RESEARCH AND DEVELOPMENT OF CORROSION RESISTANT OIL WELL CEMENTS

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At present enormous value is given to improving of fastening, reliability and longevity of oil and gas wells. The accomplishment of these objectives is complicated by a useful increase of depths of wells, by the complication of mining and geological conditions, by an increase of requirements for the insulation complex of wells with respect to its reliability and longevity. Especially great difficulties are encountered during fastening of gas and gas-condensate wells with the anomalously high seam pressures and the aggressive formation fluids. These difficulties lead to annulus flows and cross-flows, to the mixing of formation fluids, to the loss of reservoir energy, to pollution of the environment due to the corrosion damage of plugging material. They can be the reason for the premature liquidation of petroleum and gas wells. In spite of the research engineering in the improving of fastening of wells under complex mining geological conditions is conducted constantly, at present it is not possible to name this problem solved. Therefore the creation of the reliable insulation complex of wells is the vital problem of well construction, without this problem solving the more complete extraction of hydrocarbon raw material is impossible, and solution of questions of ecology, conservation of mineral resources and preservation of the environment are impossible too.
Traditional technologies and materials for fastening of wells under these conditions ensure the creation of the reliable and long-lived dissociative bridge in the hole annuity to the smallest degree. This problem can be solved by the application of special inexpensive materials for well construction.

The insufficient effectiveness of the technology of fastening of wells under the conditions of corrosiveness required to develop special corrosion-resistant backfill compositions. Improvement of the quality of many backfill compositions (increase of sedimentation stability and gel-forming ability of solution, obtaining noshrinking cement stone with the low permeability, increased strength and the minimum degree of destruction) is limited by the need of conservation of flow characteristics - pumpability of solution before the completion of well cementing process. Starting from the fundamental ideas of the physicochemical mechanics of dispersed structures, the creation of the self-organizing structure of backfill stone with prevention of erosive leakage and channeling is the most effective direction of improvement of corrosion resistance.

The structure of plugging material is formed as a result of the hydration process and under the action of reagents, belonging to its composition.

Each of the reagents, belonging to the complex for processing of backfill suspension, acts with its inherent mechanism; it has an independent effect on the processes of structurization. It is possible to summarize the action of reagents and in such a way to form purposely the structure of cement stone and to obtain plugging materials with the high service properties.

It was noted in the process of experimental investigations and analysis of trade material that not all reagents behave equally.

Decrease of water-to-cement ratio is set as an object; plasticizers and supersplasticizer are used. Their nature is different; therefore the mechanism of action to the cement particles is various. Thus, the plasticizer NTP (nitrilotrimethylphosphonic acid), that is traditionally and widely used decreases the viscous characteristics of suspension effectively, but according to the results of the realized analysis it acts negatively on the stability of system, on the degree of dehydration. But it means that the undesirable processes take place as a result of interaction of reagent and basic components of cement. Application of reagents - plasticizers of another type, for example, of organic nature - CSAG (sulphide alcohol grain), lignosulphonates, ROP-U (reagent for oil production universal) does not lead to such sharp reduction of the sedimentation stability of system, it increases the dispersity of solid phase, that leads to improving of the solidified cement stone.

On the other hand, it is necessary to use reagents - stabilizers, mainly of polymeric type (CMC, CMOEC, TYLOSE, OEC and others) for increasing stability of system and decreasing filtering degree. But, as it is known, when stabilizing suspensions, even the small concentrations of polymers cause a sharp increase of system viscosity, that in its turn hampers the process of delivery of grouting mortar into the well.

The third aspect of task is application of the highly mineralized backfill suspensions. It might be necessary for cementing salt layers. In the ideal case it is necessary that the components of sealing liquid would not be mutually exclusive and they would go well together, creating favorable conditions for forming the firm low-porosity structure of plugging material.

Unfortunately, not all versions of combination "plasticizer - stabilizer" make it possible to reach positive effect. For example, according to the experimental data it is established that there is no effect of reduction of filtering degree and solution stabilization, when NTP and CMC are used together. It means that the stabilizing effect of polymer is annulled in the presence of a plasticizer. The complexes of organic plasticizers of ROP-U type and fusion cake of salt have distinctions in kind with polymeric stabilizers. In this case there is effect of sharp reduction of filtering degree till values commensurable with the water loss of drilling mud and at the same time there is retention of high degree of freedom with the minimum content of dispersion medium. It speaks in favor of this type of complexes. They make it possible to obtain highly mobile backfill systems with low content of liquid phase and maximum sedimentation stability. And all these characteristics say that from this suspension the firm low-permeability microcellular stone with good functional qualities will be formed. Not all complexes of reagents behave positively in the presence of salts of the type of sodium chloride or potassium chloride also. A question of reagents compatibility in the complex will also take place here. The positive effect of sodium chloride on the complex "organic plasticizer - stabilizer" and the negative effect of salt on the complex "NTP - stabilizer" are noted in practice.

As the facts were available, the attempt to determine the mechanism of interaction of reagents in the complex was made. The complex was prepared as the sealing liquid of backfill suspension.

An experiment for the investigation of the mutual influence of reagents forming part of mixing water for the cement mortar was made. Organic reagents are combined with the stabilizers well; they form the structure "in each other" during the formation of backfill stone, and thus they contribute to an improvement of the service properties of cement cover. But other reagents are not combined with each other at all, they do not improve properties but on the contrary they sometimes worsen them. The influence of corroding agents on backfill compositions in the suspensions and the sections prepared from the formed backfill stones was also noted.

To realize the experimental work we have taken two types of plasticizers (NTP (nitrilotrimethylphosphonic acid) and developed by us and produced by industry ROP-U) and also stabilizer (water-soluble polymer CMC (carboxymethyl cellulose)) as the most commonly used in practice for the treatment of oil-well cement. The oil-well cement of brand PCT II-SS-100 was used as the binding component. The oil-well cement of brand PCT II-SS-100 was prepared according to Government Standard 1581-96. Temperature of tests was 20-220 ^{o} C.

