal materials and minerals, combined according to time-honoured prescriptions and prepared by trained pharmacists. Traditional Chinese medicines may also be manufactured on a commercial basis and marketed in the form of bottled liquids, plasters, pills, ointments, and powders. Such medicines are referred to in this report as "manufactured Chinese medicines".

Rhinoceros horn and Tiger bone have been part of the pharmacopeia of TCM for centuries (Bensky and Gamble, 1993). Until the ban, the use of such medicines was part of China's official pharmacopeia.

Rhinoceros horn - *xi jiao* in Mandarin Chinese (Reid, 1993) and *cornu rhinocerotis* in TCM terminology (Zhang, 1990a) - is used for "removing heat from the blood, inducing haemostasis, clearing away heart-fire to achieve tranquilization of the mind, removing toxic substances and relieving feverish rashes or eruptions" (Zhang, 1990a). It is most prized, and said by some to be unmatched, in curing life-threatening fever. TCM recognizes two forms of rhinoceros horn: "Siam horn" from Asian rhinoceroses and "Guangdong horn" from African rhinoceroses (Zhang, 1990a).

Tiger bone - *hu gu* in Mandarin Chinese and *os tigris* in TCM terminology (Zhang, 1990b) - is used for "expelling wind," "relieving pain," and "strengthening the muscles and bones" and to treat "flaccidity of muscles and bones and weakness of lower limbs due to deficiency of the liver and kidney" (Zhang, 1990b). It continues to be touted for its effectiveness in treating rheumatism and broken bones when applied topically (placed on or rubbed into the skin).

Martin (1990) estimated that China was using 600 to 700kg of rhinoceros horn annually in the late 1980s. Leader-Williams (1992) showed that China imported an average of more than 2000kg of rhinoceros horn per year from 1982 to 1986 and, in 1988, a registration of rhinoceros horn stocks in Chinese medicine corporations, conducted by the Ministry of Forestry, recorded total holdings of 9874kg. This amount did not include holdings in retail shops, museums and under private ownership (Leader-Williams, 1992).

CITES data from 1990 to 1992 show that China exported more than 27 million units (bottles, boxes, cartons, bags, capsules, etc.) of Tiger derivatives to 26 countries and territories (Mulliken and Haywood, 1994). Indeed, China was reportedly the exporter of the largest quantities of medicinal products containing, or purporting to contain, extracts from Tigers in the world from 1990 to 1992, despite having only a remnant native wild Tiger population. Export of these products was permitted by China's CITES authorities on the grounds that they were derived from stocks acquired before CITES came into force in the country (April 1981).

In the context of the preceding paragraph, it should be noted that tests for the presence of Tiger bone, or rhinoceros horn, in manufactured medicines can only be carried out by complicated laboratory analysis. That their inclusion in such medicines is open to question is of concern, especially when it relates to China, the country with the largest population in the world and the only country in which TCM is fully integrated into the national health care system. Conservationists believe that demand for rhinoceros horn and Tiger bone for use in medicines in East Asia, especially in China, has already contributed significantly to the decline of these species in the wild. While they acknowledge that habitat destruction and over-hunting for sport and pest control in the past have brought rhinoceros species and the Tiger to the brink of extinction, many believe that medicinal demand was - and may still be - the factor that could bring about the end of each in the wild (Nowell and Jackson, 1996; Foose and van Strien, 1997).

Box 1

Manufactured Chinese medicines tested for the presence of rhinoceros horn and Tiger bone

Fratkin (1986) writes that "it is not possible for most of the products [labelled as containing rhinoceros horn] to contain this rare and expensive item. Similarly, products which list Tiger bone on the label probably lack that item". Recent tests on some factory-produced Chinese medicines claiming to contain Tiger-bone and/or rhinoceros horn have found that they appeared not to contain these ingredients. Using the isoelectric focusing method developed by Carracedo *et al.* (1987), analyses were conducted by Dr E. Espinoza and associates at the US Fish and Wildlife Service's National Fish and Wildlife Forensic Laboratory (NFWFL) on three samples of the manufactured Chinese medicine commonly known as "rhino horn tea balls". Researchers could not detect keratin proteins consistent with known rhinoceros horn samples in any of the "tea balls" (Espinoza *et al.*, undated).

Additionally, NFWFL used fourier transform infra-red spectroscopy to analyse seven different brands of Tiger-bone plaster (produced by Hubei Huangshi Changzhen Pharmaceutical Factory). None of the plasters contained detectable amounts of any type of bone - hydroxyapatite (Espinoza *et al.*, undated). These results do not necessarily mean that rhinoceros horn or Tiger bone were not used in the manufacture of these medicines. Horn or bone could have been present in quantities too low to detect by the above forensic techniques, or may have been altered during the manufacturing process through heating to high temperature or chemical extraction, which may render them undetectable. The fact remains, that without extensive testing or investigative research, it is not possible to know whether or not manufactured medicines purporting to contain Tiger bone and/or rhinoceros horn actually contain these ingredients.

Related conservation action

Recognizing the trade elements in the continued insecure status of rhinoceros species and the Tiger in the wild, in 1993 various actions were taken, including:

- the action of the Standing Committee of CITES, in March 1993, which directed its chairman to send letters to the Governments of China, the Republic of Korea and Yemen, and to the authorities issuing CITES-equivalent documents in Taipei, informing them of the concerns over continuing commerce in rhinoceros horn. The Standing Committee also expressed deep concern over poaching and smuggling of Tigers and their parts to sustain markets for traditional medicines and called for Parties to the Convention, and consumers, whether Parties or non-Parties, to take measures to halt the illegal trade in Tigers and Tiger parts and derivatives (Anon., 1993b).
- the "certification" by the US Government, in May 1993, of Taiwan and China under the Pelly Amendment to the *Fishermen's Protective Act of 1967* for "engaging in trade that diminishes the effectiveness of CITES" (Anon., 1993c). According to the Pelly Amendment, the US Secretary of Commerce is required to make a formal "certification" to the US President when it is determined that actions of citizens of another country undermine the effectiveness of an international mechanism to protect endangered species, such as CITES, even if such actions do not actually violate international or domestic law. Following certification of a country under the Pelly Amendment, prohibitions on imports of products from that country may be imposed until the situation is corrected.

Following these actions, China's State Council issued the *Notice Promulgated by the State Council on the Prohibition of Trade in Rhinoceros Horn and Tiger Bone* on 29 May 1993 (hereafter in this report referred to as "the ban"), which prohibited domestic trade in rhinoceros horn and Tiger bone as well as reiterating the CITES ban on international commercial trade.

The Notice stated that:

- The import and export of rhinoceros horn, Tiger bone and their derivatives were "strictly prohibited."
- Any item marked as containing rhinoceros horn or Tiger bone would be treated as containing the same.
- Selling, purchasing or transporting rhinoceros horn or Tiger bone was forbidden, and all stocks of these items were to be registered, sealed and "properly kept".
- The pharmaceutical criteria for using rhinoceros horn and Tiger bone in manufactured medicines were cancelled immediately.
- Sale of existing manufactured medicines containing rhinoceros horn and Tiger bone was to be prohibited from 30 November 1993, after a six-month period of grace.
- The State encouraged research on substitutes for rhinoceros horn and Tiger bone as medicine and "active publicity" for any "research achievements" in finding efficacious substitutes.

An English translation of the full text of the Notice forms Appendix I of this report.

While the initiatives expressed in the text of the ban were comprehensive, actual implementation of these would require widespread enforcement and public awareness activities, a formidable task in a country as large as China.

INTRODUCTION

Common sense and sociological research show that changes in laws do not necessarily lead immediately, if ever, to a total change in human practice - especially if such practice is perceived as being supportive of human welfare. Indeed, law enforcement action has shown that the trade in medicines made from rhinoceros horn and Tiger bone continues, whether motivated by profit or devotion to ancient health care remedies, despite an almost worldwide ban of commercial international trade.

As the level of post-ban availability of rhinoceros horn and Tiger bone can be regarded as a fairly straightforward measure of the effectiveness of implementation of the ban, TRAFFIC decided to survey domestic markets and manufacturers in China in each of the three years following 1993, to attempt to assess its impact. In the first section of this report, the investigations of the market, which took place from 1994-1996, are detailed. In the second section, the description and results of mail surveys of availability of medicines containing Tiger bone, in particular, from China's pharmaceutical companies in 1991 and 1995 are presented. Both the market and mail surveys revealed some indication of levels of awareness of, and compliance with, and levels of enforcement of, the ban and these are recorded in the third section of the report.

Recommendations focus on suggested actions on the part of China's Government and the international conservation community to reduce illegal trade in rhinoceros horn, Tiger bone and their medicinal derivatives in China, for although the levels of trade documented are low, they are still significant enough to be of note and possibly of conservation significance, because of the size of China's market and the dedication of its people to the use of TCM.

It should be noted that TRAFFIC is aware that illegal trade in rhinoceros horn, Tiger bone and their medicinal derivatives is not a problem unique to China. However, information available from law enforcement cases worldwide indicate that the majority of manufactured medicinal products containing these raw ingredients, which are seized, appear to have been produced in China. It is hoped that this report will lead to further investigative studies that examine this problem in its global context.

SECTION 1: MARKET SURVEYS

Methods

Literature review of pre-ban market surveys for rhinoceros horn and Tiger bone

Published literature and various unpublished reports were consulted for information on pre-ban availability of rhinoceros horn, Tiger bone and their medicinal derivatives in China.

Retail market surveys, from 1994 to 1996

Retail surveys were conducted in 1994, 1995, and 1996.

The same two investigators conducted the 1994 and 1995 surveys, using the same survey protocol in each year to ensure consistency in data collection. The investigators were of Chinese descent and spoke fluent Mandarin Chinese. Mandarin language was used in all cities but two, where the investigators used the local dialect (to instill trust and ensure accurate information). In 1996, one of the two investigators who had conducted surveys in 1994 and 1995 carried out investigations, using the same survey protocol as used in previous years. It is important to note that no non-Chinese were involved in carrying out surveys in any year, in an effort to minimize bias on the part of respondents and misunderstandings owing to language difficulties.

Cities selected for survey were chosen either because of their size and/or importance (e.g. Beijing and Shanghai); because they have large medicine markets and were visited previously by Martin (1989) (e.g. Chengdu and Xi'an); because of their proximity to other important centres and their good transport links (e.g. Tianjin and Chongqing); or because of their location along trade routes (e.g. Kunming and Xiamen) (see Figure 1).

Survey methods for businesses

For the purposes of this report, the word "business" encompasses all shops (from pharmacies to department stores) and all dispensaries within hospitals and clinics.

Businesses within the cities selected were located by consulting telephone directories or by street searches of business sections of the city. The total number of businesses visited in each city, each year, is shown in Table 1. It should be noted at this point, however, that not all businesses were surveyed for every raw ingredient/type of medicine in any year, as will be shown.

Having located a business, investigators posed as customers and followed one of the methodologies described below, as appropriate, in each case.

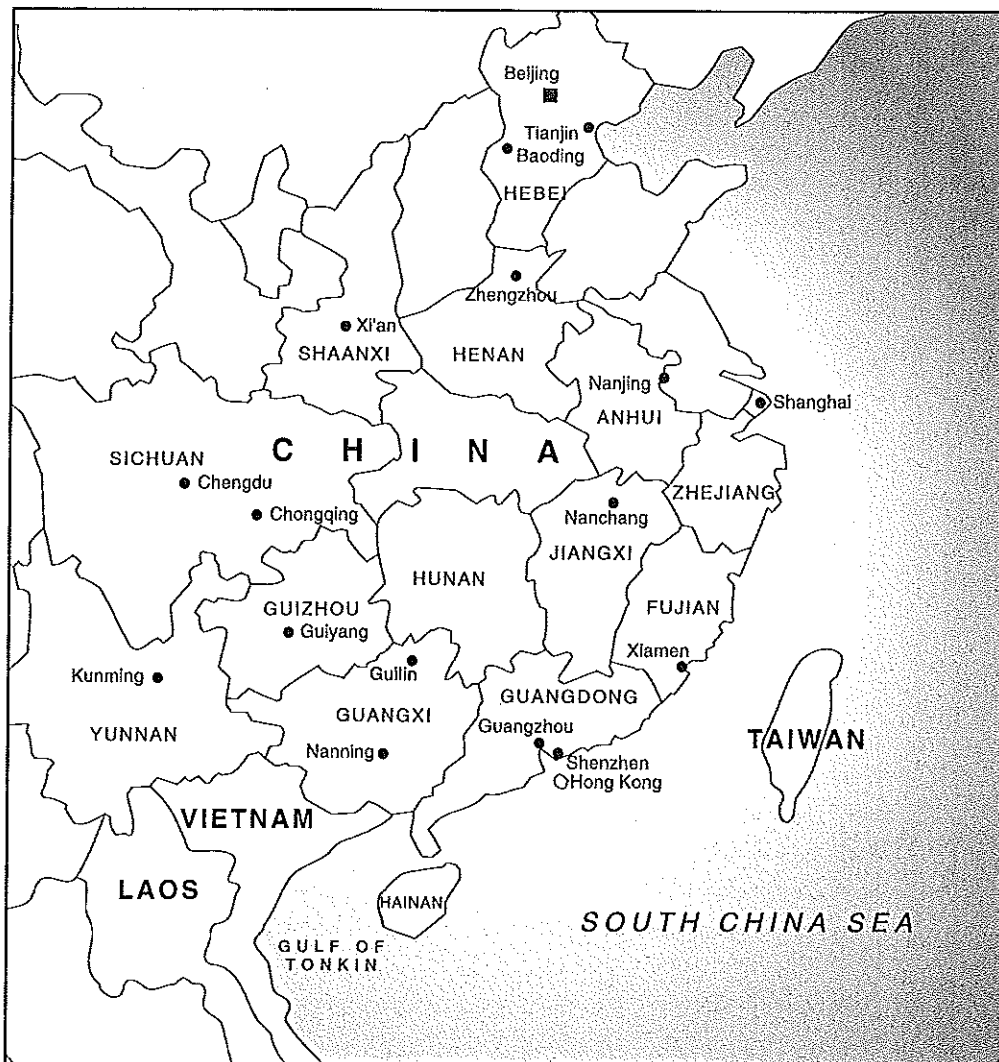
1. If the outlet was, or had, a TCM dispensary -

Investigators usually (if conditions seemed opportune) enquired about the availability of raw rhinoceros horn and/or noted the availability of rhinoceros horn powder. This was done in one of three ways:

- (i) by asking the attendant if he/she could fill a prescription, presenting a piece of paper with the handwritten words "rhinoceros horn, 6 gms" in Chinese script. Customers at a TCM

Figure 1

Map to show cities in China visited during market surveys



Note: The cities of Beijing and Tianjin are in their own separate provinces.

pharmacy would normally have a prescription from a TCM practitioner. This means of requesting rhinoceros horn was not used during research for this report, owing to the complications which may have ensued from asking a TCM practitioner to break the law - the writing of prescriptions calling for rhinoceros horn is an offence in China. Therefore, this less formal alternative approach was used.

- (ii) by asking the attendant if the establishment stocked raw rhinoceros horn; or,
- (iii) by asking directly for rhinoceros horn.

If the response to any of these questions was positive, investigators asked to see the horn, and its price. If an attendant claimed to have horn, but did not produce any, investigators noted the stated reason for this. If responses to questions (i), (ii) and (iii) above were negative, investigators persisted by explaining, for example, that a TCM doctor had prescribed a medicine containing rhinoceros horn for a critical medical condition. If responses remained negative, investigators recorded that raw rhinoceros horn was not available. It should be noted that the survey method for raw rhinoceros horn is likely to have been unsuccessful in instances where a pharmacy would only fill a genuine prescription from a local TCM doctor, would deal only with familiar persons or those with a referral, or suspected the investigators' motives.

Whether or not raw rhinoceros horn was available, the display or offer of rhinoceros horn powder, supposedly made of pure ground rhinoceros horn, was noted. In addition, displayed stock was visually scanned for the presence of Tiger bone, rhinoceros horn, or any medicines containing them.

2. If the outlet had no TCM dispensary -

Investigators asked directly for Tiger-bone wine or Tiger-bone plaster, in the majority of cases. If these items were available, investigators asked to see the products and their price. If the items were not available, investigators usually asked a follow-up question, such as where the items might be obtained, or occasionally asked for another type of manufactured Chinese medicine known usually to include Tiger bone or rhinoceros horn, but otherwise restricted their survey to a visual inspection for these ingredients or medicines containing them.