To study we have taken plugging materials obtained as a result of the hardening of cement paste that had been processed by the solution of the following chemical reagents:

1. PCT II-SS-100 is fresh
2. PCT II-SS-100 is salt
3. PCT II-SS-100 + 5 % ROP-U is fresh
4. PCT II-SS-100 + 5 % ROP-U is salt
5. PCT II-SS-100 + 0,5% CMC + 5 % ROP-U is fresh

6. PCT II-SS-100 + 0,5% CMC + 5 % ROP-U is salt
7. PCT II-SS-100 +0,03% NTP is fresh
8. PCT II-SS-100 + 0,03% NTP + 0,5% CMC is fresh
9. PCT II-SS-100 + 0,5% phosphates is fresh
10. PCT II-SS-100 + 0,5% phosphates + 0,5% CMC

Water-to-cement ratio of all suspensions is 0,5.

The formation water of well №303 of the field Podgornenskoe was used as salt mixing water. The ionic composition of water is represented in table 1.

Table 1. The ionic composition of water

Specific gravity, d_4^{20}	Mineralization, g/l	Ionic composition, g/l					
		HCO_3^-	Cl^-	SO_4^{-2}	Ca^{+2}	Mg^{+2}	K^++Na^+
1,178	255,2463	0,3794	152,8208	2,7883	2,6448	1,0579	95,5551

Tests were conducted according to the International Standard NACE TM0177-96. The sections of different composition of two day's, ten day's and monthly period of storage were prepared as the reference patterns. Models of the same composition were placed into the corrosive environment. Test solution consisted of 5% NaCl and 0,5% of crystalline acetic acid dissolved in the distilled water. Then solution in the desiccator was saturated with hydrogen sulfide till concentration 3000 mg/l. pH of medium was 2,8. Such aggressive medium was created to see in a short space of time how the prepared sections of cement stone, which had been subjected by the action of it, would behave. Then reference patterns subjected to action of aggressive medium were analyzed and described with the observation under a 100-power electron microscope "Philips". The X-ray spectrum analysis of models was also conducted.

All microscopical analyses were conducted with thin sections prepared from the hardened compositions; all models were sprayed with graphite. Porosity, fissuring and structure of units served as a criterion for changing the structural state of cement stone that had been subjected by sulfurated hydrogen corrosion.

As can be seen from the given photomicrographs (fig. 1, 3, and 5) it is possible to observe sufficiently distinctly the processes of focal corrosion development, crack formation over the entire surface (model №1 that was not subjected to treatment by reagents (fig. 3)). The reference pattern of the same composition is represented in the figure 1. Composition №5 (Fig. 5) proved itself to be the most stable of all enumerated compositions to the aggressive medium. It can be explained by means of synthesizing the organic-mineral microdispersed phase in the cement mortar and then in the cement stone. Analyzing data of X-ray spectrum analysis (fig .2) we can draw the following conclusions: judging by the results of X-ray spectrum analysis, model №1 (Fig. 3) endured a qualitative and quantitative change of composition to the utmost. The fact of corrosion damage confirms it (fig. 2, 4). In the presence of ROP-U and CMC (fig. 6) corrosion damage is not considerable, in products of hydration part of water-soluble salts subjected to erosive leakage is reduced in several times.

The nature of the structure of pore space is one of the most important structural parameters of cement stone, determining its filter discrimination. By sight, by means of microphotoarchitecture analysis we can note that in the process of contact with hydrogen sulfide the body of cement stone is destroyed. It is confirmed by change of pore size and configuration, by increase of the porosity, by presence of the elements of dissolution in pores, by crack and channel formation.

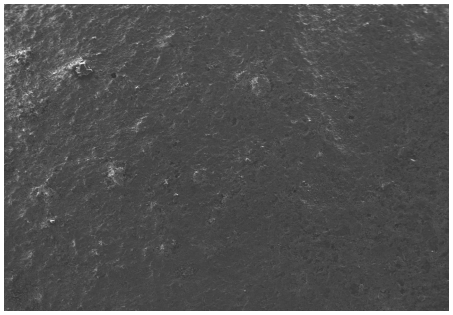

Fig. 1. The surface of reference section (composition №1)

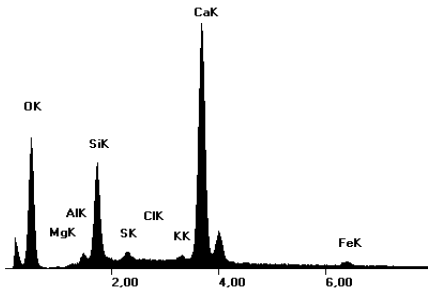

Fig. 2. X-ray spectrum analysis of reference section (composition №1)

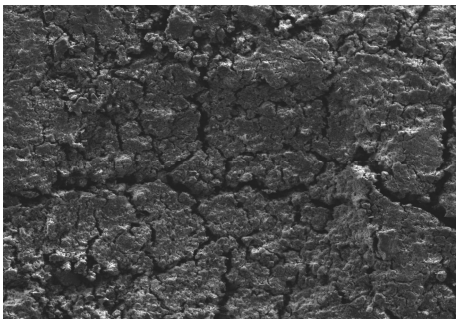

Fig. 3. The section's face subjected to corrosion (composition №1)

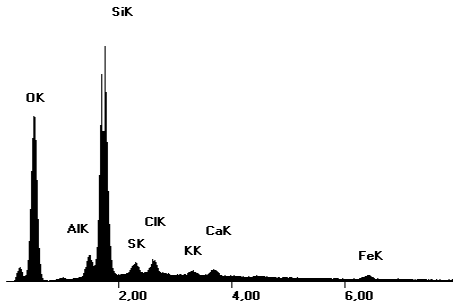

Fig. 4. X-ray spectrum analysis of the section subjected to corrosion (composition №1)