Thus, when surveying businesses, raw rhinoceros horn or Tiger-bone wine and/or plaster were usually the only types of medicine requested, the exceptions being requests for raw Tiger bone in five pharmacies, in 1994 only, and occasional requests for other types of manufactured Chinese medicines. Investigators did not otherwise request raw Tiger bone because information (e.g. Nowell, 1993 and sources within the TCM community) suggests that customers rarely purchase raw Tiger bone in China at the retail level.

In order to prepare for conducting visual surveys for the presence of manufactured Chinese medicines containing rhinoceros horn or Tiger bone in businesses visited, investigators had identified a number of TCM formulas which include these ingredients, prior to beginning fieldwork. Where such medicines were seen during surveys, investigators scanned ingredients lists on or in packets (most manufactured Chinese medicines have a list of purported ingredients printed on the outside of packaging, or on a piece of paper within), and noted the brand name of the medicine, the manufacturer and its price, if possible.

Relative to the methodology described above, it should be noted that whether or not rhinoceros horn and/or Tiger bone were actually contained in any medicines found claiming to contain them was not ascertained during research for this report (see Box 1).

Table 1

Total number of businesses surveyed, 1994-1996

City	No. of businesses		
	1994	1995	1996
Baoding	3	—	—
Beijing	53	42	49
Chengdu	53	49	53
Chongqing	39	—	—
Guangzhou	—	44	—
Guilin	25	—	—
Guiyang	—	53	—
Kunming	56	—	—
Nanchang	20	26	33
Nanjing	27	—	—
Nanning	—	29	—
Shanghai	33	—	25
Shenzen	—	10	—
Tianjin	42	32	35
Xiamen	33	—	—
Xi'an	48	44	50
Zhengzhou	10	26	35
Total	442	355	280
Total no. cities	13	10	7

Note: Cities surveyed in all three years appear in bold type.

Source: Investigators' research.

Survey methods for medicine markets

A list of the cities where medicine markets were visited, and approximate total number of vendors visited at each market, each year, is given in Table 2. Six of the markets were chosen for survey by virtue of their importance within China, namely:

- Anguo Medicine Market, Anguo, Hebei Province (the largest medicine market in northern China)
- Heluazhi Medicine Market, in Chengdu, Sichuan Province (the largest medicine market in southwestern China)
- Qingping Medicine Market, Guangzhou, Guangdong Province
- Xi'an Herbal Medicine Market, Xi'an, Shaanxi Province (Xi'an #1 in text and tables)

- Xi'an Wanshoulu Chinese Medicine Wholesale Market (Xi'an #2 in text and tables)
- Zhangshu Medicine Market, Zhangshu, Jiangxi Province (the largest medicine market in south-central China)

The other six medicine markets were selected for survey as they are located in cities where surveys of businesses were being conducted and were therefore easy for investigators to visit.

In all three years of surveys, investigators posed as customers at medicine markets. Raw rhinoceros horn was sometimes requested directly, but otherwise simply noted if on display, as was rhinoceros horn powder. The numbers of vendors and medicine markets surveyed for rhinoceros horn and horn powder in given years equate to the totals in Table 2, *i.e.*, these products were surveyed for at every market visited each year. Raw Tiger bone was requested on occasion in 1994, while in 1995 it was looked for, but not specifically requested. The numbers of vendors and medicine markets surveyed for raw Tiger bone equate to those shown in the columns for 1994 and 1995, only, in Table 2, as raw Tiger bone was not surveyed for at medicine markets in 1996. Commercially packaged Tiger-bone plasters and wines were noted if on display in 1994 and 1995, but no data for this category of medicines were collected in 1996. Therefore, as with raw Tiger bone, the numbers of vendors and medicine markets surveyed for these products are shown in the columns for 1994 and 1995, only, in Table 2. Manufactured Chinese medicines other than wines and plasters were not surveyed for at medicine markets in any year.

Table 2

Medicine markets visited and number of vendors surveyed at each, 1994-1996

City where market located	1994	1995	1996
Anguo	±12	—	—
Chongqing #1	±25	—	—
Chongqing #2	±10	—	—
Guiyang	—	±20	—
Chengdu	±20	±30	±25
Kunming	±20	—	—
Nanchang	5	C	C
Guangzhou	—	±30	—
Xi'an #1	±20	±20	±15
Xi'an #2	±20	±15	18
Zhangshu	22	—	—
Zhengzhou	*	2	8
Totals	±154 vendors 9 markets	±117 vendors 6 markets	±66 vendors 4 markets

* closed for Spring Festival; C closed since 1994

Note: Markets surveyed in all three years appear in bold type.

Source: Investigators' research.

Box 2**China's retail market for TCM**

Shops selling medicines in China range from small, traditional establishments (mainly dispensing traditional Chinese medicines made up from raw ingredients and selling manufactured Chinese medicines) to large, western-oriented businesses (selling mainly manufactured Chinese medicines and western medicines), to department stores and gift shops in hotels, airports and other tourist centres. Department stores and gift shops usually stock manufactured Chinese medicines, western medicines, and/or raw herbs, such as ginseng *Panax* spp. packaged in elaborate boxes.

Hospital and clinic pharmacies also sell medicines and may dispense anything from traditional Chinese medicines made up on the premises, commercially packaged herbs, manufactured Chinese medicines, to western medicines - depending upon the medical emphasis of the establishment.

In addition, China has a number of **medicine markets** where raw materials for TCM formulas as well as manufactured Chinese medicines are sold. Medicine markets vary in size, appearance, and emphasis. Some specialize in raw plant and animal materials used in TCM, which are sold in bulk. Others have both raw materials and one or more stalls where manufactured Chinese medicines are sold. Still others deal mainly in manufactured Chinese medicines. Large medicine markets usually serve a regional clientele (e.g. an entire province or several provinces), whereas smaller markets serve primarily a local clientele (e.g., the city in which the market is located).

Some medicine markets are open-air with sheet-metal roofing and concrete floors. These are usually "free markets" where vendors assemble in rows on specified market days to sell raw materials in bulk from large burlap sacks. Other markets consist of one or more long, narrow concrete buildings subdivided into small stalls or booths. Each stall is often rented by the same vendor on repeated occasions, who sells raw materials and/or manufactured Chinese medicines. A third type of market found in China is completely contained within a building and consists of a series of stalls and/or counters, where manufactured Chinese medicines are sold.

Results***Literature review of pre-ban market surveys for rhinoceros horn and Tiger bone***

According to the literature consulted, rhinoceros horn, rhinoceros horn powder and Tiger bone were readily available in some locations in some principal Chinese cities prior to the ban, as described below.

Esmond Martin visited China in 1985 and 1987 to assess trade in rhinoceros horn. Rhinoceros horn was found for sale in approximately half the shops visited in Xi'an and in 17% of the medicine shops visited in Guangzhou in 1985 (Martin, 1989). None was found in Guilin, Kunming, Beijing, Nanjing, Wuxi, Suzhou, Shanghai or Hangzhou that year, but whether Martin specifically requested horn in shops is not recorded. In 1987, Martin again found rhinoceros horn for sale in Guangzhou - but mentions only one two-and-a-half-kilogramme horn - and also 16 pieces of African rhinoceros horn on open display at the Free Market Trading Centre in Chengdu. After specifically requesting rhinoceros horn at the market in Chengdu, he was taken to a private location where he was shown three small pieces of African horn, for sale at a price equivalent to USD2989/kg (USD = US dollars). The horn on display at the market in Chengdu was for sale at a price equal to USD2581/kg (Martin, 1989).

In November-December 1992, researchers visiting 25 businesses in six major Chinese cities (Johnson *et al.*, 1993) saw the following on display:

- raw rhinoceros horn in one location in Wuhan (*i.e.*, in 4% of businesses visited);
- rhinoceros horn powder in three locations in two cities (*i.e.*, in 13% of businesses visited);
- raw Tiger bone in four locations in three cities (*i.e.*, in 17.4% of businesses visited);
- Tiger-bone wine in seven locations in five cities (*i.e.*, in 30.4% of businesses visited).

Just before the ban, TRAFFIC investigators conducted "spot checks" for rhinoceros horn on sale in Guangzhou and Shanghai. In Guangzhou, investigators requested rhinoceros horn in eight pharmacies. Items said to be rhinoceros horn were shown to investigators in four of these, but investigators were of the opinion that the horn was fake (Loh and Loh, 1994). Three vendors in the Guangzhou wholesale market displayed authentic African rhinoceros horn (two whole horns and one bag of pieces), priced between CNY12 000-15 000/kg (average price CNY13 333 (USD1333)/kg) (CNY = Chinese yuan)¹. No whole rhinoceros horns or pieces of horn were seen in nine pharmacies visited in Shanghai, but five were selling a substance said to be powdered rhinoceros horn (Loh and Loh, 1994).

An official price list from Anguo Medicine Market, dated 2 April 1993, includes prices for Tiger bone, rhinoceros horn and Leopard *Panthera pardus* bone. A type of rhinoceros horn named *Yunjiao* was priced at CNY130 000/kg (USD14 942/kg) and a type described as *Guangjiao* at CNY11 000/kg (USD1264/kg) for whole horn and CNY9000/kg (USD1034/kg) for pieces.

No information on pre-ban retail availability of manufactured Chinese medicines containing rhinoceros horn and/or Tiger bone was found, with the exception of the Tiger-bone wine noted in 1992 (Johnson *et al.*, 1993).

All that can be concluded from the pre-ban literature consulted is that rhinoceros horn, Tiger bone, and some of their medicinal derivatives were available in China prior to the ban. Unfortunately, no information was found documenting how widespread availability may have been.

Availability of raw rhinoceros horn and rhinoceros horn powder in businesses, from 1994 to 1996

This section presents data for businesses found to have or be TCM dispensaries, in which investigators specifically requested rhinoceros horn. Consequently, results pertain to only some of the total number of businesses visited each year.

1994

In 1994, TRAFFIC investigators requested raw rhinoceros horn in 170 businesses, in 13 cities (Table 3). Staff in seven (4.1%) of the businesses claimed to have, and were seen to have, rhinoceros horn. Staff in six (3.5%) of the businesses, all in Nanchang, claimed to have, and were seen to have rhinoceros horn powder. The powder was offered as an alternative to unground horn. In total, therefore, raw rhinoceros horn or rhinoceros horn powder was seen in 13 (7.6%) of 170 businesses in 1994 (see Table 3).

Two types of rhinoceros horn were encountered during the 1994 survey - called "regular", or *Yunjiao*, and *Guangjiao* by merchants. *Guangjiao* means "Guangzhou form" although this does not necessarily imply that the horn was imported through Guangzhou. On the basis of price (see *Prices and quantities* below) and Zhang (1990b), investigators believe that *Yunjiao* is "Siam horn" from Asian rhinoceroses, while *Guangjiao* is "Guangdong horn" from African rhinoceroses, as *Yunjiao* horn was generally more expensive than *Guangjiao* horn, as is Asian horn relative to African (Nowell *et al.*, 1992).

The rhinoceros horn powder seen was labelled with the brand name *Xijiaofen* and produced by a local pharmaceutical factory.

1995

In 1995, TRAFFIC investigators requested raw rhinoceros horn in nine cities, in 118 businesses (Table 3). Staff in eight (6.8%) of the businesses claimed to have raw rhinoceros horn, but investigators actually saw

Table 3

Availability of raw rhinoceros horn and rhinoceros horn powder in businesses surveyed for these, 1994-1996

City	Number					
	surveyed for horn	claiming to have horn	where horn seen	claiming to have powder	where powder seen	where horn or powder seen
1994						
Baoding	2	0	0	0	0	0
Beijing	25	0	0	0	0	0
Chengdu	22	1 (4.5%)	1 (4.5%)	0	0	1 (4.5%)
Chongqing	13	0	0	0	0	0
Guilin	15	3 (20.0%)	3 (20.0%)	0	0	3 (20.0%)
Kunming	20	0	0	0	0	0
Nanchang	12	1 (8.3%)	1 (8.3%)	6 (50.0%)	6 (50.0%)	7 (58.3%)
Nanjing	7	0	0	0	0	0
Shanghai	10	0	0	0	0	0
Tianjin	17	0	0	0	0	0
Xiamen	16	0	0	0	0	0
Xi'an	9	2 (22.2%)	2 (22.2%)	0	0	2 (22.2%)
Zhengzhou	2	0	0	0	0	0
Total	170	7 (4.1%)	7 (4.1%)	6 (3.5%)	6 (3.5%)	13 (7.6%)
1995						
Beijing	12	0	0	0	0	0
Chengdu	18	2 (11.1%)	2 (11.1%)	0	0	2 (11.1%)
Guangzhou	23	1 (4.3%)	1 (4.3%)	0	0	1 (4.3%)
Guiyang	12	1 (8.3%)	1 (8.3%)	0	0	1 (8.3%)
Nanchang	11	1 (9.1%)	0	2 (18.2%)	1 (9.1%)	1 (9.1%)
Nanning	8	0	0	0	0	0
Tianjin	18	1 (5.6%)	0	2 (11.1%)	2 (11.1%)	2 (11.1%)
Xi'an	11	2 (18.2%)	2 (18.2%)	0	0	2 (18.2%)
Zhengzhou	5	0	0	1 (20%)	1 (20%)	1 (20%)
Total	118	8 (6.8%)	6 (5.1%)	5 (4.2%)	4 (3.4%)	10 (8.5%)
1996						
Beijing	15	0	0	0	0	0
Chengdu	12	2 (16.7%)	1 (8.3%)	0	0	1 (8.3%)
Nanchang	13	2 (15.4%)	1 (7.7%)	1 (7.7%)	1 (7.7%)	2 (15.4%)
Shanghai	5	0	0	0	0	0
Tianjin	16	0	0	1 (6.3%)	1 (6.3%)	1 (6.3%)
Xi'an	10	2 (20.0%)	2 (20.0%)	0	0	2 (20.0%)
Zhengzhou	9	1 (11.1%)	1 (11.1%)	3 (33.3%)	3 (33.3%)	4 (44.4%)
Total	80	7 (8.7%)	5 (6.3%)	5 (6.3%)	5 (6.3%)	10 (12.5%)

Source: Investigators' research.

it in only six (5.1%) of these, in one case on open display. In addition, two (1.7%) businesses surveyed for horn claimed to have had it recently but were "sold out" or "out of stock". Staff in five (4.2%) of the businesses claimed to have rhinoceros horn powder, but it was actually seen only in four (3.4%). One business claimed to be receiving stock in two days. In total, therefore, raw rhinoceros horn or rhinoceros horn powder was seen in 10 (8.5%) of the 118 businesses in 1995 (Table 3).

1996

In 1996, investigators requested raw rhinoceros horn in 80 businesses in seven cities (Table 3). Staff in seven (8.7%) of the businesses claimed to have raw rhinoceros horn, but investigators actually saw it in only five (6.3%) of these. Staff in five (6.3%) of the businesses claimed to have, and were seen to have, rhinoceros horn powder. In total, therefore, raw rhinoceros horn or rhinoceros horn powder was seen in 10 (12.5%) of the 80 businesses in 1996.

In cases where rhinoceros horn was not available, reasons stated, for all years, included the explanations that it was locked in a safe, available only in large quantities, sold-out, or out of stock.

Availability of raw rhinoceros horn and rhinoceros horn powder in medicine markets, from 1994 to 1996

1994

Of the approximately 154 vendors at nine medicine markets surveyed for rhinoceros horn in 1994 (see Methods/Table 2), ten (6.5%) claimed to have raw rhinoceros horn, but it was seen only with eight (5.2%). Two (1.3%) vendors were seen with rhinoceros horn powder for sale. In total, therefore, raw rhinoceros horn or rhinoceros horn powder was seen with 10 (6.5% of) vendors in 1994 (Table 4).

A price list from Anguo Medicine Market for January 1994 did not feature prices for Tiger bone and rhinoceros horn, as had the price list from the same market in April 1993, indicating that open trade, which apparently existed at that market prior to the ban, may have ceased. Moreover, one of the vendors at Anguo Medicine Market in 1994 said that rhinoceros horn would take time to locate and obtain, indicating that it was not available at that market at the time.