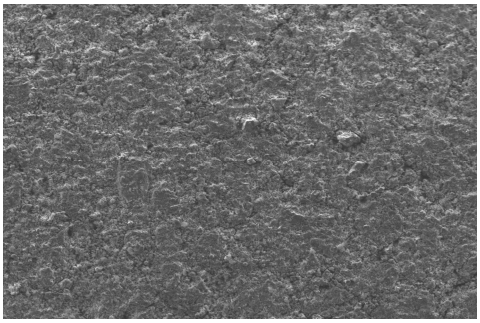

Fig. 5. The section's face subjected to corrosion (composition №5)

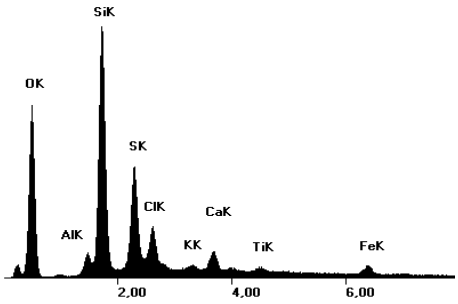

Fig. 6. X-ray spectrum analysis of the section subjected to corrosion (composition №5)

Thus, to increase the life of well, and hence to increase the reliability of disconnection of layers containing corrosion-active medium it is necessary to stabilize backfill suspensions in such a way as to a plugging of interpore space by newly formed organic-mineral substances, which make it possible to decrease the permeability of stone and contact zones till minimum, would be the result of effect of the complex of reagents.

Materials of Conferences

THE HEAVY METALS IN ECOSYSTEMS OF CITIES ALTAY

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The strong contribution in ecosystems large cities of Altay introduce different industrial enterprises and as well as automobiles and cars, that are assuming in last years threatening scales on ejections in environment enough extensive spectrum toxicants.

The dominant in spectrum heavy metals in ecosystems of cities Altay define by prevailing pollutants, that these arrive in environment from different sources pollution industrial infrastructural and acquiring cumulative effect acting on biota. Tree principal types ecosystems cities on Altay split: 1- ecosystems of cities with predominance industrial ejections enterprises military-industrial complex and chemical plants (Biisk); 2- ecosystems of cities with predominance industrial enterprises of heavy machine building (Barnaul); 3- ecosystems cities with predominance ejections rock-withdrawal and rock-benefication enterprises (Zmeinogorsk, Rubscovsk).

The high information of evaluation ecologic condition of nature system supplay by high detectivity bio-geochemical mapping with using X-ray emission spectroscopy radiometric apparatus (RRA) type NOKKIA (c. Saint Petersburg, LSU) that it is allow study roentgen spectrum assay probes on wide spectrum of chemical elements. The probes of dry leafs analyzed with assistance RRA on first stage. The first microns of surface leaf analyzed, where are concentrate more part of heavy metals, accumulation of plants for period from appearance to their gathering for analysis. The ash probe leafs analyzed on the second stage and bark of plants by method ICP-MS and ICP-AES on large spectrum elements in Analytical centre IMGRE (c. Moskow).

We adjusted before that the heavy metals more intensity absorb from gas faze, poorly – from solution and more poorly – from solid faze – soil (Gusev, Rusanova, 2005). The all chemical elements divided trough level biologic accumulation in correspondence of classification A. Perelman (Perelman, 1975): the phosphorus follow to classify to elements biologic accumulation (Kx = 3.4-24.0); Mo, Zn, Cu, Mn, Ag, Sr, Ba, B, Pb, Sn, Ni – to elements of middle entrainment (Kx = 0.5-8); Ti, Al, Co, Cr, Be, F – to elements of faint entrainment (Kx = 0.1-1). The elements zinc and silver (group of middle entrainment of elements) in industrial zone of Biisk exceed standard levels that these are showing in literature data.

The comparative analysis of ecosystem cities of region completed on detecting paragenetic association elements in plants with high count (200-250 probes) of poplar and wormwood for supply representation receiving results by method main components of factor analysis. It is know, that the factor analysis in more degrees correspond sense paragenetic analysis (Smirnov, 1975). The structure unity of model evidence about it, that it is describing of behavior chemical elements of system on change outward conditions and model main components:

$X_i = \sum W_{ij} Z_j$, where Z_j – values of $_j$ factor; Wij – factor load of j factor on i variable; (i=1,2,3,…, m; j= 1,2,3, …, r; r ≤m).

The heavy metals in the first type of ecosystems enter in all environments and these has specific set paragenic associations of elements. The calculation of factor loads for data on sampling analysis for bark and herb of wormwood receive in such form:

Φ I of poplar, D=42%, $Zn_{0,95}$ $Mo_{0,86}$ $Sn_{0,61}$ $Sr_{0,52}$ $P_{0,48}$ $Pb_{0,42}$

Φ I of wormwood, D=39,2, $Ag_{0,81}$ $Zn_{0,77}$ $P_{0,72}$ $Mo_{0,62}$ $Pb_{0,57}$ $Cu_{0,43}$

Where Φ I – factor loads of first exponent, D – contribution of factor loads in percents (for 95% level significance).

These results show that there are discovering associations in plants of industrial zone of c. Biisk reflect complexes of chemical elements, having technogenic nature, but the particularly values of factors arrange order on level increasing coefficient biologic accumulation (or anomaly in the plants). The paragenic associations of chemical elements in bark poplar and herb of wormwood has features similarity and distinction. There are has common associations chemical elements (Zn, Mo, P, Pb), but so specific, these are characteristic for poplar (Sr, Sn) and characteristic for wormwood (Ag, Cu).

The factor loads and paragenetic associations of heavy metals for those plants for second type of ecosystems (c. Barnaul) determine in follow appearance:

Φ I of poplar, D=49%, $P_{0,98}$ $Zn_{0,95}$ $Sr_{0,88}$ $Cu_{0,73}$ $B_{0,62}$ $Mo_{0,46}$ $Pb_{0,42}$ $Hg_{0,33}$

Φ I of wormwood, D=47,6, $P_{0,94}$ $Mo_{0,82}$ $Cu_{0,63}$ $B_{0,60}$ $Zn_{0,57}$ $Mn_{0,51}$ $Sr_{0,40}$

The bark of poplar of ecosystem Barnaul contain boron and mercury an against of Biisk and it is lacking tin, but phosphorus acquire significant role in bringing formula. The phosphorus predominate and in the wormwood. The paragenetic association appearance manganese, strontium and it is falling out silver from list.