1995

Of the approximately 117 vendors at six medicine markets surveyed for rhinoceros horn in 1995, sixteen (13.6%) claimed to have raw rhinoceros horn for sale, but it was actually seen only with 14 (12%). One stallholder claimed to have "sold out last week", while another said he was only willing to sell large quantities. No vendors were seen displaying rhinoceros horn powder. In total, therefore, raw rhinoceros horn or rhinoceros horn powder was seen with 14 (12% of) vendors in 1995 (Table 4).

1996

Of the approximately 66 vendors at four medicine markets surveyed for rhinoceros horn in 1996, twelve (18%) claimed to have raw rhinoceros horn for sale, but it was actually seen only with seven (10.6%). As in 1995, no rhinoceros horn powder was seen, and in total, therefore, raw rhinoceros horn or rhinoceros horn powder was seen with 7 (10.6% of) vendors in 1996 (Table 4).

Prices and quantities of rhinoceros horn and horn powder, from 1994 to 1996

Information on rhinoceros horn prices and quantities available was collected from most vendors with raw horn and is set out in Table 5. The average price for horn specified as *Guangjiao* in 1994 was CNY60 (USD6.90)/g. In 1995, prices encountered ranged from CNY30/g (USD3.70) to CNY240/g (USD29.63)

RHINOCEROS HORN AND TIGER BONE: AN INVESTIGATION OF TRADE SINCE THE 1993 BAN

Table 4

Availability of raw rhinoceros horn (RH) and rhinoceros horn powder (RHP) in medicine markets surveyed, 1994-1996

Market	Number of				
	vendors surveyed for RH*	vendors claiming to have RH	vendors where RH seen	vendors where RHP seen	vendors where RH/RHP seen (%)
1994					
Anguo	±12	0	0	0	0 (0.0)
Chongqing#1	±25	0	0	0	0 (0.0)
Chongqing#2	±10	1	0	0	0 (0.0)
Chengdu	±20	2	2	0	2 (10.0)
Kunming	±20	1	0	0	0 (0.0)
Nanchang	5	**1	0	2	2 (40.0)
Xi'an#1	±20	3	3	0	3 (15.0)
Xi'an#2	±20	2	2	0	2 (10.0)
Zhangshu	22	1	1	0	1 (4.5)
Totals	±154	10	8	2	10 (6.5)
1995					
Guangzhou	±30	0	0	0	0 (0.0)
Guiyang	±20	0	0	0	0 (0.0)
Chengdu	30	4	3	0	3 (10.0)
Xi'an#1	±20	7	7	0	7 (35.0)
Xi'an#2	±15	4	3	0	3 (20.0)
Zhengzhou	2	1	1	0	1 (50.0)
Totals	±117	16	14	0	14 (12.0)
1996					
Chengdu	±25	4	1	0	1 (4.0)
Xi'an#1	±15	4	3	0	3 (20.0)
Xi'an#2	18	4	3	0	3 (16.7)
Zhengzhou	8	0	0	0	0 (0.0)
Totals	±66	12	7	0	7 (10.6)

* ± indicates that a precise count of the number of vendors surveyed was not made; the figures in this column were used to calculate the percentages in the final column.

Source: Investigators' research.

Table 5

Information on quantities available and prices for raw rhinoceros horn in businesses and with medicine market vendors surveyed.

Location	Horn type	Quantity available	Price
1994			
1 Pharmacy in Chengdu	"Guangjiao" variety	- estimated 60-80g total	CNY22/g
2 Chongqing Med. Mkt.#2	not specified	- claimed to have 10-20g	
3 Pharmacy in Guilin	"Guangjiao" variety	- 250-400g in total	CNY49/g
4 Pharmacy in Guilin	not specified	- not specified	CNY300/g
5 Pharmacy in Guilin	not specified	- not specified	CNY312/g
6 Hehuazhi Medicine Market	not specified	- claimed to have whole horns, 1/2kg each, and pieces	CNY180/g
7 Hehuazhi Medicine Market	"Guangjiao" variety	- a few hundred grammes	CNY200/g
8 Pharmacy in Nanchang	not specified	- 50-80g in total	CNY170/g
9 Pharmacy in Xi'an	not specified	- a few pieces, 61g in total	CNY25.5/g
10 Pharmacy in Xi'an	not specified	- 3 pieces, 50g in total	CNY35/g
11 Xi'an Medicine Market	"Guangjiao" variety	- a few pieces, 120g in total	CNY14/g
12 Xi'an Medicine Market	"Guangjiao" variety	- not specified	CNY14/g
13 Zhangshu Medicine Market	not specified	- a whole horn , about 408g; pieces weighing 50-80g each	CNY50/g
1995			
1 Pharmacy in Chengdu	"White" horn	- not specified	CNY180/g
2 Pharmacy in Chengdu	not specified	- not specified	CNY140/g
3 Pharmacy in Guangzhou	not specified	- not specified	CNY200/g
4 Pharmacy in Guiyang	not specified	- 2-3g only	CNY120/g
5 Hehuazhi Medicine Market	not specified	- 50g	CNY30/g
6 Hehuazhi Medicine Market	not specified	- not specified	CNY150/g
7 Hehuazhi Medicine Market	not specified	- about 3kg	CNY50/g
8 Pharmacy in Tianjin	not specified	- not in stock at time of visit	CNY240/g
9 Pharmacy in Xi'an	not specified	- 7g	CNY193/g
10 Pharmacy in Xi'an	not specified	- 20g	
11 Xi'an Medicine Market	not specified	- about 400g	CNY95/g
12 Xi'an Medicine Market	not specified	- about 500g	CNY60/g
13 Xi'an Medicine Market	not specified	- about 400g	CNY30/g
14 Xi'an Medicine Market	not specified	- about 50g	CNY85/g
15 Xi'an Medicine Market	not specified	- about 1kg	CNY55/g
16 Xi'an Medicine Market	"Guangjiao" variety	- about 500g	CNY80/g
17 Xi'an Medicine Market	not specified	- about 200g	CNY80/g
18 Xi'an Medicine Market	not specified	- about 100g	CNY95/g
19 Xi'an Medicine Market	not specified	- 10g	CNY150/g
20 Xi'an Medicine Market	not specified	- 50g	CNY105/g
21 Xi'an Medicine Market	not specified	- not specified	CNY120/g
1996			
1 Pharmacy in Nanchang	"Yunjiao" variety	- 6.4g left from old stock	CNY249.5/g
2 Pharmacy in Chengdu	"Guangjiao" variety	- not specified	CNY40/g
3 Hehuazhi Medicine Market	"Guangjiao" variety	- not specified	CNY12/g
4 Pharmacy in Xi'an	not specified	- not specified	CNY85/g
5 Pharmacy in Xi'an	not specified	- not specified	CNY45/g
6 Xi'an Medicine Market	"Guangjiao" variety	- about 500g	CNY10/g
7 Xi'an Medicine Market	"Guangjiao" variety	- not specified	CNY18/g
8 Xi'an Medicine Market	"Guangjiao" variety	- 57g	CNY15/g
9 Xi'an Medicine Market	not specified	- not specified	CNY160-190/g
10 Xi'an Medicine market	not specified	- 200g	CNY16/g
11 Pharmacy in Zhengzhou	"Guangjiao" variety	- not specified	>CNY200/g

Note: Each entry represents one business or market vendor.

Source: Investigators' research

for unidentified forms of horn: in only one case was the type of horn specified, namely as *Guangjiao*, at CNY80/g. Prices in 1996 ranged widely from CNY12/g (USD1.48) for an unspecified form of rhinoceros horn, to CNY249.5/g (USD30.80) for horn specified as *Yinjiao*. The average price for horn specified as *Guangjiao* in 1996 was CNY49 (USD6)/g. Virtually every merchant in 1996 who had raw rhinoceros horn and offered an opinion on price said that prices were lower owing to a decline in demand for rhinoceros horn, brought about by the ban.

Rhinoceros horn powder was selling for CNY25 (USD2.87)/vial (1 vial = 0.3g, therefore price was equivalent to CNY83 or USD9.5/g) in 1994. Three brands of rhinoceros horn powder were encountered during the 1995 survey: one made by *Jiangxi Guoyao Pharmaceutical Factory* selling for CNY58 (USD7.16) for a 0.3g vial; one called *Guangjiaofen* seen priced at CNY22 (USD2.72)/g and CNY32.70 (USD4.04)/g; and one made by *Henan Kaifeng Chinese Medicine Pharmaceutical Factory* selling for CNY2000 (USD247) for a 50g-bottle. Based on these four samples from 1995, the average price of rhinoceros horn powder per gramme would be CNY72 - but the range is very wide and the sample size small. Two brands of rhinoceros horn powder were found on sale in 1996, one at CNY19.2 (USD2.40) per vial (CNY64 or USD8/g) and the other at CNY52 (USD6.42)/g.

Availability of raw Tiger bone in businesses, from 1994 to 1996

Raw Tiger bone was requested in two pharmacies in Guilin and three in Xiamen in 1994, but was said not to be available in any of these. No raw Tiger bone was seen on display in any of the 442 businesses visited in 1994, nor in any of the 355 visited in 1995, nor in any of the 280 visited in 1996.

Availability of raw Tiger bone in medicine markets in 1994 and 1995

Raw Tiger bone was not seen on display with any of the 154 vendors surveyed in 1994, nor offered in response to investigators' requests. Some vendors claimed to be able to obtain raw Tiger bone, however, as outlined below:

- Although Tiger bone was not listed in a price list dated 30 January 1994 for Anguo Medicine Market, one vendor at that market reported that, given time, he might be able to obtain Tiger bone. He said an entire Tiger skeleton would cost CNY3200 (USD367), but investigators believe that the price may have been per kilogramme, as it seemed too low a price for a whole skeleton.
- At Kunming Medicine Market, a vendor told investigators that he had 10kg of raw Tiger bone at a price of CNY1100/kg (USD126.50). He also claimed to have the Tiger's skin as "proof" that the bones were real.
- A vendor at one of Xi'an's medicine markets claimed to have a complete Tiger skeleton (30kg) for sale at the price of CNY1500/kg (USD172).

In 1995, raw Tiger bone was not seen on display with any of the 117 medicine market vendors surveyed.

In 1996, raw Tiger bone was not surveyed for at medicine markets, as noted in *Methods*.

Availability of Tiger-bone wine and Tiger-bone plaster in businesses, from 1994 to 1996

This section presents data for two categories of result, namely, a) results from surveys of businesses found not to be, nor to have, TCM dispensaries, in which cases investigators specifically requested Tiger-bone wine or plaster and, b) results from visual scans for openly displayed medicines.

Table 6 Availability of Tiger-bone wine (TBW) and Tiger-bone plaster (TBP) in businesses surveyed for these

City	No. of businesses where TBW/P requested	No. (%) of businesses showing TBW/P on request	No. of businesses visually scanned for TBW/P	No. (%) of businesses with TBW/P on display
1994				
Baoding	0	0 (0.0)	3	0 (0.0)
Beijing	10	3 (30.0)	53	0 (0.0)
Chengdu	26	1 (3.8)	53	1 (1.9)
Chongqing	23	2 (8.7)	39	2 (5.1)
Gulin	13	2 (15.4)	25	0 (0.0)
Kunming	26	2 (7.7)	56	2 (3.6)
Nanchang	4	1 (25.0)	20	1 (5.0)
Nanjing	19	1 (5.3)	27	2 (7.4)
Shanghai	26	0 (0.0)	33	0 (0.0)
Shanghai	11	0 (0.0)	42	0 (0.0)
Tianjin	21	4 (19.0)	33	0 (0.0)
Xiamen	25	2 (7.1)	48	3 (6.3)
Xi'an	4	0 (0.0)	10	0 (0.0)
Zhengzhou	4	0 (0.0)	10	0 (0.0)
Total	208	18 (8.7)	442	11 (2.5)
1995				
Beijing	28	1 (3.6)	42	0 (0.0)
Chengdu	31	0 (0.0)	49	0 (0.0)
Guangzhou	22	0 (0.0)	44	0 (0.0)
Guiyang	43	6 (14.0)	53	0 (0.0)
Nanchang	9	0 (0.0)	26	4 (15.4)
Nanning	8	3 (37.5)	29	0 (0.0)
Shenzhen	0	0 (0.0)	10	0 (0.0)
Tianjin	11	1 (9.1)	32	0 (0.0)
Xi'an	35	2 (2.9)	44	0 (0.0)
Zhengzhou	20	2 (10.0)	26	0 (0.0)
Total	207	15 (7.2)	355	4 (1.1)
1996				
Beijing	45	0 (0.0)	49	0 (0.0)
Chengdu	41	0 (0.0)	53	0 (0.0)
Nanchang	25	4 (16.0)	33	0 (0.0)
Tianjin	16	1 (6.3)	35	1 (2.9)
Shanghai	7	0 (0.0)	25	0 (0.0)
Xi'an	40	0 (0.0)	50	0 (0.0)
Zhengzhou	30	1 (3.3)	35	0 (0.0)
Total	204	6 (2.9)	280	1 (0.4)

Source: Investigators' research

Table 7

Commercial brands of Tiger-bone wine seen in businesses surveyed

Name	Pharmaceutical factory (P.F.)	Prices
1994		
1. <i>Hugu Jiu</i>	Tongrentang Medical Wine Factory	CNY55/250g
<i>Hugu Jiu</i>	Beijing Tung Jentang	CNY55/323ml
<i>Hugu Jiu</i>	Beijing Tongrentang P.F.	CNY110/500ml;
		CNY60/250ml; CNY64/375ml
2. <i>Hugu Mugua Jiu</i>	Tianjin Darentang No.2 P.F.	CNY5.76/bottle (250ml?)
3. <i>Hugu Jiu</i>	Jiangxi Yongfeng P.F.	CNY27.8/500g
4. <i>Hugu Jiu</i>	Wuhan Jianmin P.F.	CNY50/500ml;
		CNY60-70/500ml; CNY58/500ml
5. <i>Hugu Jiu</i>	Wuhan Dongshan P.F.	CNY39.95/500ml
6. <i>Hugu Mugua Jiu</i>	Zuxiang P.F.	CNY7.6/bottle (250ml)
7. <i>Hugu Jiu</i>	Yunnan Tengchong Dongfanghong P.F.	CNY7.24/250ml; CNY7.5/250ml
8. <i>Hugu Jiu</i>	Sichuan Jisheng P.F.	CNY19.47/500g;
		CNY20/250ml; CNY58.5/500g
9. <i>Hugu Jiu</i>	Yunnan Tengchong P.F.	CNY8.4/250ml
10. <i>Hugu Jiu</i>	Nanjing Tongrentang P.F.	CNY29/250ml
11. <i>Hugu Jiu</i>	Wuhan No. 5 P.F.	CNY22/250ml
1995		
1. Tiger Bone Wine	Beijing Tongrentang Medical Wine F.	CNY100.0/500ml
2. <i>Hugu Jiu</i>	Wuhan Zhonglian P.F.	CNY29.12/500g
3. <i>Hugu Mugua Wine</i>	Guangxi Wuzhou Longshan Wine F.	CNY8.75/500ml
4. Tiger Bone Wine	Tianjin Darentang P.F.	CNY70.0/500ml
5. Tiger Bone Wine	Xi'an Guoyao P.F.	CNY120.0/500g
6. Tiger Bone Wine	Yunnan Tengchung Dongfangzhong P.F.	CNY9.1/250ml
1996		
1. <i>Hugu Jiu</i>	Beijing Tongrentang P.F. (6/93)	CNY80/323ml
2. Tiger Bone Wine	Wuhan Jianmin P.F. (6/93)	CNY30/500ml; CNY40/500ml
3. Tiger Bone Wine	Wuhan Fifth P.F.	CNY85/500ml
4. Tiger Bone Wine	Wuhan Zhonglian P.F. (7/93)	CNY67/500ml
5. Tiger Bone Wine	Tianjin 2nd Chinese Medicine Factory.	CNY228/500ml; CNY96.8/500ml

Table 8

Commercial brands of Tiger-bone plaster seen in businesses surveyed

Name	Pharmaceutical factory (P.F.)	Price
1994		
1. Musk and Tiger-bone plaster	Hubei Huangshi M. M. Fact. (LB and TB listed)	CNY5.6/10 pieces
2. Tiger-bone analgesic plaster	Chongqing Traditional Medicine Factory.	CNY3.0/10 pieces
3. Tiger-bone musk plaster	Chongqing Chinese Medicine P.F.	CNY1.5/4 pieces
4. Tiger-bone plaster	Hubei Huangshi Changzhen P.F. (LB and TB listed)	- not recorded
5. Musk and Tiger-bone plaster	Shenyang Dongling P.F.	CNY1.5/4 pieces
6. Tiger-bone plaster	Chengdu P.F.	CNY2.0/5 pieces
7. Tiger-bone plaster	Guangdong Zhanjiang Health Material Factory	CNY2.49/4 pieces
8. Tiger-bone plaster	Hubei Shashi Shijinhong P.F. (LB and TB listed)	CNY1.5/4 pieces
1995		
1. Musk Tiger-bone plaster	Hubei Huangshi Changzhen P.F.	CNY5.00/5 pieces
2. Musk Tiger-bone plaster	Guizhou Guiyang Health Material Factory	CNY1.5/4 pieces
3. Tiger-bone plaster	Hengyang Medicine Material Plant	CNY4.8/4 pieces
4. Musk Tiger-bone plaster	Hubei Shashi Health Mat. Factory	CNY3.0/4 pieces
5. Musk Tiger-bone plaster	Guilin 4th P.F.	CNY3.5/10 pieces
6. Tiger-bone plaster	Hubei Suizhou Zutian P.F.	CNY5.0/4 pieces
7. <i>Shexiang Hugu Gao</i>	Jinan Health Material Factory	CNY0.8/2 pieces
8. <i>Shexiang Hugu Gao</i>	Xi'an Zhiqiang P.F.	CNY1.7/pack
1996		
1. Tiger-bone plaster	Hubei Suizhou Zutian P.F.	CNY5.0/10 pieces

Crenford Allan/TRAFFIC



Hugu Mugua Jiu, a formula seen on sale in businesses in 1994 and 1995

Staff in 6 (2.9%) of the businesses showed investigators one or the other of these medicines, in response. In the same year, the 280 businesses visited were visually scanned for the presence of Tiger-bone wine or plaster and one or the other of these medicines was seen on display in only 1 (0.4%) of these.

Brands and prices of Tiger-bone wine and plasters seen in businesses, from 1994 to 1996 are detailed in Tables 7 and 8 .

Availability of Tiger-bone wine and Tiger-bone plaster in medicine markets in 1994 and 1995

In 1994, Tiger-bone wine or plaster was seen with six (3.9%) of the approximately 154 vendors surveyed and in 1995 with three (2.6%) of the approximately 117 vendors surveyed (Table 9).

In 1996, as noted in Methods, availability of Tiger-bone wine and plaster at medicine markets was not recorded.

1994

Investigators requested Tiger-bone wine or plaster in 208 businesses, in 12 cities (Table 6). Staff in 18 (8.7%) of the businesses showed investigators one or the other of these medicines, in response. In the same year, the 442 businesses visited were visually scanned for the presence of Tiger-bone wine or plaster and one or the other of these medicines was seen on display in 11 (2.5%) of these.

1995

Investigators requested Tiger-bone wine or plaster in 207 businesses, in 9 cities (Table 6). Staff in 15 (7.2%) of the businesses showed investigators one or the other of these medicines, in response. In the same year, the 355 businesses visited were visually scanned for the presence of Tiger-bone wine or plaster and one or the other of these medicines was seen on display in 4 (1.13%) of these.

1996

Investigators requested Tiger-bone wine or plaster in 204 businesses, in 7 cities (Table 6).

Table 9

Availability of Tiger-bone wine (TBW) and Tiger-bone plaster (TBP) in medicine markets surveyed, 1994-1995[#]

Market	Number of vendors surveyed for TBW and TBP*	Number (%) of vendors where TBW or TBP seen
1994		
Anguo	±12	0 (0.0)
Chongqing#1	±25	1 (4.0)
Chongqing#2	±10	0 (0.0)
Chengdu	±20	1 (5.0)
Kunming	±20	1 (5.0)
Nanchang	5	1 (20.0)
Xi'an#1	±20	0 (0.0)
Xi'an#2	±20	0 (0.0)
Zhangshu	22	2 (10.0)
Total	±154	6 (3.9)
1995		
Guangzhou	±30	0 (0.0)
Guiyang	±20	0 (0.0)
Hehuazhi	30	0 (0.0)
Xi'an#1	±20	3 (15.0)
Xi'an#2	±15	0 (0.0)
Zhengzhou	2	0 (0.0)
Total	±117	3 (2.6)

[#] Records of availability of these medicines at medicine markets in 1996 were not made.

* ± indicates that a precise count of the number of vendors surveyed was not made; the figures listed in this column were used to calculate the percentages in the last column.

Source: Investigators' research.

Availability of manufactured Chinese medicines, other than Tiger-bone wine and plaster, claiming to contain Tiger bone and/or rhinoceros horn, from 1994 to 1996

Table 10 lists several TCM formulas identified by investigators prior to commencement of field research in 1994, which traditionally call for rhinoceros horn, Tiger bone, or both. Investigators saw several, though not all, of the types of manufactured medicines shown in Table 10 for sale during their surveys conducted in 1994, 1995 and 1996. The different formulas and brands seen are listed in Table 11. Three formulas - *An Gong Niu Huang Wan*, *Dahuohuo Dan* and *Niu Huang Qing Xin Wan* - were noted in all three years.

The visual surveys for these medicines, undertaken in each businesses visited, were not meant to be quantitative. Some manufactured medicines containing rhinoceros horn or Tiger bone on display were undoubtedly missed by investigators. It should be noted that the survey was limited to recording medicines labelled as containing Tiger bone and/or rhinoceros horn and thus it is possible that some such medicines may not in fact have contained these ingredients (but conversely, some which did not declare them, may nonetheless have included them).

Table 10

Examples of traditional Chinese medicines containing rhinoceros horn, Tiger bone, or both, according to their usual formulas

Medicine	English translation of name	Contents	Source
<i>Angong Niuhuang Wan</i>	Cow-bezoar bolus for resurrection	RH	Ou 1989, Zhang 1990c
<i>Dahuoluo Wan/Dan</i>	Large bolus for activating channels and collaterals	RH	Zhang 1990c
<i>Duzhong Hugu Wan</i>	(not known)	TB	TRAFFIC survey
<i>Huaban Wan</i>	Decoction for relieving feverish rash	RH	Zhang 1990b
<i>Huqian Wan</i>	Huqian bolus	TB	Ou, 1989
<i>Huitian Zaizao Wan</i>	Restorative bolus with tremendous power	RH, TB	Zhang, 1990c
<i>Jianbu Huqian Wan</i>	(not known)	TB	research for this report
<i>Jufang Zhibao Dan</i>	Treasured bolus	RH	Zhang, 1990c
<i>Niuhuang Qingxin Wan</i>	Cow-bezoar sedative bolus	RH	Zhang, 1990c
<i>Qingwen Baidu Yin</i>	Decoction for clearing away pestilent factors and detoxification	RH	Ou, 1989
<i>Renshen Zaizao Wan</i>	Ginseng restorative bolus	TB, RH	Zhang, 1990c
<i>Shihu Yeguoguan Wan</i>	Bolus of dendrobii for poor vision	RH	Ou, 1989, Zhang, 1990c
<i>Suhe Xiang Wan</i>	Bolus of liquidambaris orientalis	RH	Ou, 1989
<i>Suxiao Niuhuang Wan</i>	Quick-acting Cow-bezoar bolus	RH	Zhang, 1990c
<i>Tianma Hugu Wan</i>	(not known)	TB	research for this report
<i>Xiaoban Qingdai Yin</i>	Decoction of indigo naturalis for rashes subsidence	RH	Ou, 1989
<i>Xiaoer Jindan Pian</i>	Children-welfare tablet	RH	Zhang, 1990c
<i>Xijiao Dihuang Wan</i>	Decoction of rhinoceros horn and rehmannia	RH	Ou, 1989, Zhang, 1990b
<i>Xiling Jiedu Pian</i>	Detoxifying tablet of rhinoceros horn and antelope horn	RH	Zhang, 1990c
<i>Zhenzhumu Wan</i>	Pill of margarita	RH	Ou, 1989
<i>Zhibao Dan</i>	Bolus of precious drugs	RH	Ou, 1989
<i>Zixue Dan</i>	Purple snow	RH	Ou, 1989, Zhang, 1990c

Source: Investigators' research.

Of all the 442 businesses visited in 1994, 49 (10.8%) were selling one or more formulas of manufactured Chinese medicines listing Tiger bone and/or rhinoceros horn. In 1995, 38 (10.7%) of the total of 355 businesses visited that year were seen to be selling such medicines, and in 1996, 38 (13.6%) of the total of 280 businesses visited stocked them (see Table 12).

Manufactured Chinese medicines including Tiger-bone and/or rhinoceros horn (other than Tiger-bone wine and plaster) were found in all 13 cities visited in 1994, but in only seven of the 10 visited in 1995 and five of the seven visited in 1996.

Table 11

Manufactured Chinese medicines (other than Tiger-bone wines and plasters) listing rhinoceros horn (RH) and/or Tiger bone (TB) as ingredients, seen in businesses, 1994-1996

Medicine	Pharmaceutical factory	Contents
1994		
<i>Angong Niuhuang Wan</i>	Beijing Tongrentang P.F.	RH
<i>Angong Niuhuang Wan</i>	Chongqing Chinese Medicine P.F.	RH
<i>Angong Niuhuang Wan</i>	Chongqing Tongjunge P.F.	RH
<i>Angong Niuhuang Wan</i>	Harbin Shiyitang P.F.	RH
<i>Angong Niuhuang Wan</i>	Jilin Dongfeng P.F.	**RH
<i>Angong Niuhuang Wan</i>	Tianjin Darentang P.F.	RH
<i>Angong Niuhuang Wan</i>	Tongrentang No. 2 P.F.	RH
<i>Dahuoluo Dan</i>	Beijing Tongrentang P.F.	RH
<i>Tahuoluo Tan</i>	Beijing Tongrentang P.F.	TB
<i>Dahuoluo Dan</i>	Liaoning Fushen City Chinese M.F.	*RH
<i>Dahuoluo Dan</i>	Nanjing Tongrentang P.F.	TB
<i>Dahuoluo Dan</i>	Shaanxi Xi'an Beilin Chinese M.F.	RH
<i>Dahuoluo Dan</i>	Shaanxi Xi'an Guoyao P.F.	RH,TB
<i>Dahuoluo Dan</i>	Tianjin Darentang P.F.	^RH,TB
<i>Dahuoluo Dan</i>	Tianjin Darentang P.F.	TB
<i>Dahuoluo Wan</i>	Wuhan Zhonglian P.F.	TB
<i>Dahuoluo Wan</i>	Chongqing Chinese Medicine P.F.	TB
<i>Dahuoluo Wan</i>	Jiangxi Guoyao P.F.	RH,TB
<i>Dahuoluo Wan</i>	Jiangxi Guoyao P.F.	TB
<i>Dahuoluo Wan</i>	Sichuan Liangshanzhou P.F.	TB
<i>Dahuoluo Wan</i>	Sichuan Xichang P.F.	TB
<i>Hu Qian Wan</i>	Yunnan Tengchong P.F.	TB
<i>Jian Bu Bao Qian Wan</i>	Lanzhou Foci P.F.	TB
<i>Niuhuang Qingxin Wan</i>	Beijing Tongrentang P.F.	+RH
<i>Niuhuang Qingxin Wan</i>	Chengdu Chinese Medicine P.F.	RH
<i>Niuhuang Qingxin Wan</i>	Nanjing Tongrentang P.F.	RH
<i>Niuhuang Qingxin Wan</i>	Tangshan No. 3 P.F.	RH
<i>Shihu Yeguang Wan</i>	Shaanxi Xi'an Guoyao P.F.	RH
<i>Suhe Xiang Wan (#2)</i>	Beijing Chinese Med. No.1 P.F.	RH
<i>Suhe Xiang Wan (#2)</i>	Tongrentang P.F.	RH
<i>Tianma Hugu Wan</i>	Chengdu P.F. No. 7	TB
1995		
<i>Angong Niuhuang Wan</i>	Beijing Tongrentang P.F.	RH
<i>Angong Niuhuang Wan</i>	Chengdu Chinese M.F.	RH
<i>Angong Niuhuang Wan</i>	Heilongjiang Chinese M. P.F.	RH
<i>Angong Niuhuang Wan</i>	Heilongjiang Chinese M. Coll. P.F.	RH
<i>Angong Niuhuang Wan</i>	Jilin Denhua P.F.	RH
<i>Angong Niuhuang Wan</i>	Shanxi Chinese M.P.F.	RH
<i>Angong Niuhuang Wan</i>	Tianjin Darentang P.F.	RH
<i>Angong Niuhuang Wan</i>	Wuhan Zhonglian P.F.	RH
<i>Dahuoluo Dan</i>	Beijing Tongrentang P.F.	TB
<i>Dahuoluo Dan</i>	Guangdong Chenliji P.F.	TB
<i>Dahuoluo Dan</i>	Guangzhou Cheliji P.F.	RH,LB
<i>Dahuoluo Dan</i>	Tianjin Darentang P.F.	TB
<i>Dahuoluo Dan</i>	Tianjin Darentang P.F.	RH,TB
<i>Duzhong Hugu Wan</i>	Guiyang Chinese M.P.F.	TB
<i>Huitian Zaizao Wan</i>	Harbin Chinese M. 1st P.F.	RH
<i>Huitian Zaizao Wan</i>	Jilin Siping P.F.	RH,LB
<i>Jianbu Huqian Wan</i>	Tianjin Darentang P.F.	TB

Table 11 continued

Medicine	Pharmaceutical factory	Contents
<i>Niu Huang Qingxin Wan</i>	Beijing Tongrentang 2nd P.F.	RH
<i>Niu Huang Qingxin Wan</i>	Chengdu Chinese M.P.F.	RH
<i>Renshen Zaizao Wan</i>	Chongqing Tongjunge P.F.	TB
<i>Renshen Zaizao Wan</i>	Jilin Denhua P.F.	TB
<i>Renshen Caicao Wan</i>	Jilin Dongfeng P.F.	RH
<i>Renshen Zaizao Wan</i>	Tianjin Darentang 2nd P.F.	TB
1996		
<i>Angong Niu Huang Wan</i>	Tianjin Darentang P.F.	RH
<i>Dahuoluo Dan</i>	Beijing Tongrentang P.F.	TB
<i>Dahuoluo Dan</i>	Beijing Tongrentang 2nd P.F.	RH, TB
<i>Dahuoluo Dan</i>	Fushun 2nd Chinese M.P.F.	RH
<i>Huitian Zaizao Wan</i>	Harbin 1st Chinese M.F.	#TB, LB
<i>Huitian Zaizao Wan</i>	Harbin 2nd Chinese M.F.	RH, TB
<i>Huitian Zaizao Wan</i>	Liaoning Benxi Chinese M.F.	RH, TB
<i>Huitian Zaizao Wan</i>	Chengchun People's P.F.	RH, LB
<i>Huitian Zaizao Wan</i>	Heilongjiang Mudanjiang P.F.	RH, TB
<i>Huitian Zaizao Wan</i>	Heilongjiang Mudanjiang Chinese M.P.F.	RH, TB
<i>Jianbu Huqian Wan</i>	Tianjin Darentang P.F.	TB
<i>Jufang Zhibao Dan</i>	Beijing Tongrentang P.F.	RH
<i>Jufang Zhibao Dan</i>	Beijing Tongrentang P.F.	RH
<i>Niu Huang Qingxin Wan</i>	Tianjin Darentang P.F.	RH

P.F. = pharmaceutical factory; M.F. = medicine factory; LB - Leopard bone.

* = some packages list RH and TB as ingredients

** = RH not listed, but pharmacy kept this medicine hidden

^ = English list of ingredients includes RH and TB, but Chinese list has neither;

+ = some packages list antelope horn instead of RH, but others neither ingredient

= ingredients list not seen; these are probable contents.

Source: Investigators' research.