The paragenetic associations of third type ecosystem (c. Zmeinogorsk) determine entirely by composition extracted polymetallic ores from gold-sulfide massive deposits (Zmeinogorskoe, Korbalichinskoe, Srednee, Petrovskoe and other). The factor loads and paragenetic associations of heavy metals for those plants for third type of ecosystems (c. Zmeinogorsk) determine in follow appearance:

Ф I of poplar, D=52,4%, Ba $_{0,97}$ Cu $_{0,93}$ Zn $_{0,91}$ Pb $_{0,89}$ Sr $_{0,88}$ Ag $_{0,81}$ Cd $_{0,60}$ Mo $_{0,46}$ Tl $_{0,39}$

Ф I wormwood, D=44,5, Ba $_{0,92}$ Ag $_{0,91}$ Cd $_{0,85}$ Zn $_{0,81}$ Pb $_{0,69}$ Cu $_{0,53}$ Sr $_{0,48}$ Mo $_{0,42}$ Tl $_{0,29}$

The barium, copper, silver, cadmium, tallium receive considerable role in both plants in composition of paragenetic associations of ecosystem city Zmeinogorsk. The last elements from it list appear by admixture**,** but they turn out an important pollutants, absorption by plants.

The intense change (yellow of leafs) on poplars and birches happened in July 2004 year in ecosystem of Biisk in area of target burning rocket fuel (to N-W and N-E from target) after next burnings. Unusual early defoliation foliose trees and bushes took place at beginning august. The probes of leafs birch and poplar in it area turn out with anomaly concentrations of manganese, aluminium, mercury, cobalt, chromium, strontium. The near list anomaly elements fixed in wormwood also. High concentrations noted for lead, zinc and barium in wormwood besides above indicating.

Consequently necessity it note that in limits of every ecosystem arranged considerable variations in spectrums of anomaly elements. Anomaly indicators at lead, cadmium, zinc, cooper, cobalt in soils and in leafs of different herb reveal in the center of c. Biisk, that there are connect with high longstanding assignment on environment movement auto transport on the stretch auto station – Biisk city and these caused by high fume of it area and thrusting out in atmosphere tetra etil lead and other heavy metals with exhaust gases.

The near picture technogenic pollution observe for center of city Barnaul, area of railway station, auto station and so area “Potok”, where there are concentrate intensive movement auto transport. The anomaly significances in ecosystem of Barnaul as against Biisk obtain the elements of first class of danger – mercury and beryllium (Zhdanova, Gusev, 2006).

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CONFIGURATION OF CROSS CRACKS FORMED IN BRITTLE MATERIALS BY MEANS OF PLASTIC SUBSTANCES AND EXTERNAL LOADING ON FRACTURED SAMPLE

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To find out the possibilities of crack configuration management in the course of its development under the conditions of external loading on the destroyed sample a series of laboratory experiments in a press was carried out by my colleague Kyu N.G. and me. Four separate organic glass blocks dimensioned 100×100×100 mm each one were used in the experiment and were fractured using plasticine. The purpose of the experiments was to find out general principles of crack formation in such conditions.

The first experiment was carried out without any external loading on the tested sample and served as the basis for the following comparisons. The plasticine charging was performed through a bore drilled out in the block center into its bottom-hole part by means of a special cylinder device held in this bore by thread. The bottom-hole pressure was measured by a manometer provided with a special adaptor placed on the opposite side of the block. In the course of the experiment it was found out that with the increase of the putty amount introduced into the crack and simultaneous growth of its dimensions the putty charge pressure decreases at the end and at the beginning of every separate stage of the experiment. Besides, the horizontal and vertical dimensions of the formed crack and also the zones of its filling with a plastic substance grow much the same in the nature with the result that the crack assumes a definite round-shape form. At the beginning of plasticine charging the pressure changed from 370 atm до 150 atm, and at the end – from 200 atm to 50 atm. The split of the sample followed the pressure downtick. In the course of carrying out the first experiment all the earlier educed principles of development of the crack formed using plastic substances transverse the shot hole axis in brittle materials were confirmed, they corresponding to the lack of external loading on the tested sample.

The second experiment was carried out at the vertical loading on the sample on the part of press. Because of technical failures (faulty seals in the system of oil charging) the loading varied fluently within the interval from 10 to 15 tons. A characteristic feature of the second experiment was an accelerated growth of the crack and the zone of its filling with the putty in the direction of loading appliance to the tested

sample (vertical). At a light loading (10-15 tons) these changes were scarcely noticeable as usual measuring devices were used. The crack shape grew looking like an ellipse with the bigger side oriented in the vertical direction. As a result of the last charging a split of the block into two parts occurred. At the beginning of charging the pressure changed from 300 atm to 100 atm, and at the end – from 175atm to 50 atm. The split of the sample followed the pressure downtick.

The third experiment was carried out at the loading equal to 60-70 tons on the part of the press. At the moment of its being finished the pressure made 70 kgf/cm^2. At the moment of unloading on the part of the press the pressure turned out to be at the level of 45kgf/cm^2. After that the loading was fluently increased up to 60 tons. Under the loading the crack mainly grew in the vertical direction (the direction of loading appliance), and without it – in the horizontal direction, bringing its shape into proximity with a round. At the beginning of charging the pressure changed from 190 atm to 200 atm, and at the end – was at the level of 139 atm. The experiment was carried out up to the split of the sample into two parts.