Most manufactured Chinese medicines produced in China have a manufacturing date stamped on the packaging, and investigators documented several cases where those claiming to contain rhinoceros horn or Tiger bone were dated as having been manufactured after the ban on such production went into effect, indicating that illegal manufacturing may have taken place. For example, one package of "Musk and Tiger-Bone Plaster" from Hubei Huangshi Health Material Factory had a manufacturing date of February 1994; one package of *Angong Niu Huang Wan* from Chengdu Chinese Medicine Factory, listing rhinoceros horn as an ingredient, was manufactured in November 1993; and packaging for *Jianbu Huqian Wan* from Tianjin Darentang Pharmaceutical Factory listed Tiger bone as an ingredient and carried a manufacture date of August 1993. (See Section 2 below for more information on illegal manufacturing.)

Table 12

Number of businesses where manufactured Chinese medicines containing rhinoceros horn, Tiger bone, or both (other than Tiger-bone wines and plasters) were seen during visual surveys, 1994-1996

City	1994		1995		1996	
	N	H	N	H	N	H
Baoding	3	1	-	-	-	-
Beijing	53	6	42	7	49	10
Chengdu	53	1	49	3	53	0
Chongqing	39	5	-	-	-	-
Guangzhou	-	-	44	0	-	-
Guilin	25	4	-	-	-	-
Guiyang	-	-	53	3	-	-
Kunming	56	2	-	-	-	-
Nanchang	20	7	26	2	33	0
Nanjing	27	5	-	-	-	-
Nanning	-	-	29	4	-	-
Shanghai	33	3	-	-	25	2
Shenzhen	-	-	10	3	-	-
Tianjin	42	4	32	16	35	22
Xiamen	33	1	-	-	-	-
Xi'an	48	9	44	0	50	2
Zhengzhou	10	1	26	0	35	2
Total	442	49 (10.8%)	355	38 (10.7%)	280	38 (13.6%)

N = number of businesses surveyed; H = number of businesses having manufactured Chinese medicines listing rhinoceros horn, Tiger bone, or both, as ingredients; the presence of such a medicine is only recorded here if investigators saw the list of ingredients.

Note: Cities visited in all three years appear in bold type.

Source: Investigators' research.

Availability of manufactured Chinese medicines possibly containing rhinoceros horn or Tiger bone, from 1994 to 1996

Anecdotal information obtained during the market surveys of 1994 and 1995 suggested that some medicine manufacturers may have attempted to circumvent the ban by omitting to list Tiger bone as an ingredient in wines and plasters and/or re-labelling packages to exclude its mention, as described below.

- One merchant told investigators in 1994 that the Tiger bone in one manufactured musk and bone plaster was deliberately mis-declared as *tong gu* (meaning "aching bone" in Mandarin) to circumvent the ban.
- Staff in at least two establishments in 1995 said that "Musk *Zhuang gu* Plaster" made by Chengdu Fifth Pharmaceutical Factory was actually musk Tiger-bone plaster. This particular brand was seen in seven locations in 1995.
- Assistants in at least three establishments in 1995 said that "Musk Bone-Strengthening Plaster" made by Hubei Shashi Jinfeng Pharmaceutical Factory was actually Tiger-bone plaster, and this brand was found in three locations in 1995.
- One ambiguously labelled "bone-protecting" wine, produced by Beijing Tongrentang Pharmaceutical Factory and Medical Wine Factory, was said by assistants in at least eight businesses in three different cities in 1995 to be real Tiger-bone wine. This particular wine was seen by investigators in at least 12 businesses in 1995.

Such reports were supported by the fact that on several packets of "Musk *Zhuang gu* plaster", investigators in 1995 noted that the name of the product had been changed simply by covering the word *Hu*, meaning "Tiger", with the word *Zhuang*, meaning "strengthening". Thus, "Musk and Tiger-bone plaster" became "Musk bone-strengthening plaster". One sample of "Musk bone-strengthening plaster" seen still included Tiger bone and Leopard bone on its ingredients list inside the package.

The incidence of manufactured Chinese bone plasters and wines, apparently similar to Tiger-bone equivalents apart from the inclusion of the terms "bone-strengthening" or "bone-protecting" in their names and the absence of Tiger bone as an ingredient, appears to have soared from one recorded case from visual surveys of businesses in 1994, to 41 recorded cases in 1995, to 155 in 1996 (see Table 13). The actual names of such medicines seen during field research each year are listed in Table 14. Several of these listed Leopard bone as an ingredient, which has similar medicinal properties to Tiger bone, in the context of TCM (see Medicinal substitutes for Tiger bone and rhinoceros horn noted during surveys). Prices for plasters and wines, whether listing Tiger bone as an ingredient or not, were found to be very variable and it is therefore not possible to use price as an indicator of whether or not a medicine may actually include Tiger bone (compare Tables 7, 8 and 14).

Investigators also noticed during the course of their visual surveys of businesses in 1995 that packaging on manufactured Chinese medicines which traditionally include rhinoceros horn had been altered in some cases to obscure or omit reference to this ingredient. For example,

- On one package of *Renshen Zaizao Wan* from Jilin Dongfeng Pharmaceutical Factory, the Chinese symbols for "rhinoceros horn" were covered by a small new label with the Chinese symbols for "buffalo horn."

Crawford Allam TRAFFIC

大活絡丹

成分：虎骨、牛膝、鹿角、熟地、何首烏、人參、
 沉香、黃連、天麻、木香、羌活、獨活、地黃、
 板地黃、地黃、白朮、白芍、熟艾、何首烏、
 香、乳香、骨皮、防風、桂心

功能：此丹力能祛風、活絡、止痛之功。

主治：風濕諸痛、筋骨疼痛、頭暈目眩、語言謇澀、
 筋骨不柔、行動不便。

服法用量：每服一丸，每日三次，早晚用開水送下。

北京同仁堂

TA HUO LU TAN

(Velus & Arteries Relieving Pills, bio)

Ingredients			
Aquilegion	1%	Calcium Bone	1%
Tiger Bone	3%	Morchu	10.71%
Radix Polygoni		Radix Coptidis	4.29%
Mullifolium	2.81%	Rhizoma Opiphi	2.81%
Lignum Aquilariae	2.81%	Radix Scutellariae	2.81%
Rhizoma Gastrodiae	2.81%	Conium Maculatum	2.81%
Rhizoma Et Radix	2.81%	Radix Angelicae	2.81%
Notopteryll	2.81%	Radix L. Juss	2.81%
Plastura Insudans		Radix C. chin	2.81%
Radix Angelicae	2.13%	Radix C. chin	2.81%
Sine		Radix C. chin	2.81%
Herba Acon. Cum	1.42%	Radix C. chin	2.81%
Radix	1.42%	Radix C. chin	2.81%
Herb. Gynophyll	1.42%	Radix C. chin	2.81%

Actions: An analgesic for relieving pain & arteries constricting blood circulation.

Indications: Rheumatic pain in the back and muscles, headache, dizziness, difficulty in the movement of the limbs.

Administration: 1 pill each time, 1-2 times daily, to be taken with tea or warm water.

BEIJING TUNG REN TANG
BEIJING, CHINA

大活絡丹

成分：虎骨、牛膝、鹿角、熟地、何首烏、人參、
 沉香、黃連、天麻、木香、羌活、獨活、地黃、
 板地黃、地黃、白朮、白芍、熟艾、何首烏、
 香、乳香、骨皮、防風、桂心

功能：此丹力能祛風、活絡、止痛之功。

主治：風濕諸痛、筋骨疼痛、頭暈目眩、語言謇澀、
 筋骨不柔、行動不便。

服法用量：每服一丸，每日三次，早晚用開水送下。

中國 北京

TA HUO LU TAN

(Velus & Arteries Relieving Pills, bio)

Ingredients			
Aquilegion	1%	Calcium Bone	1%
Zizone	3%	Morchu	10.71%
Radix Polygoni		Radix Coptidis	4.29%
Mullifolium	2.81%	Rhizoma Opiphi	2.81%
Lignum Aquilariae	2.81%	Radix Scutellariae	2.81%
Rhizoma Gastrodiae	2.81%	Conium Maculatum	2.81%
Rhizoma Et Radix	2.81%	Radix Angelicae	2.81%
Notopteryll	2.81%	Radix L. Juss	2.81%
Plastura Insudans		Radix C. chin	2.81%
Radix Angelicae	2.13%	Radix C. chin	2.81%
Sine		Radix C. chin	2.81%
Herba Acon. Cum	1.42%	Radix C. chin	2.81%
Radix	1.42%	Radix C. chin	2.81%
Herb. Gynophyll	1.42%	Radix C. chin	2.81%

Actions: An analgesic for relieving pain & arteries constricting blood circulation.

Indications: Rheumatic pain in the bones and muscles, headache, dizziness, difficulty in the movement of the limbs.

Administration: 1 pill each time, 1-2 times daily, to be taken with tea or warm water.

BEIJING TUNG REN TANG
BEIJING, CHINA

Lists showing ingredients for two separate packages of Tahuoluo Tan, manufactured by the same pharmaceutical company, one including Tiger bone, the other without

- On some packages of *Angong Niu Huang Wan* from Beijing Tongrentang Pharmaceutical Factory, the symbols for rhinoceros horn were simply covered by a small piece of paper, or blackened out. The price for supposedly rhinoceros-horn-free *Angong Niu Huang Wan* was as high as the price for *Angong Niu Huang Wan* with rhinoceros horn.
- On at least one package of *Dahuoluo Dan* from Beijing Tongrentang, rhinoceros horn was not listed as an ingredient, but there was a blank left where the symbols for rhinoceros horn had been on other packets of medicine with the same name.

Whether these cases represent deliberate label falsification to avoid detection of banned contents is unknown. It is possible that manufacturers were attempting to use existing stocks of printed packaging and ingredients lists, although misrepresentative of true contents.

Table 13

Incidence of bone-protecting wine, or bone-strengthening wine, and musk bone-strengthening plasters (supposed substitutes for Tiger-bone equivalents) noted on display, 1994-1996

City	No. of businesses visually scanned	No. of businesses where bone-strengthening/-protecting wine or plaster seen
1994		
Baoding	3	0
Beijing	53	0
Chengdu	53	1
Chongqing	39	0
Guilin	25	0
Kunming	56	0
Nanchang	20	0
Nanjing	27	0
Shanghai	33	0
Tianjin	42	0
Xiamen	33	0
Xi'an	48	0
Zhengzhou	10	0
Total	442	1 (0.22%)
1995		
Beijing	42	9
Chengdu	49	9
Guangzhou	44	1
Guiyang	53	3
Nanchang	26	11
Nanning	29	0
Shenzen	10	0
Tianjin	32	3
Xi'an	44	3
Zhengzhou	26	2
Total	355	41 (11.6%)
1996		
Beijing	49	45
Chengdu	53	24
Nanchang	33	17
Tianjin	35	12
Shanghai	25	4
Xi'an	50	29
Zhengzhou	35	24
Total	280	155 (55.5%)

Source: Investigators' research

Table 14

Wines and plasters not including Tiger bone in their listed ingredients, yet claiming identical or similar properties to Tiger-bone wines and plasters, seen during market surveys

Name	Factory	Prices
Wines		
1995		
1. <i>Hugu Jiu</i>	Beijing Tongrentang P.F.	CNY80/500g
2. <i>Hugu Yao Jiu</i>	Beijing Tongrentang P.F.	CNY80/500g
3. <i>Zhuanggu Jiu</i>	Wuhan Zhonglian P.F.	CNY28.42/500ml
4. <i>Zhuanggu Jiu</i>	Tianjin Darentang P.F.	CNY65.4/500ml
1996		
1. <i>Hugu Jiu</i>	Beijing Tongrentang P.F.	CNY80/323ml
<i>Hugu Jiu</i>	Beijing Tongrentang Med. Wine F.	CNY78.9/323ml
2. <i>Zhuanggu Jiu</i>	Wuhan Jianmin P.F.	CNY28.9/500ml
3. <i>Zhuanggu Jiu</i>	Sichuan Jisheng P.F.	CNY29.5/500ml
Plasters		
1994		
1. Musk and bone plaster	Fifth Chengdu P.F.	CNY1.25/5 pieces
1995		
1. Musk-bone-strengthening plaster	Hubei Huangshi Health Mat. F.	CNY3.0/5 pieces
2. Musk <i>Zhuanggu</i> plaster	Fifth Chengdu P.F.	CNY1.5/4 pieces
3. Musk-bone-strengthening plaster	Wuhan P.F.	CNY1.8/"pack"
4. Musk-bone-strengthening plaster	Hubei Huangshi Changzhen P.F. (LB)	CNY3.5/5 pieces
5. Musk-bone-strengthening plaster	Tianjin Tongrentang P.F.	CNY2.1/4 pieces
6. Musk-bone-strengthening plaster	Wuhan Jianmin P.F. (LB)	CNY3.5/5 pieces
7. Musk-bone-strengthening plaster	Hubei Shashi Jinfeng P.F.	- not recorded
8. Musk-bone-strengthening plaster	Huangshi Lilijia P. Co. (LB)	CNY3.4/4 pieces
9. Musk-bone-strengthening plaster	Jiangxi Health Mat. F. (LB)	CNY3.65/5 pieces
1996		
1. Musk bone-strengthening plaster (<i>Shexiang Zhuanggu Gao</i>)	Wuhan Jianmin P.F. (LB)	CNY3.9/10 pieces
2. Musk bone-strengthening plaster	Hubei Huangshi Health Mat. F. (LB)	- not recorded
3. Musk bone-strengthening plaster	Jiangxi Wanli Health Mat. F.	CNY3.6/10 pieces
4. Musk bone-strengthening plaster	Hubei Suizhou Chutian P.F. (LB)	CNY5.0/10 pieces
5. Musk bone-strengthening plaster	Hubei Jinhong P.F.(LB)	CNY2.4/6 pieces
6. Musk-bone-strengthening plaster	Chengdu 5th P.F.	CNY2.2/6 pieces
7. Musk bone-strengthening plaster	Sichuan Aba Prefecture P.F.	CNY4.0/10 pieces
8. Musk bone-strengthening plaster	Shashi Jinfeng Med. Co. Ltd. (LB)	CNY4.0/10 pieces
9. Musk bone-strengthening plaster	Yunnan Mengsheng P.F. (LB)	CNY2.5/8 pieces
10. Musk bone-strengthening plaster	Hainan Logos Med. Co. Ltd. (LB)	CNY2.9/8 pieces
11. Musk bone-strengthening plaster	Hubei Suizhushi Zutian P.F. (LB)	CNY3.5/8 pieces
12. Musk bone-strengthening plaster	Huangshi Health Mat. F.** (LB)	CNY3.0/8 pieces
13. Musk bone-strengthening plaster	Hubei Huangshi Changzheng P.F. (LB)	CNY3.0/8 pieces
14. Musk bone-strengthening plaster	Huangshi Lilijia P.F.(LB)	CNY5.8/8 pieces
15. Musk bone strengthening plaster	Shenyang Liaohe P.F.	CNY2.2/4 pieces
16. Musk bone-strengthening plaster	Henan Zhengzhou Linglei Corp.	CNY3.0/8 pieces
17. Musk bone-strengthening plaster	Jinan Health Mat. F. (LB)	CNY4.0/10 pieces
18. Musk bone-strengthening plaster	Jinzhou Chinese Med. P.F. (LB)	- not recorded
19. Musk bone-strengthening plaster	Harbin Taiyangdao P.F. (LB)	CNY2.0/6 pieces
20. Musk bone-strengthening plaster	Tianjin Tongrentang P.F.	CNY2.1/4 pieces
21. Musk bone-strengthening plaster	Beijing Health Mat. F.	CNY3.4/10 pieces
22. <i>Shexiang Da Wang Gao</i>	Anqing Yuliangqing P.F. (LB)	- not recorded

Box 3

Medicinal substitutes for Tiger bone and rhinoceros horn noted during market surveys

Bones labelled and/or orally described as being of Leopard, a substitute for Tiger bone (Mills, 1994), were seen in several pharmacies and medicine markets in 1994 and 1995.

In 1994, Leopard bone was seen,

- on display in a pharmacy in Nanchang at CNY11/10g
- on display in a pharmacy in Chongqing at CNY10.9/10g
- on display in a pharmacy in Chongqing at CNY7.9/10g
- on display in a pharmacy in Chengdu - no price recorded
- on display in a pharmacy in Guilin at CNY16.35/10g
- on display in Chongqing medicine market (#1) - no price recorded

Leopard bone was on the January 1994 price list of Anguo Medicine Market at CNY320 (USD36.78)/kg for a "whole set" (complete skeleton). Prior to the ban, in April 1993, Leopard bone had been listed alongside Tiger bone and rhinoceros horn, whereas by January 1994, only Leopard bone remained on the price list. According to vendors in the market, not much Leopard bone was sold there.

In 1995, Leopard bone was seen on display in two pharmacies in Chengdu (the bone was claimed to be from Yunnan and Sichuan), priced at CNY9.8/10g in each case.

No Leopard bones were seen in 1996.



Crawford Allan/TRAFFIC

Analgesic plaster including Leopard bone in its listed ingredients

In all three years of market surveys, investigators saw manufactured Chinese medicines listing Leopard bone as an ingredient (Tables 8, 14 and 15; see also Section 2, *Pharmaceutical companies offering alternatives to Tiger-bone medicines*). Several formulas listed in Table 15, which listed Leopard bone in combination with Tiger bone in 1994, no longer claimed to include the latter in 1995 and 1996.

If Leopard bone is being used as a substitute for Tiger bone in Chinese medicines, this poses a new threat to wild populations of Leopards, as well as a new

responsibility for Chinese authorities to enforce protection of this species listed as a Category I-endangered species under Chinese law, and in Appendix I of CITES.

Water buffalo *Bubalus bubalis* and Saiga Antelope *Saiga tartarica* horn are often used medicinally in combination with, or as a substitute for, rhinoceros horn, although both are considered less potent in certain circumstances (Nowell *et al.*, 1992; Chan *et al.*, 1995). For example, when it is used as a substitute, up to 10 times as much water buffalo horn is required to achieve the same medicinal effect as the normal dosage of rhinoceros horn (Reid, 1993). From 1994 to 1996, investigators encountered an increase in the number of formulas and brands of manufactured Chinese medicines using buffalo horn and/or Saiga Antelope horn as a substitute for rhinoceros horn.

Box 3 continued

Table 15

Manufactured Chinese medicines, other than wines and plasters, listing Leopard bone (Lb) as an ingredient, seen during surveys

Medicine	Pharmaceutical factory	How Lb listed?
1994		
1. <i>Dahuoluo Dan</i>	Jinzhou City Ceyanshan P.F.	Lb listed as substitute for Tb
2. <i>Dahuoluo Dan</i>	Jinxi Baohai P.F.	Lb listed
3. <i>Dahuoluo Wan</i>	Shanxi P.F.	Lb listed
4. <i>Dahuoluo Wan</i>	Sichuan Nanchong P.F.	Lb listed as substitute for Tb
5. <i>Dahuoluo Wan</i>	Sichuan Xichang P.F.	Lb in parentheses next to Tb
6. <i>Dahuoluo Wan</i>	Sichuan Liangshanzhou P.F.	Lb in parentheses next to Tb
7. <i>Jianbu Baoqian Wan</i>	Lanzhou Foci P.F.	Lb listed in Chinese; Tb in English
1995		
1. <i>Dahuoluo Dan</i>	Tianjin Darentang P.F.	Lb listed
2. <i>Dahuoluo Dan</i>	Liaoning Jinxi Xinghai P.F.	Lb listed
3. <i>Dahuoluo Dan</i>	Liaoning Benxi 5th P.F.	Lb listed
4. <i>Dahuoluo Wan</i>	Foshan 1st P.F.	Lb listed
5. <i>Huitian Zaizao Wan</i>	Heilongjiang Wuchang P.F.	Lb listed
6. <i>Niuhuang Qingxin Wan</i>	Tianjin Darentang P.F.	Lb listed
7. <i>Renshen Zaizao Wan</i>	Foshan 1st P.F.	Lb listed
8. <i>Renshen Zaizao Wan</i>	Jilin Denhua P.F.	Lb listed
1996		
1. <i>Dahuoluo Dan</i>	Xi'an Beilin Chinese Med. P.F.	Lb listed
2. <i>Dahuoluo Dan</i>	Liaoning Benxi Chinese Med. P.F.	Lb listed
3. <i>Dahuoluo Wan</i>	Foshan 1st P.F.	Lb listed
4. <i>Huitian Zaizao Wan</i>	Shenyang Chinese Med. P.F.	Lb listed as substitute for Tb
5. <i>Huitian Zaizao Wan</i>	Chengchun People's P.F.	Lb listed as substitute for Tb

Source: Investigators' research

Discussion

Determining the extent to which availability of raw rhinoceros horn changed in China as a result of the ban is impossible, because no large-scale market surveys were conducted prior to the ban.

Based on the results of research for this report, availability of raw rhinoceros horn and rhinoceros horn powder overall increased from 1994 (seen in 7.6% of businesses), to 1995 (seen in 8.5% of businesses), to 1996 (seen in 12.5% of businesses) (Table 3). If one considers availability in businesses in only the six cities which were visited every year of survey, it shows a similar steady increase, but availability at the three medicine markets visited each year was apparently the same in 1996 as in 1994 (Table 16). However, because of non-standardised sampling methods, these fluctuations may not be statistically significant and cannot be extrapolated to characterize the overall retail market in China.

RHINOCEROS HORN AND TIGER BONE: AN INVESTIGATION OF TRADE SINCE THE 1993 BAN

Table 16

Availability of rhinoceros horn and horn powder, Tiger-bone wines and plasters and other manufactured Chinese medicines in cities (and markets for rhinoceros horn) surveyed in all three years, 1994-1996.

Rhinoceros horn and horn powder seen						
	1994		1995		1996	
Businesses						
Beijing	0/25		0/12		0/15	
Chengdu	0/22		2/18		1/12	
Nanchang	7/12		1/11		2/13	
Tianjin	0/17		2/18		1/16	
Xi'an	2/9		2/11		2/10	
Zhengzhou	0/2		1/5		4/9	
Total	9/87 (10%)		8/75 (11%)		10/75 (13%)	
Medicine markets						
Chengdu	2/20		3/30		1/25	
Xi'an#1	3/20		7/20		3/15	
Xi'an#2	2/20		3/15		3/18	
Total	7/60 (12%)		13/65 (20%)		7/58 (12%)	
Tiger-bone plaster and wine seen in businesses						
City	1994		1995		1996	
	on request	on display	on request	on display	on request	on display
Beijing	3/10	0/53	1/28	0/42	0/45	0/49
Chengdu	1/26	1/53	0/31	0/49	0/41	0/53
Nanchang	1/4	1/20	0/9	4/26	4/25	0/33
Tianjin	0/11	0/42	1/11	0/32	1/16	1/35
Xi'an	2/25	3/48	2/35	0/44	0/40	0/50
Zhengzhou	0/4	0/10	2/20	0/26	1/30	0/35
Total	7/80 (8.7%)	5/226 (2.2%)	6/134 (4.5%)	4/219 (1.8%)	6/197 (3.0%)	1/255 (0.4%)
Other manufactured Chinese medicines seen in businesses (visually scanned)						
City	1994		1995		1996	
Beijing	6/53		7/42		10/49	
Chengdu	1/53		3/49		0/53	
Nanchang	7/20		2/26		0/33	
Tianjin	4/42		16/32		22/35	
Xi'an	9/48		0/44		2/50	
Zhengzhou	1/10		0/26		2/35	
Total	28/226 (12.4%)		28/219 (12.8%)		36/255 (14.2%)	

Note: Figures represent the number of businesses or market stalls at which investigators saw a product (to the left of the "/" sign) compared with the number of locations surveyed for that product (to the right of "/"). At the foot of each column, the percentages show the proportion of locations in the six cities or three markets in which a given product was seen in any year.

Most merchants who had raw rhinoceros horn in 1996 claimed their horn was from old stock and that new horn was not available.

Comparison of prices between years is difficult, as an average price for apparently comparable types of horn is calculable only for 1994 and 1996, (CNY60 (USD6.90)/g and CNY49 (USD6)/g, respectively, for *Guangjiao* horn). These prices are significantly more than Martin's recorded retail prices of USD2582-2989/kg for African horn in 1987 in Chengdu, which in turn significantly exceed the price of around CNY9000-11 000 (USD1034-1264)/kg for *Guangjiao* horn at Anguo Medicine Market in 1993. Such wide variation in prices could reflect different types of rhinoceros horn on the market, whether horn is whole or in pieces, or possibly the presence of fakes. Prices overall do appear to have dropped in real terms between 1994 and 1996, however, and some sellers with raw rhinoceros horn said that this was because there was not much demand for it anymore.

Although raw Tiger bone was seen prior to the ban in four businesses of the 25 surveyed in 1992 by Johnson *et al.* (1993), it was never seen on display in any of the businesses and market stalls surveyed for this report, which numbered over 1300 in total. Where requested, it was not apparently available, either.

Total availability of Tiger-bone wines and plasters in businesses appears to have decreased yearly. In 1996, the percentage of merchants offering these medicines in response to investigators' requests for them was about a third of the percentage so doing in 1994. The apparent decrease in incidence of these medicines on open display from 1994 to 1996 is even more marked (about one sixth of the 1994 percentage in 1996). When considering businesses in only the six cities visited each year (Table 16), percentages of availability of wines and plasters in 1996 as compared to 1994 are nearly identical to those recorded for the total sample sizes (Table 6).

Recorded incidence of manufactured Chinese medicines, other than Tiger-bone plasters and wines, containing rhinoceros horn and/or Tiger bone appears to have stayed fairly steady from 1994 to 1996. The apparent slight increase in recorded sightings from 1995 to 1996 (Tables 12 and 16) may have been related to the Chinese Government's decision of January 1995 to allow use of pre-ban stocks of these medicines in designated hospitals (Qing, J.H., *in litt.* to CITES Secretariat, 31 July 1996 and 6 August 1996).

SECTION 2: SURVEY OF PHARMACEUTICAL MANUFACTURERS

Methods

1991 survey

Investigators reviewed the *Catalogue of Proprietary Chinese Medicine in Mainland China* (Anon., 1985), which lists 3866 medicines produced by 529 manufacturers, to identify companies listed as producing medicines with Tiger bone (and parts of other CITES-listed species). Of the 529 manufacturers, 130 appeared to be producing 40 different medicines incorporating Tiger bone or Leopard bone. A letter from a fictitious Hong Kong-based trading company was sent to each of the 130 apparently manufacturing cat-bone medicines, enquiring about the availability of such medicines. The letter also requested ingredient lists for each medicine, price lists, samples of packaging, and relevant export procedures.

Until now, the results of this survey, conducted in 1991 by TRAFFIC Japan and WWF Hong Kong, have not been published.

1995 survey

The 1995 survey attempted to duplicate, to the extent possible, the methodology used in 1991. In addition to re-contacting the 130 companies which received letters as part of the earlier survey, a further 77 pharmaceutical companies which, at least at one time, used either Tiger bone or Leopard bone were identified from *The Complete Volume of Chinese Pharmaceutical Factories* (Anon., 1993d), *Insight into PRC's Medicinal Products* (Anon., undated), *Prescription of Extinction* (Gaski and Johnson, 1994), and packages of medicines confiscated by wildlife law enforcement personnel in the USA and Australia. A list of a total of 207 companies was therefore drawn up for inclusion in the 1995 survey.

As in 1991, a mail survey was conducted, but the 1995 survey used a letter enquiring about the availability of named medicines for rheumatism, whose formulas include Tiger bone. Price lists, minimum orders, ingredient lists, export procedures and, in case Tiger-bone medicines were not available, suggested substitutes were requested. Companies that responded without providing complete ingredient and price information were contacted again by telephone or fax or, if this was not possible, by letter again.

The survey of pharmaceutical manufacturers in 1995 was conducted by an investigator of Chinese descent who could read, write and speak Mandarin Chinese. This investigator was assisted by TRAFFIC staff fluent in Cantonese.

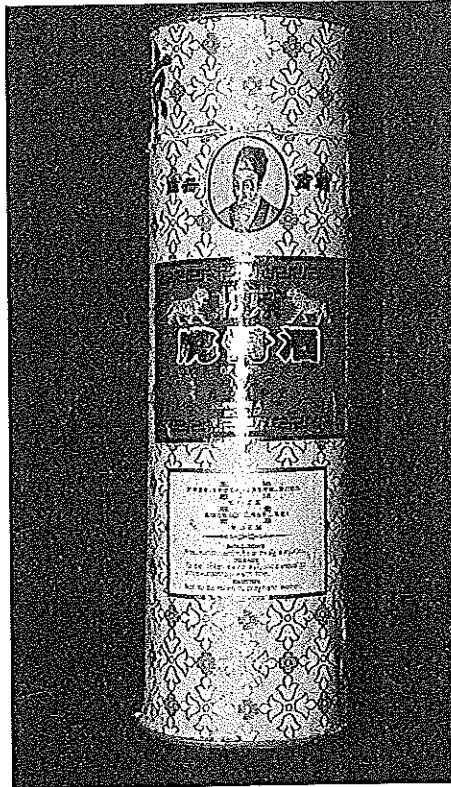
Results

1991 survey

Thirty-one (24%) of the 130 companies producing medicines containing cat bone, according to the *Catalogue of Proprietary Chinese Medicine in Mainland China*, replied to the survey letter. Of these 31, 21 (68%) confirmed that they made Tiger-bone medicines, while a further seven (22%) stated that they made medicines with Tiger bone or Leopard bone.

Most respondents expressed a desire to establish ties with companies in Hong Kong, and in most cases were willing to export their medicines. In two instances, companies already had agents in Hong Kong and, therefore, were unable to do business with other trading companies. Only one company set out the process by which medicines containing Tiger or Leopard parts could legally leave China for Hong Kong. This company was also the sole respondent to make reference to CITES or to indicate awareness of trade restrictions regarding endangered species.

Prices for Tiger-bone wines ranged from CNY3.36 (USD0.60) to CNY12.78 (USD2.28) per 250ml-bottle. Leopard-bone wines, used for the treatment of similar ailments, cost CNY2.02 (USD0.36) to CNY4.09 (USD0.73) per 250ml-bottle. Thus, Tiger-bone wines were two to three times more expensive than Leopard-bone wines



Tiger-bone wine, boxed for sale

1995 survey

Thirty-two (15%) of the 207 companies contacted in 1995 responded to the survey letter. Of these 32, four (13%) offered to sell medicines containing Tiger bone. Twenty-one (66%) of the 32 respondents mentioned that the use of Tiger bone in manufactured medicines was prohibited by wildlife conservation laws in China, CITES, the national government, or provincial health regulations. One company replied that it manufactured "Musk and Strong Bone Plaster (previously named Musk and Tiger Bone Plaster)", suggesting that only the name of the medicine had changed. All four companies that offered Tiger-bone medicines made reference to the regulations which ban the use of Tiger bone in medicines, but were willing to sell anyway. Their responses are outlined below.

Factory A prefaced its offer of Tiger-bone medicines with a statement about China's law: "In accordance with international environmental conservation regulations, Tiger bone and derivatives are forbidden to be manufactured in medicines. Therefore, our

factory has ceased to manufacture these types of Tiger bone medicines...." The factory went on to offer five units (2000 packets) of Tiger-bone plasters medicines, but stated they would be unable to handle export and Customs procedures.

Factory B claimed to have 30 000 250-ml bottles of Tiger-bone wine in stock, priced at approximately CNY18.2 (USD2.25) per bottle. Though explicit in stating the illegality of manufacturing this product, the respondent attempted to justify the offer by stating, "Because manufactured medicines containing Tiger bone are no longer allowed to be manufactured, the existing stock was manufactured a few years ago. According to Chinese Government regulations, we are permitted to sell off existing stock, so long as we do not re-manufacture the products."

Factory C said that it was capable of manufacturing *Dahuoluo Dan* and *Hugu Jiu* with Tiger bone. The respondent indicated that packaging could be altered, if necessary, to facilitate export and import, explaining, "Because in the past two years the Chinese Government has controlled Tiger bone in medicine, we should have a detailed discussion on how to use the proper channels, using legitimate procedures, in order to achieve our business.... If there are problems with the word "hu" (Tiger) when exporting *Hugu Jiu* (Tiger-bone wine), then we suggest a name change as *Zhuanggu Jiu* (bone-strengthening wine). The ingredients and medicinal effects remain unchanged."