The fourth experiment was carried out at the loading equal to 85 tons on the part of the press. Its characteristic feature was the fact that the pressure in the crack center fell slower than in the previous experiments. After ceasing the charging of plasticine and exposing the sample to the same loading - 85 tons for 15 minutes, the pressure in the crack center didn't practically fall and became equal to 100 kgf/cm^2. The crack ellipse changed the orientation from the vertical one at the beginning to the horizontal one at the end. A peculiarity of this experiment was the greatest vertical loading applied to the fractured sample and, as a consequence of it, the possibility of a better observation of the tendency educed by means of carrying out the previous experiments. At the beginning of charging the pressure was maintained at the level of 190 atm, and at the end – at about 110 atm. The experiment was carried out up to the split of the sample into two parts.

The educed principles can be successfully used at breaking out natural stone, the procurement of which is carried out under the conditions of mineral deposits' underground mining method and great value rock pressure presence, using plastic substances.

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THE ASSOCIATION OF PSYCHIATRIC COMORBIDITY AND USE OF THE EMERGENCY DEPARTMENT AMONG PERSONS WITH SUBSTANCE USE DISORDERS: AN OBSERVATIONAL COHORT STUDY

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Background: Psychiatric and substance use problems are commonly found to be contributing factors to frequent Emergency Department (ED) use, yet little research has focused on the association between substance use and psychiatric comorbidity. This study assesses the association of a psychiatric comorbidity on (ED) use among patients with substance use disorders (SUDs).

Methods: The study focuses on 6,865 patients who were diagnosed with SUDs in the ED of a large urban hospital in the southern United States from January 1994 - June 1998. Patients were grouped by type of substance use disorder. After examining frequency of visits by diagnosis, the sample was assigned to the following groups-alcohol dependence (ICD9 = 303), alcohol abuse (ICD9 = 305.0), cocaine dependence/abuse (ICD9 = 304.2, 305.6), and polysubstance/mixed use (ICD9 = 305.9). A patient was classified with psychiatric comorbidity if a psychiatric diagnosis appeared during any of the patient's visits. The following psychiatric diagnoses were included-schizophrenia/psychoses, bipolar disorder, depression, anxiety, and dementia (ICD-9 codes available upon request).

Results: Patients with SUDs and psychiatric comorbidity had significantly higher mean number of ER visits (mean = 5.2 SD = 8.7) than SUD patients without psychiatric comorbidity (mean = 2.5, SD = 3.7). In logistic regressions predicting several categorizations of heavier use of the ED (either 4+, 8+, 12+, 16+, or 20+ visits over the span of the study) SUD patients with psychiatric comorbidity had adjusted odds ratios of 3.0 to 5.6 (reference group = patients with SUDs but no psychiatric comorbidity). This association was found across all substance use diagnostic categories studied, with the strongest relationship observed among patients with cocaine disorders or alcohol dependence.

Conclusion: The results provide further support for the notion that the ED could and should serve as an important identification site for cost-effective intervention.

Background

For some time, health services research has focused on the issue of frequent use of the ED. This growing literature finds that smaller subgroups of patients with repeat visits use disproportionate amounts of services. [1-4] From both clinical and policy perspectives, few would argue that frequent use of the ED is an optimal treatment approach. It is incumbent upon the field to identify the health and social issues driving frequent use of the ED and to identify suitable interventions to improve care and reduce the strain on scarce ED resources.

Research on frequent users of the ED find that they have fewer resourcesand higher rates of mortality and morbidity than non-frequent users. [5,6] Psychiatric and substance use problems are commonly found to be contributing factors to frequent ED use. [3,7-14] Little research, however, has focused on the association between substance use and psychiatric *comorbidity* and the frequency of ED use. A group of studies has found that comorbid substance use disorders were associated with increased ED use among persons with schizophrenia. [12,15,16]

A recent study by the current authors found that comorbid substance use disorders were significantly and substantially related to increased ED use across samples of ED users with a range of primary psychiatric disorders (e.g., schizophrenia, depression, anxiety,

etc.). [17] The largest increases in ED use frequency were observed for patients with schizophrenia or dementia and a comorbidity of substance use disorders (generically defined). That study used data from the same hospital as the current study; however, the samples are mutually exclusive and there are no overlapping cases.

The current study is the first to our knowledge to examine the association of a comorbid psychiatric diagnosis to the frequency of ED visits of a cohort of patients who were discharged from an ED with a primary substance use disorder diagnosis. More specifically, the goal of the study was to document the association of psychiatric comorbidity to frequency of ED use among patients with *different* substance use disorders. The study authors' hypothesis was that psychiatric comorbidity would be associated with more frequent ED use across all substance use diagnostic groups studied. It is hoped that the identification of modifiable risk factors for frequent ED use could lead to the development of promising interventions in the future.

Methods

Data source and collection

The data used in the study originate from a large community hospital in the southern United States. The facility is a general medical/surgical hospital with a specialized psychiatric ED within the general ED. Data were gathered on every ED visit (total = 364,591) from January 1994 to June 1998. The hospital cares for approximately 60% of all county hospital ED patients. With the only level 1 trauma center in the area, the hospital handles most of the city's trauma and virtually all acutely ill indigent patients. The psychiatric emergency department is where law enforcement officers are instructed to take individuals needing psychiatric care, and was the only facility in the area equipped to handle involuntary indigent patients needing psychiatric evaluation during the study period. Patients presenting with psychiatric and/or substance use problems are directed to the psychiatric ED. All psychiatric diagnoses are made by psychiatrists.

Every psychiatric ED patient received a multi-axial assessment and diagnostic formulation. Diagnoses were made according to the Diagnostic and Statistical Manual of Mental Disorders III-R or IV. [18,19] The hospital's medical record allowed for the recording of four diagnoses per visit, including psychiatric, alcohol or substance related conditions, and medical conditions. All psychiatric diagnoses were made by the attending psychiatrists or by first or second year psychiatry residents who were directly supervised by the attending staff. During the entire study period there were three attending psychiatrists on staff, and the continuity of attending psychiatrists provided consistency in the diagnostic process. Because diagnosis in an emergency department setting may be difficult, [15] several safeguards were employed in the psychiatric ED to improve the quality of diagnosis. First, any suspicion of a medical condition causing the psychiatric presentation was evaluated by the internal medicine service to provide medical diagnosis and determine that the patients' presenting symptoms are due to psychiatric and not medical disorders. Second, the index of suspicion for substance abuse and substance induced psychiatric disorders was high for the presenting population, and a primary psychiatric diagnosis was not given if substance use is suspected as a primary etiologic factor.