Factory D offered to sell more than 6000 bottles of Tiger-bone and *mugua*² wine, at CNY50 (USD6.15) per bottle, from what was said to be old stock. The respondent from this factory demonstrated that he also was aware of the ban but willing to break the law. He wrote: "Tiger bone and *mugua* wine is especially effective towards relieving rheumatism. Last year our factory manufactured a batch, but due to national regulations protecting the Tiger and prohibiting the manufacture and sale of Tiger bone TCM products since 1993, our factory presently has more than 6000 bottles of Tiger bone and *mugua* wine. In addition, we have 18kg of raw Tiger bone, which can produce 6000 bottles of medicinal wine. Our factory is a regular medicine factory, our products can be guaranteed. If your company absolutely needs the above medicinal wines, our factory can resell it to you, but there will be problems with exporting. We can use a different medicinal wine's label for the outside of the box in order to apply to Customs. In addition, our factory also has "rheumatism medicinal wine" and "painful bones medicinal wine", which have a definite curative effect for rheumatism."

In 1995, according to replies from the survey, medicines listing Tiger bone among their ingredients were several times more expensive than those which did not. For example, one factory offered Tiger-bone and musk plaster at CNY3 (USD0.37) per plaster, while a similar plaster claiming to contain musk and "strong" bone cost CNY0.23 (USD0.028). Another factory offered Tiger-bone wine for CNY17.6 (USD2.17) per 250ml-bottle, while Leopard bone *mugua* wine cost CNY6 (USD0.73) per 250ml-bottle.

Pharmaceutical companies offering alternatives to Tiger-bone medicines

In all cases where rheumatism medicines containing Tiger bone were unavailable from companies responding, alternative medicines, including some claimed to be newly-developed substitute formulas, were offered. More than half of the companies responding in 1995 had developed new rheumatism medicines or modified previous formulas in order to comply with the ban. One company explained that musk and Tiger-bone plaster, along with 10 other medicines, used to be one of the main products of their factory, which in China occupied a considerable market share. "After China's ban on medicines containing Tiger bone", the respondent stated, "our company has put a lot of effort into maintaining the market in China, by researching and producing medicines with the identical medicinal effects." Another company described its Tiger bone-free substitute as being of the "second generation" of rheumatism medicines.

Two factories attached to their replies notices from provincial health departments, which declared new substitute medicines effective. One of these respondents stated that their factory produced "*Hulishan*, which does not contain Tiger bone, which is banned by the State Council." All companies offering Tiger bone alternatives, except one, stated that their new medicines were equally as effective in treating rheumatism as their original Tiger-bone medicines. One declaration read, "there are many manufactured medicines which cure rheumatism and are as effective as Tiger bone medicines." One factory representative admitted, however, that their "China Strength Wine" was "not as good as Tiger-bone *mugua* wine, but when taken over a long period of time, it is effective in curing rheumatism." According to several companies, the new Tiger-bone substitute medicines were selling well on the domestic market and internationally in Hong Kong and Southeast Asia.

Seven of the companies offering alternative medicines promised that changes in the names of medicines, (e.g. substituting "bone-strengthening" for "Tiger-bone") reflected actual changed ingredients. Seven (22%) of 32 respondents to the 1995 survey of pharmaceutical companies offered rheumatism medicines claiming to contain Leopard bone as a substitute for Tiger bone. However, not one company mentioned the protected status of Leopard under Chinese law or according to CITES. In regard to Leopard bone

Box 4**Possible origins of Tigers in trade in China**

China itself has a remnant population of wild Tigers, but no more than a few tens of animals survive (Kemf and Jackson, 1994b). China has a Tiger breeding facility, for Siberian Tigers, the Hengdaohezi Breeding Centre of Felidae Animals, in Heilongjiang Province, which it sought to register as a commercial captive breeding operation under the terms of CITES (Anon. 1994, Mills and Jackson 1994). The proposal outlined China's plan to breed Siberian Tigers for possible future release to the wild (Liu, 1993, Mills and Jackson, 1994). Bones and other parts from Tigers that had died from disease, old age, etc. or that had been culled for management reasons (e.g., excess representation of their bloodline in the captive population) were to be sold commercially to finance the Centre's operations. (A Chinese Government official told TRAFFIC investigators in Spring 1994 that 26 complete Tiger skeletons were in storage at the Centre.) The proposal was subsequently withdrawn by the Chinese Government because of strong international opposition to the idea.

If not from within China, Tiger parts would need to be smuggled into the country. There are various possible sources.

- * **Myanmar**, with a unknown but small number of wild Tigers (Kemf and Jackson, 1994), shares a long border with China's Yunnan Province. A Chinese scientist in Yunnan told TRAFFIC investigators in 1994 that cross-border smuggling of wildlife, including Tiger parts, from Burma into Yunnan occurs, especially along the western border near the city of Ruili (see Lintner, 1994). Tan (1987) reported that a premium price was being paid for Burmese Tiger bone. A middleman encountered at Wengong fur market, Jiangxi Province, by researchers in 1992 (Johnson *et al.* 1993), claimed that skins were covertly available from Southeast Asian countries like Myanmar, and that he had the proper "connections" to obtain them.
- * **India and Nepal** Smuggling of Tiger bones into China *via* Tibet has been documented during recent investigations and interrogations of wildlife smugglers in India and Nepal (Martin, 1992; Mills and Jackson, 1994). Overland smuggling routes used were either *via* Leh (in Ladakh, India) into western Tibet, or *via* Kathmandu into Lhasa, the main city of Tibet.
- * **Vietnam**, which may have about 200 wild Tigers left (Kemf and Jackson, 1994b) shares a border with Yunnan Province and Guangxi Autonomous Region of China. According to Li *et al.* (1996), there is considerable, and largely unregulated, cross-border trade of wildlife from Vietnam to China through border trade sites in Pingxiang City and Fangchengang City. It is possible that Tiger parts enter China through these crossing places.

The town of Hekou is on the Yunnan-Vietnam border and straddles the railroad tracks linking Kunming and Hanoi. According to a Chinese scientist and literature sources (Malmstrom, 1993), this town is the site of cross-border wildlife smuggling and also has a wildlife market, through which Tiger parts may be traded.

It has been documented that Tigers killed in Lao PDR were sold to traders in Vietnam (Baird, 1993).

- * The Chinese (and South Koreans) are reportedly the main recipients of Tiger bone from the Russian Far East (Traffic International, 1994). In early April 1995, 14 people were arrested in Kaiyun, Liaoning Province, China in possession of the skin of a four-metre Tiger and its skeleton. Those arrested stated that they had purchased the Tiger parts in Russia and smuggled them to China by train (Anon., 1995).

The *China Daily* newspaper (22 and 24 January 1994 issues) reported that the north-east province of Heilongjiang in China had experienced a steady growth of cross-border trade with Russia in the last four to five years, substantially increasing the opportunity for smuggling across the border. Heilongjiang had, as of January 1994, opened 21 border cities for trade, and truck transport connects the city of Heihe in Heilongjiang and Blagoveschensk in Russia, across the frozen Heilong River during winter.

TRAFFIC investigators were told by a conservationist in 1994 that he had observed bus loads of Russians, apparently entering China on a daily basis to barter goods in the border town of Hailar, Inner Mongolia.

medicines, one company stated, "Because of the international conservation regulation (CITES) which bans the use of Tiger bone in medicines...medicines containing Tiger bone are not allowed to circulate. If your company needs these medicines, we can manufacture them, but the Tiger bone in the medicine must be substituted with Leopard bone." Leopard bone was also an ingredient in a new medicine called *Te Zhong Zhuanggu Jiu* (Speciality Bone-strengthening Wine) manufactured by one respondent. Another factory included a notice from their provincial department of health with their reply, which read, "We agree to the name change of *Te Zhong Hugu Wan* to *Te Zhong Fengshi Wan*... (as long as) the medicines that used to contain Tiger, now contain Leopard bone...".

Discussion

If the results of the 1991 and 1995 surveys of manufacturers were representative of China as a whole, the number of Chinese pharmaceutical companies producing and/or selling Tiger-bone medicines dropped substantially after the ban. While most companies responding to the 1991 survey were willing to export Tiger-bone medicines and only one mentioned CITES restrictions on the international trade in these, in 1995, only two companies conveyed a willingness to circumvent export procedures and the majority of respondents expressed awareness of the ban.

The fact that two (6.3%) of respondents in 1995 were apparently willing to manufacture new Tiger-bone medicines, supports the theory that the making of these has indeed continued after the ban, as suggested by findings recorded in Section 1 of this report. Information from Customs seizures reinforce this theory also. For example, on 24 August 1995, officials in Hong Kong seized 3120 Tiger-bone and musk plasters from a Chinese man entering the territory. The plasters were stamped with a manufacturing date of March 1995, nearly two years after the ban on manufacturing went into effect.

SECTION 3: SURVEY OF AWARENESS OF, AND ATTITUDES TO, THE BAN AND OF GOVERNMENT ATTEMPTS TO PUBLICIZE AND ENFORCE THE BAN

Methods

During the 1994-96 surveys of businesses and medicine markets, investigators collected information pertaining to awareness of the ban, attitudes towards it, and the Government of China's efforts to implement it. Specifically, investigators:

- asked some of the vendors of medicines they visited in 1994 how they had officially been notified of the ban, and scanned news media (newspaper, radio, and television) for announcements regarding the ban;
- recorded every instance where a vendor mentioned awareness of the ban after having been asked for raw rhinoceros horn or Tiger-bone wine or plaster. In 1994, investigators also interviewed a professor at one of China's largest colleges for teaching TCM and villagers in central China, to test their awareness of the ban;
- recorded whether vendors were willing to sell items which they knew were banned, or if they expressed concern about violating the ban, in order to gauge attitudes towards the ban;
- scanned media for news of enforcement of the ban;

Results

Official notification of, and media reporting of, the ban

Investigators were informed by pharmacists and medicine vendors that the State Council's official notice of the ban was disseminated to provincial authorities by the federal agency responsible for regulation of the Chinese medicine community. The notice was in turn distributed to city authorities, who further broadcast it to pharmaceutical factories, businesses, hospitals and clinics, medicine markets, and TCM colleges in their area of administrative responsibility. Investigators saw a copy of the State Council's notice of the ban posted on the wall of one shop associated with the Anguo Medicine Market, and a vendor in the shop said that every stall or shop in the market had this document. Another vendor told investigators that the city's mayor had held a meeting with all vendors in the market to inform them of the contents of the notice.

In some places, additional notices, associated with the Government's official notice, were posted. The Ministry of Health of Shaanxi Province, for example, issued three notices - one announcing the State Council's decree, one providing a list of manufactured medicines banned as a result, and one listing penalties for violation of the ban. In addition, the Xi'an Medicine Company (run by the civic government) gave notice that it would be conducting an investigation for rhinoceros horn and Tiger bone, and directed businesses and factories to disclose the whereabouts of any stocks of these, to inventory their stockpiles of the same, as well as to inventory their manufactured medicines and provide information regarding recent sales of the outlawed products.

In addition to dissemination of the ban *via* bureaucratic channels, the Government used the media extensively to communicate the ban to the public and some of the staff in businesses visited by investigators reported having learned of the ban from television or radio. Investigators encountered the following examples of media reporting of the ban:

- On 16 September 1993, the overseas version of the *People's Daily News* newspaper contained a detailed article regarding the State Council's "Public Notice about ban of trading of rhinoceros horns and Tiger bones" of 29 May 1993.
- On 4 February 1994, the newspaper *China Daily* contained a brief article on the visit by the CITES High Level Delegation, whose purpose was to review China's implementation of the ban.
- On 4 February 1994, the evening news on one of China's state-run television network channels, CCTV-2, included a pause during which the words, "China bans the commerce and trading of rhinoceros horn and Tiger bone" appeared on the screen.
- On 5 February 1994, the evening international news report on CCTV-1 broadcast a story on the CITES High Level Delegation's trip to China. It included a discussion of the ban on rhinoceros horn and Tiger bone, a statement that China hopes CITES discriminates between the Government and individuals when it comes to smuggling, and news about China's recent efforts to protect endangered species, especially through the building of captive breeding centres.
- On 6 February 1994, Central China Radio re-broadcast the previous day's television news report about the CITES High Level Delegation trip.

The fact that residents of a small farming village in central China, with a population of fewer than 100 people, interviewed by investigators, were aware of the ban is testimony to the far-reaching potential of the media, since one farmer in this village recounted that he had watched the burning of rhinoceros horn in Harbin on television and had heard over the radio about the burning of rhinoceros horn in Guangzhou. The pharmacist at the village's clinic was aware that rhinoceros horn and Tiger bone were banned.

In 1995 and 1996, investigators saw no television broadcasts or newspaper articles pertaining to the ban, but it should be noted here that they were in China for shorter periods during these years than in 1994.

Awareness of the ban

Awareness of the ban, was expressed by approximately 50% of vendors in businesses in 1994, 1995 and 1996, upon request for rhinoceros horn or Tiger-bone wine or plaster (Table 17).

The professor of TCM consulted in 1994 was aware of the ban and the reasons for it.

Attitudes towards the ban

1994

Several of those merchants still offering prohibited rhinoceros horn and Tiger-bone medicines for sale after the ban did so knowing that such an act was illegal, as has already been mentioned.

Staff in six of seven pharmacies that offered raw rhinoceros horn for sale to investigators in 1994 knew that such sale was banned, while staff in two of six pharmacies offering rhinoceros horn powder for sale also mentioned that sale was banned. Raw rhinoceros horn was on open display in at least four locations among the businesses and medicine markets visited in 1994.

Tiger-bone wine was on display in some businesses and in some such cases, staff told investigators that

Table 17

Expressed awareness of the ban by staff in businesses in which raw rhinoceros horn or Tiger-bone plasters and wines were requested during market surveys, 1994-1996.

City	1994			1995			1996		
	N	MB	(%)	N	MB	(%)	N	MB	(%)
Baoding	2	1	50.0	-	-	-	-	-	-
Beijing	37	22	59.5	34	29	85.3	47	11	23.4
Chengdu	48	22	45.8	46	24	52.2	45	27	60.0
Chongqing	37	16	43.2	-	-	-	-	-	-
Guangzhou	-	-	-	42	35	83.3	-	-	-
Guilin	25	17	68.0	-	-	-	-	-	-
Guiyang	-	-	-	52	28	53.8	-	-	-
Kunming	48	27	56.3	-	-	-	-	-	-
Nanchang	19	13	68.4	22	8	36.4	31	24	77.4
Nanjing	27	11	40.7	-	-	-	-	-	-
Nanning	-	-	-	15	6	40.0	-	-	-
Shanghai	32	22	68.8	-	-	-	12	9	75.0
Shenzhen	-	-	-	0	0	0.0	-	-	-
Tianjin	27	20	74.1	29	9	31.0	29	14	48.3
Xiamen	32	22	68.8	-	-	-	-	-	-
Xi'an	32	18	56.3	43	26	60.5	42	14	33.3
Zhengzhou	6	6	100.0	23	19	82.6	24	14	58.3
Total	373	218	58.4	306	184	60.1	230	113	49.1

N = number of businesses surveyed; MB = number of businesses mentioning the ban; % = percentage of businesses mentioning ban; - indicates that the city was not visited in a given year.

Note: Cities visited in all three years appear in bold type.

Source: Investigators' research.

they were aware of the ban on sales of the wine, but were willing to sell it anyway. On two occasions comments by vendors appeared to have been attempts to justify display of Tiger-bone wine, despite being aware of the requirements of the law: one vendor explained he had only two bottles remaining in stock, while the other commented that he should have put the bottles away. By contrast, one merchant told investigators that the manufacturing date on one brand of Tiger-bone plaster that he was selling had been purposely falsified so that the plaster appeared to have been produced prior to the ban, and that the factory was still producing the plaster.

If the testimonies of staff in businesses are to be believed, the sale of prohibited items in the months after the ban were often in an effort to get rid of existing stocks only, rather than an indication of long-lasting defiance of the ban. Several employees stated they were trying to "get rid of" or "not waste" these items. Most of these employees said that they would not be getting any new stocks of prohibited items.

Some vendors in medicine markets were highly circumspect in reaction to investigators' questions regarding rhinoceros horn and Tiger-bone medicine. The merchant at Kunming Medicine Market in 1994 claiming to have raw Tiger bone said that he dared not sell the bones, nor would he show them to the investigator. Similarly, the vendor at Xi'an Medicine Market claiming to have a complete Tiger skeleton would not show it to anyone unless they were willing to buy it in its entirety (see *Availability of raw Tiger bone at medicine markets*).