In addition to the diagnostic information at each visit, demographic and patient entry and disposition data was recorded by emergency department nursing staff. Demographic information includes gender, race, and age. Data entry for the study period was supervised by a single individual who checked the accuracy of data input by comparison with the medical record. When the database was generated, DSM diagnoses were recorded as ICD-9 codes. The research was approved by the Institution Review Board at the University of Arkansas for Medical Sciences.

The sample

Every patient with at least one primary discharge diagnosis of *any* substance use disorder from any area of the ED (medical, surgical, psychiatry) during the study span (n = 7,570) was included in the initial sample. This group made up 3.7% of the total number of unique patients using the ED across the span of the study (n = 203,114). These patients were then grouped by type of substance use disorder. After examining frequency of visits by diagnosis, the final sample (n = 6,865) was assigned to the following groups-alcohol dependence (ICD9 = 303), alcohol abuse (ICD9 = 305.0), cocaine dependence/abuse (ICD9 = 304.2, 305.6), and polysubstance/mixed use (ICD9 = 305.9). The alcohol dependence and abuse groups were not combined due to the large numbers of patients in each category. The cocaine abuse and dependence groups were combined due to the very small number of patients who received a cocaine dependence diagnosis. For the current study we excluded patients (n = 705) in less commonly presented diagnostic categories (e.g., opiate, hallucinogen, barbiturate, amphetamine, and marijuana use disorders to name several).

Because the diagnosis for a given patient could change from visit to visit, patients were placed in a diagnostic category based on the diagnosis received during a majority of visits. In the rare cases of "ties" in the number of visits falling in more than one diagnostic category, a grouping algorithm was used. If any tie involved "polysubstance use", the patient was placed in that category. Next, the following hierarchy of "severity", based on the clinical judgment of the authors, was imposed such that any remaining ties would be resolved by the patient being grouped in the more severe category-cocaine dependence/abuse, alcohol dependence, or alcohol abuse.

A patient was classified with psychiatric comorbidity if a psychiatric diagnosis appeared during any of the patient's visits. The following psychiatric diagnoses were included-schizophrenia/psychoses, bipolar disorder, depression, anxiety, and dementia (ICD-9 codes available upon request).

Data Analyses

T-tests of group means were used to investigate differences in number of ED visits across our substance use categories by psychiatric comorbidity. Logistic regression analysis was used to test the predictive ability of the presence of psychiatric comorbidity on frequency of ED visits, controlling for age, race (Caucasian, African-American, Hispanic, other), and gender. Interaction effects were also tested between psychiatric comorbidity and age, race, and gender. Due to the large sample size, we used a conservative *p* value of .01. Separate logistic regression models were used for each substance use group. Five categories of "frequent ED use" were created: 4 or more visits (4+), 8 or more visits (8+), 12 or more visits (12 +), 16 or more visits (16+), and 20 or more visits (20+) across the 4.5-year span of the study. The rationale for using multiple categories was twofold: 1) The literature does not agree on what "frequent use" is, and providing a range of categories allows the data to be comparable to a broader range of previous work. 2) The categories allowed for "sensitivity analyses" to investigate if the predictive ability of the psychiatric comorbidity would be constant across frequency categories or if its strength as a predictor might level or drop-off after a certain number of visits. To arrive at these specific categories, the data on ED use were examined. The sample's mean number of visits across the span of the study was 2.9, with a standard deviation of 4.8. Based on these data, and the judgment of the clinician co-authors of the manuscript, it was decided that the categories would be based on a count of 4. The first category of frequent use (4+ visits) represents a value just beyond the mean as a lower bound. The next category (8+ visits) captures the number of visits corresponding to the first standard deviation. The remaining categories approximate the next standard deviations. This categorization also reflects the judgment of the clinician co-authors that it would be

useful to have categories that correspond to 1+ mean visit per year of the study (4+ visits), 2+ mean visits per year of the study (8+ visits), up to 5+ means visits per year of the study (20+ visits). As well, this grouping corresponds closely to the categories used by one of the only other multi-year studies of repeat users of the ED by persons with psychiatric diagnoses. [16]

Results

Patient demographic information is presented in Table 1. The sample was predominantly male (72.9%). African-Americans were more heavily represented in the polysub-stance use, cocaine, and alcohol abuse groups; Caucasians were more represented in the alcohol dependence group. The most common presenting disorder was alcohol abuse (35.5%), followed by alcohol dependence (26.0%), cocaine (21.2%) and polysubstance use (17.4%) disorders. Patients with polysubstance use disorder were the most likely to also have been diagnosed with a psychiatric disorder (21.2%) in the ED. Patients with cocaine use disorders (14.3%) and alcohol dependence (14.1%) had similar rates of comorbid psychiatric disorders.

Overall, the group of primary substance use disorder patients without a recorded psychiatric comorbidity had a mean of 2.5 visits (SD = 3.7) over the study, while the patients with a psychiatric comorbidity had a mean of 5.2 visits (SD = 8.7; *t-test for group mean difference* significant at $p < .001$; *Kruskal Wallis test* significant at p= 0.02). Patients with psychiatric comorbidity had significantly more ED visits in every diagnostic category (data not shown) with similar mean values as noted above.