All stall holders visited at Anguo Medicine Market in early 1994 were aware of the ban and many were nervous or afraid to discuss the subjects of rhinoceros horn and Tiger bone, fearing a substantial fine or gaol sentence. They told investigators that the market had already been inspected by people from the Government's "commerce department". Only one of approximately 12 vendors consulted in Anguo Medicine Market was willing to talk about selling rhinoceros horn and Tiger bone. Investigators suspect that this vendor would not have taken any risks unless certain that he could make a sale of large quantities of either.

The TCM professor interviewed mentioned that substitutes were now being used for rhinoceros horn and Tiger bones, and that students at the college were being taught to use these substitutes.

1995

A number of staff in businesses continued to offer rhinoceros horn and Tiger-bone medicines for sale, despite expressing their awareness of the ban. It seems probable indeed that the great majority of pharmacists and medicine market vendors must have known about the ban by 1995, yet raw rhinoceros horn was openly displayed in one pharmacy and by five medicine market vendors visited by investigators that year, while manufactured Chinese medicines containing rhinoceros horn and/or Tiger bone were still sometimes on open display (exceptionally, in 50% of businesses visited in Tianjin) (Table 12).

In 1995, the majority of vendors at Xi'an's medicine markets who offered to sell raw rhinoceros horn to investigators mentioned that such sale was banned. One medicine market vendor in Xi'an said that doctors from the TCM hospital were still coming to the market to buy rhinoceros horn. However, in Guangzhou's Qingping Medicine Market vendors told investigators that they dared not sell rhinoceros horn for fear of being caught and punished.

1996

In 1996, manufactured medicines prohibited under the terms of the ban continued to be on open display in all cities visited by investigators, albeit sometimes in only one or two businesses per city (Tables 6 and 12). Incidence of banned medicines on display was much reduced in the case of Tiger-bone wine and plaster (Table 6).

Reports of enforcement of the ban

Investigators noted the following incidents of Government enforcement of the ban:

- According to Mills and Jackson (1994) 625.4kg of Tiger bones had been registered and sealed by the Government by the end of 1993 in China.
- In December 1993, CCTV's evening news had a story about police confiscation of seven or eight pieces of rhinoceros horn, according to a reliable account.

- During the week beginning 17 January 1994, a programme entitled "Half Hour at Noon" on Central People's Radio Station had a live broadcast from Harbin describing the burning of 50kg or more of rhinoceros horn. The broadcast said that most of the horns were fake.
- On 8 February 1994, CCTV-1 evening news reported the burning of 450kg of rhinoceros horn, valued at CNY2 300 000 (USD264 370), in Guangzhou before the visiting CITES High Level Delegation.
- A Chinese Government official in Beijing told investigators in early 1994 that over 453kgs of smuggled Tiger bones had recently been burned in Harbin.
- A Chinese Government official in Beijing told investigators, also in early 1994, that six groups of envoys were sent by the Government to 10 provinces in late 1993 to investigate how well the ban was being enforced, and that additional groups were to be sent to 10 different provinces later in 1994.
- A member of staff at a pharmacy in Tianjin told investigators in early 1994 that the Ministry of Health had recently completed inspections of many pharmacies throughout the country.
- An informed and reliable source in Xi'an told investigators in early 1994 that employees of provincial authorities, including local policemen, had conducted an inspection of pharmacies in Xi'an. They were said to have confiscated all the raw rhinoceros horn and Tiger bone and manufactured Chinese medicines containing rhinoceros horn and Tiger bone they found. In addition, one or more pharmacies were said to have lost their business licences for having refused to co-operate with the inspection.
- Employees in at least six businesses in Xi'an and four in Kunming told investigators in early 1994 that all rhinoceros horn and Tiger bone products had been confiscated and "sealed" by the Government as part of the ban.
- During their visit to the Qingping Medicine Market in Guangzhou in 1995, investigators were told by vendors that the Department of Industry and Commerce had confiscated about 200 whole rhinoceros horns from the market at the end of 1993/beginning of 1994.

Investigators heard of only a few examples of active enforcement of the ban in 1995 and 1996. The Guiyang medicine market was found to be very "clean" in that virtually no prohibited items were seen: market vendors said that the Government's Medicine Inspection Institute had just inspected the market earlier that day, distributing a list including the names of 42 legally protected animals and plants banned from trade in the market. A pharmacy assistant in Nanchang told investigators in 1996 that an inspection had been conducted "not long ago", during which the inspector found an empty Tiger-bone wine box, but since the box was empty, the inspector could do nothing.

Discussion

Notification of the ban by the Government of China appears to have been systematically carried out by bureaucratic channels and *via* the media. The effectiveness of these systems of notification is testified to by the expressed awareness of the ban by employees in the majority of businesses where an outlawed medicine was requested in 1994 and 1995 (Table 17). Moreover, it must be borne in mind that these levels

of awareness are minimum estimates of such, as some employees could have been aware of the ban, without mentioning it to investigators.

It is not possible to measure attitudes towards the ban by incidence of display of banned medicines, but while these were on view in all three years of survey, there were no records of rhinoceros horn on display in 1996 and the percentage of businesses surveyed displaying Tiger-bone wines or plasters by that year was extremely low (0.4%).

Anecdotal information suggests that Government efforts to enforce the ban in late 1993 and 1994 were substantial. However, China's Government has not released details of these efforts to TRAFFIC, despite repeated requests.

CONCLUSIONS

Information from TRAFFIC's surveys of China's retail market from 1994 to 1996 and surveys of pharmaceutical companies suggest that the Government of China generated widespread awareness of the ban. Owing to the fact that no extensive market surveys were conducted prior to the ban, drawing accurate conclusions about reduction of availability after the ban went into effect is impossible. It is important to note, however, that raw rhinoceros horn, commercial Tiger-bone wines and plasters, and manufactured Chinese medicines containing rhinoceros horn or Tiger bone were never seen in more than 13.6% of either businesses or medicine markets surveyed in any year and that the percentage was as low as 0.4% for displayed wines and plasters in businesses in 1996. The preponderance of products designed and promoted as substitutes for banned products is an encouraging result, which indicates that the Government's call in 1993 for finding alternatives was at least somewhat successful, if banned ingredients really have been substituted.

Despite these positive findings, the consistent availability of banned products, albeit at low levels, since announcement of the ban is cause for concern over whether enforcement of the ban is being sustained, as well as over potential conservation impacts. Even a low level of availability of raw rhinoceros horn, commercial Tiger-bone products, and manufactured Chinese medicines claiming to contain rhinoceros horn and Tiger bone in 1996 is of conservation concern. Three years after the ban went into effect (*i.e.* in 1996), raw rhinoceros horn or rhinoceros horn powder were seen in 12.5% of the businesses and with 10.6% of the medicine market vendors surveyed by TRAFFIC. Manufactured Chinese medicines claiming to contain rhinoceros horn and Tiger bone were also available. While percentages of availability are indeed low, their significance is magnified in the context of China's size. China has 1.3 billion people, most of whom depend, at least in part, on TCM for health care. TCM is dispensed by a million practitioners in China and from thousands of retail and wholesale outlets.

The fact that these TRAFFIC surveys did not employ a statistically random sampling method precludes extrapolating from the results to define China's TCM market overall. However, the surveys document ongoing supply and apparent demand for the medicinal parts of rhinoceroses and Tigers at a time when species and/or populations of these are precariously close to extinction in the wild. Some merchants said their stocks of rhinoceros horn were old, that new stocks were unavailable, and they were charging less for rhinoceros horn than in previous years, which could indicate that little new rhinoceros horn was entering China, that continuing availability simply reflects an effort to use stockpiles, and that demand has declined. On the other hand, availability and reductions in price may be indications that new rhinoceros horn is entering the market, allowing a steady supply and a resulting drop in price. More research is urgently needed to determine which scenario is true.

The recorded decline in availability of commercial Tiger-bone wine and Tiger-bone plaster and apparent transition to substitute medicines for these may be an encouraging sign, if those substitutes are legitimate and no Tiger bone is used in their production. However, the ongoing availability in China of manufactured Chinese medicines claiming to contain Tiger bone, the apparent willingness of two pharmaceutical companies to manufacture and export new Tiger-bone products in 1995, and the continuing availability of these products outside China suggest supply and demand. Are the supply and demand residual and small, or are they steady enough to offer incentive to fuel a black market trade significant enough to threaten the Tiger's survival in the wild? The origin of these products must be ascertained as a matter of urgency.

The apparent increased usage of Leopard bone as a substitute for Tiger bone in manufactured Chinese medicines is of possible conservation concern. Not one manufacturer who responded to the 1995 survey of pharmaceutical companies mentioned the protected status of the Leopard in China or under CITES. Use of this substitute ingredient deserves further clarification and investigation.

The most troubling results of the surveys are indeed the questions they pose but cannot answer, including the following:

- In January 1995, the Government decided to allow existing stocks of medicines containing rhinoceros horn and Tiger bone to be used in hospitals. Did some of these medicines find their way into the retail and wholesale market? If so, how and in what quantities?
- Have businesses been selling previously accumulated stockpiles of rhinoceros horn, Tiger bone and their derivatives, or newly obtained and/or newly manufactured products, or both?
- It is troubling that the relatively high level of awareness of the ban within the TCM community is juxtaposed with a willingness among some merchants to sell prohibited items, despite knowledge of the ban. Are there further enforcement measures which the Government can take to bridge this gap, or does this reflect some kind of socio-cultural impasse which cannot be remedied through a reliance upon law enforcement?
- What public awareness measures is the Government taking to reiterate the ban? Does the Government have a long-term plan to continue to remind the public of the ban?

RECOMMENDATIONS

Enforcement and regulation

- As a matter of urgency, the Government of China should redouble its efforts to enforce the ban.
- With effect as soon as possible, law enforcement officials in China should conduct regular unannounced inspections of pharmacies, clinics, hospitals, department stores, gift shops, and medicine markets throughout China.
- Violations of the ban should be prosecuted, given high penalties, and made public through the mass media, so as to maximize public awareness of the seriousness of violating the ban.
- Law enforcement agencies in China should increase operations aimed at stopping individuals and organizations involved in smuggling and black market sales of rhinoceros horn, Tiger bone and

their medicinal derivatives. These activities could include:

- a. undercover infiltration of organized crime rings;
 - b. more rigorous monitoring of international border crossings to intercept illegal trans-border shipments of protected wildlife;
 - c. more stringent inspection of international travellers and their personal effects, as well as of cargo.
- The Government of China should use covert methods to identify pharmaceutical companies that continue to sell and/or manufacture medicines containing rhinoceros horn and/or Tiger bone.
 - Hospital use of stockpiles of banned medicines should be stopped until a regulatory system is put in place.
 - The Government of China should take immediate action to ensure that medicines containing CITES-listed species do not leave China in contravention of CITES. It is particularly important that these items be removed from retail outlets frequented by tourists, especially in hotel and airport shops.
 - In order to implement the above recommendations, the Government of China and interested parties internationally should increase funding, as well as capacity for regulation of wildlife trade into, within, and outside China.

Public Awareness

- China should use the media to increase public awareness of the threat medicinal use of wildlife poses to rhinoceroses, the Tiger, and other endangered species in the wild. The Government of China should promote the responsibility of China and its citizens to help save endangered species by refusing to buy banned medicines.
- The Government of China should launch a public awareness initiative, separate from that outlined above, aimed at enlisting TCM traders, practitioners and teachers in understanding the links between medicinal uses of wildlife and broader species conservation issues, and in working for acceptable and sustainable solutions to outstanding problems.
- The Government of China should consider developing and introducing into schools nationwide an element in the curriculum regarding the current threatened and/or declining status of some species of wildlife used in medicines important to health care in China.

Substitutes

- The purported use of Leopard bone as a substitute for Tiger bone in manufactured Chinese medicines should be investigated to determine if such use is actually occurring or if Tiger bone continues to be used. The use of the bones of any protected cat species as a substitute for Tiger bone should be stopped under Chinese law.

- The use of water buffalo horn as a substitute for rhinoceros horn should be actively encouraged, while the use of horns from protected species such as the Saiga Antelope should be discouraged.
- The Government of China should take steps to ensure that any substitutes for rhinoceros horn and Tiger bone do not result in the unsustainable exploitation of other species in the wild, particularly those whose status is already vulnerable or threatened.

International Co-operation

- China should be offered assistance in achieving the aforementioned goals by provision of technical and financial assistance. Specifically, technical assistance should be provided in the form of:
 - capacity-building and equipment for more effective wildlife-related law enforcement, especially undercover investigations and more effective border inspections;
 - capacity-building and equipment for laboratory analysis of manufactured Chinese medicines to determine whether they contain rhinoceros horn or Tiger bone;
 - additional funding for research into substitutes using natural products that are not in danger of decline in the wild;
 - development and implementation of public awareness and education programmes aimed at making the public aware of the Chinese consumer's integral role in conservation of wildlife and the availability of viable substitutes that do not threaten the survival of wild species.
 - assisting in the monitoring of the trade in rhinoceros horn, Tiger bone, and their derivatives, to document future trends in availability.

NOTES

¹ Exchange rates: 1991: USD1.00 = CNY5.6; 1994: USD1.00 = CNY8.7; 1995: USD1.00 = CNY8.1; 1996: USD1.00 = CNY8.1. CNY = Chinese yuan, more commonly known as RMB (renminbi).

² *Mugua* may either mean a form of flowering quince, or papaya, the former being more likely, as it is a herb commonly used in conjunction with Tiger bone (Bensky and Gamble, 1993).

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APPENDIX 1

English Translation of "Notice Promulgated by the State Council on the Prohibition of Trade in Rhinoceros Horn and Tiger Bone."

Governments of All Provinces, Autonomous Regions and Municipalities. All Ministries, Commissions and Departments Directly Under the State Council:

Rhinoceros and Tiger are endangered wildlife species under particular international protection, and are both listed in the Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora of which China is a contracting party. To protect these endangered species, in accordance with the Wildlife Conservation Law of the People's Republic of China, the Rules of the People's Republic of China for the Enforcement of the Protection of Terrestrial Wildlife, as well as the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the prohibition of trade in rhinoceros horn and Tiger bone is hereby reiterated as follows:

1. The import and export of rhinoceros horn and Tiger bone (hereinafter referring to any identifiable parts and derivatives such as medicines containing rhinoceros horn and Tiger bone and art work) are strictly prohibited. No institution and individual shall be allowed to transport, carry or mail rhinoceros horn and Tiger bone into or out of China. Any products marked with the words of "rhinoceros horn" and "Tiger bone" shall be treated as containing rhinoceros horn and Tiger bone.
2. It is forbidden to sell, purchase, carry or mail rhinoceros horn and Tiger bone. The rhinoceros horn and Tiger bone presently kept in stocks shall be examined, re-registered, sealed up and properly kept, and the owners shall declare their stocks accurately to forest departments at provincial level or the agencies designated by them. The forestry departments at provincial level or the agencies designated by them shall prepare documentation on their stock of rhinoceros horn and Tiger bone and submit the documentation to the Office of the People's Republic of China for the Administration of the Import and Export of Endangered Species.
3. It is now determined that the pharmaceutical criteria for rhinoceros horn and Tiger bone be cancelled and the pharmaceutical use of rhinoceros horn and Tiger bone be prohibited. The traditional Chinese medicines containing rhinoceros horn and Tiger bone, which have already been produced, shall be sealed up and forbidden for sale within the duration of six months commencing from the date of issuance of the present notice.
4. The state encourages research on pharmaceutical substitutes for rhinoceros horn and Tiger bone, and research achievements will actively be publicized. The use of rhinoceros horn and Tiger bone for particular purposes, such as research for substitutes, is subject to the approval of the Ministry of Public Health, and shall be reported to the Ministry of Forestry for recording, and the activities shall be under the supervision and monitoring of local forestry departments.
5. Violation of the present notice, in terms of sale, purchase, transportation, carriage and mailing of rhinoceros horn and Tiger bone, shall be investigated and dealt with accordingly by the State Industrial and Commerce Administration and the Customs of the People's Republic of China. In cases of speculation, profiteering or smuggling, the judicial department shall investigate and affix responsibility for the crime. Confiscated rhinoceros horn and Tiger bone shall be transferred to local forestry departments above county level to handle in accordance with relevant regulations.
6. The present notice shall be effective from the date of issue. Any previous rules which are inconsistent with the present notice shall accord with the present notice.

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