Table 1. Characteristics of ED Users with Primary Substance Use Disorder Diagnoses

SUD Group		Gender		Ethnicity				Age (years) (Mean/SD)	N (%) MH diagnosis
		N (%) Male	N (%) Female	N (%) African American	N (%) Hispanic	N (%) Caucasian	N (%) Other		
Total SUD	6865 (100%)	5006 (72.9)	1859 (27.1)	2428 (35.4)	1677 (24.4)	2697 (39.3)	63 (0.9)	36.9 (14.2)	1002 (14.6)
Polysubstance	1 191 (17.4%)	806 (67.7)	385 (32.3)	474 (39.8)	188 (15.8)	518 (43.5)	1 1 (0.9)	31.9 (13.5)	252 (21.2)
Cocaine	1453 (21.2%)	991 (68.2)	462 (31.8)	884 (60.8)	186 (12.8)	374 (25.7)	9 (0.6)	32.5 10.8)	207 (14.3)
Alc. Dependence	1785 (26.0%)	1333 (74.7)	452 (25.3)	442 (24.8)	561 (31.4)	761 (42.6)	21 (1.2)	39.8 16.3)	252 (14.1)
Alcohol Abuse	2436 (35.5%)	1876 (77.0)	560 (23.0)	628 (25.8)	742 (30.5)	1044 (42.9)	22 (0.9)	40.0 (13.3)	291 (12.0)

Note: SUD = substance use disorder; MH = mental health; Alc. = alcohol.

Adjusted odds ratios (OR) for frequent use of the ED are presented in Table 2. In multiple logistic regression analyses predicting frequent use of the ED, substance use patients with a comorbid psychiatric disorder were consistently more likely to be frequent users (reference groups = patients with a substance use disorder but no psychiatric disorder; covariates controlled for included age, race, and gender). For example, with the substance use diagnoses collapsed together into one group, the range of ORs for the comorbid patients ranged from 3.0 ($p < .001$) at 4+ visits to OR = 5.6 ($p < .0001$) for 20+ visits. The most substantial association of psychiatric comorbidity to frequency of ED use occurred in the cocaine group, whose ORs ranged from 3.5 ($p < .001$) at 4+ visits to 9.3 ($p < .001$) at 20+ visits. In terms of the relationships of the cov-ariates to frequent ED use

(data not shown), key findings were that males were significantly more likely to have more ED visits in all categories of ED use in all substance use groups except for cocaine, African-Americans were more likely to have more visits in all ED use categories and in all groups, and persons younger than 30 years of age were less likely to have frequent visits than persons over 45 in all ED use categories and in all substance use groups except cocaine. Interactions tested between psychiatric comorbidity and age, race, and gender were not statistically significant.

Table 2. Odds Ratios of Frequent Use of the ED for Substance Use Disorder Patients with Psychiatric Comorbidity vs. Those Without

SUD Group	**4 or more visits (CI)**	**8 or more visits (CI)**	**12 or more visits (CI)**	**16 or more visits (CI)**	**20 or more visits (CI)**
Total SUD N = 6865	3.0 (2.5, 3.4)[A]	4.0 (3.2, 4.9)[A]	5.0 (3.9, 6.5)[A]	5.0 (3.6, 7.0)[A]	5.6 (3.7, 8.4)[A]
Polysubstance N = 1191	3.9 (2.8, 5.5)[A]	4.7 (2.7, 8.2)[A]	3.4 (1.6, 7.5)[NS]	2.7 (0.9, 7.6)[NS]	3.0 (0.7, I2.7)[NS]
Cocaine N = 1453	3.5 (2.5, 4.9)[A]	6.4 (4.I, I0.I)[A]	6.8 (3.8, I2.I)[A]	9.I (4.I, 20.0)[A]	9.3 (3.3, 25.7)[A]
Alc. Dependence N = 1785	2.9 (2.1, 3.9)[A]	4.2 (2.8, 6.3)[A]	5.2 (3.1, 8.6)[A]	5.7 (3.1, I0.7)[A]	6.I (2.8, I3.5)[A]
Alcohol Abuse N = 2436	2.4 (1.8, 3.I)[A]	3.4 (2.4, 4.8)[A]	5.3 (3.5, 8.2)[A]	4.7 (2.8, 8.0)[A]	5.8 (3.I, II.0)[A]

Note: SUD = Substance Use Disorder. CI =Confidence interval. Alc. = Alcohol. [A] = $p < .001$. [NS] = non-significant.

Discussion

The data support the study's hypothesis that a comorbid psychiatric disorder among patients presenting to an ED with primary substance use disorders is associated with increased ED use. This association was found across all substance use diagnostic categories studied, with the strongest relationship observed among patients with cocaine disorders or alcohol dependence. The general trend across categories of frequency was for the association of psychiatric comorbidity to increase in magnitude, indicating that this combination of disorders might be an important risk factor for especially heavy use of the ED. It should be noted, however, that the 95% confidence intervals in the higher visit categories grew wide due to the smaller numbers of patients with higher numbers ofvisits, and thus, caution should be used in attributing robustness to the relationship to especially heavier use. Clinically speaking, the nonsignificant association of psychiatric comorbidity to higher categories of use among the polysubstance group was surprising. A dissimilar mixture of substance use patterns lumped together in this diagnostic category might have contributed to the weaker relationship. As well, this group contained the highest proportion of females and had the youngest mean age, and these factors might have also contributed to the weaker association with ED use. Further research is clearly needed to better understand service use and other outcomes associated with polysubstance use/psychiatric comorbidity.

Several limitations of this study should be noted. First, the data come from one facility, and may only be generaliza-ble to urban community EDs in the southern United States. Further, the data come from an administrative database and the variables available for analysis were limited. Inclusion of measures such as severity of illness, income, and education would have been optimal. Also, it should be noted that no adjustment for risk to use ED services was available. Those that resided in the area longer had

greater opportunity to use the ED and to be observed with a substance use condition than those who were more geographically mobile. It is plausible that persons with comorbid substance use disorders were more mobile during the study period than persons with psychiatric disorders alone, and if so, the observed relationships between comorbid substance use and ED frequency are likely underestimated. Most importantly, it should be noted that the data do not allow for a strict designation of causality. It is possible that the association between numbers of visits and comorbid psychiatric disorders could be opposite to the hypothesis-i.e., that a greater number of visits to the ED increases the probability that psychiatric disorders will be detected.

Conclusion

Despite the study's limitations, and in light of its strengths (large, multi-year design with a closely validated administrative data collection process), the findings have important clinical and policy implications. If these findings are replicated in other ED settings, interventions should be developed to improve identification, referral, and appropriate treatment of substance use disorders in this comorbid population. Our data indicate that particular attention be paid to alcohol and cocaine use. Rockett and colleagues [22,23] have demonstrated the high unmet need for substance use treatment among ED patients, and the work of Cherpitel [24] suggests that the ED should be an important point for early identification and referral for treatment of substance use disorders. Cherpitel demonstrates that persons with alcohol problems make an alcohol-related ED visit relatively early in the pattern of alcohol-related health care use. [24] As such, the ED may provide a unique opportunity for referral and/or brief intervention.

Indeed, the literature has seen an increase in published reports of ED interventions to address both substance use and psychiatric disorders (though not together). A recent randomized study by Blow et al. [25] found several variations of brief interventions for at-risk drinking to be effective in reducing alcohol consumption among injured drinkers in an ED. Shumway et al. [26] tested a case management intervention in a 24-month randomized trial with 252 frequent ED users with psychosocial problems (e.g., substance abuse, psychiatric disorders, problems with housing or medical care). Case management (assessment, crisis intervention, supportive therapy, referrals, and linkage) was associated with significant reductions in ED use and costs compared to usual care. Another case management intervention for frequent users of the ED showed promise in linking patients with substance use disorders to needed services and reducing ED use. [27] A large case management intervention focusing on 607 ED patients with anxiety disorders found significant reductions in ED recidivism and costs at 6-months post-discharge from the ED. [28] A recent randomized trial of a behavioral/skills-building intervention found short-term decreases in ED use among older patients with schizophrenia. [29] Clearly, future research will continue to show that the ED can serve as an important identification site for cost-effective intervention.

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WHO'S MINDING THE SHOP? THE ROLE OF CANADIAN RESEARCH ETHICS BOARDS IN THE CREATION AND USES OF REGISTRIES AND BIOBANKS

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Background: The amount of research utilizing health information has increased dramatically over the last ten years. Many institutions have extensive biobank holdings collected over a number of years for clinical and teaching purposes, but are uncertain as to the proper circumstances in which to permit research uses of these samples. Research Ethics Boards (REBs) in Canada and elsewhere in the world are grappling with these issues, but lack clear guidance regarding their role in the creation of and access to registries and biobanks.
Methods: Chairs of 34 REBS and/or REB Administrators affiliated with Faculties of Medicine in Canadian universities were interviewed. Interviews consisted of structured questions dealing with diabetes-related scenarios, with open-ended responses and probing for rationales. The two scenarios involved the development of a diabetes registry using clinical encounter data across several physicians' practices, and the addition of biological samples to the registry to create a biobank.
Results: There was a wide range of responses given for the questions raised in the scenarios, indicating a lack of clarity about the role of REBs in registries and biobanks. With respect to the creation of a registry, a minority of sites felt that consent was not required for the information to be entered into the registry. Whether patient consent was required for information to be entered into the registry and the duration for which the consent would be operative differed across sites. With respect to the creation of a biobank linked to the registry, a majority of sites viewed biobank information as qualitatively different from other types of personal health information. All respondents agreed that patient consent was needed for blood samples to be placed in the biobank but the duration of consent again varied.
Conclusion: Participants were more attuned to issues surrounding biobanks as compared to registries and demonstrated a higher level of concern regarding biobanks. As registries and biobanks expand, there is a need for critical analysis of suitable roles for REBs and subsequent guidance on these topics. The authors conclude by recommending REB participation in the creation of registries and biobanks and the eventual drafting of comprehensive legislation.

Background

The amount of research utilizing health information has increased dramatically over the last ten years. Single, timelimited studies with tightly-defined research questions are giving way to programs of research that rely

upon the systematic prospective collection of data in registries and biobanks for subsequent use in multiple projects to answer as yet unknown research questions. Many institutions have extensive biobank holdings collected over a number of years for clinical and teaching purposes, but are uncertain as to the proper circumstances in which to permit research uses of these samples. Research Ethics Boards (REBs) in Canada and elsewhere in the world are grappling with these issues, but have not received clear guidance regarding their role in the creation of and access to registries and biobanks. Historically, REBs have played an active role regarding specific project-by-project requests exclusively, thus not engaging in some of the larger issues concerning the creation and research uses of registries and biobanks. Indeed, some may not even be aware of the extent of registry and biobank holdings within their institutions. REBs we interviewed expressed concern and confusion both as to the handling of specific projects emanating from registries and biobanks, and to the broader issues surrounding them.

In this paper we outline variation in the responses of a wide sampling of REBs across Canada to a series of questions regarding the creation and use of registry and biobank information for health research purposes, and we note the heightened tension surrounding biobanks. We then discuss the implications of our findings for the development of policy and legislation.

Methods *Design & Sample*

We approached the Chairs of 34 REBs affiliated with Faculties of Medicine in Canadian universities and requested interviews with them and/or with their REB Administrators. They were also invited to include other REB members in the interview. The interview was to be 90-minutes faceto-face. Ethics approval was obtained from Research Ethics Boards at the universities of McMaster, Dalhousie, and Montreal and at St. Joseph Healthcare, Hamilton, Ontario.

Procedure

Interviews consisted of structured questions dealing with diabetes-related scenarios, with open-ended responses and probing for rationales. The two scenarios discussed in this paper involved the development of a diabetes registry using clinical encounter data across several physicians' practices, and the addition of biological samples to the registry to create a biobank [1]. All interviews but one were audio-recorded.

Scenarios

The registry scenario involved the construction of a multicentre multi-jurisdictional diabetes registry to serve as an ongoing resource for conducting epidemiologic and process-outcome studies. No specific research questions were identified. Instead, this was intended to provide a general research platform for future epidemiologic studies. The plan was to collect data through physician practices. At a regular patient visit, the physician would complete a duplicate encounter form. One copy would go in the patient's file; the second would be supplied to the research associate at the principal investigator's office, who was then to remove any direct identifiers and forward the data to the central registry. This registry was intended to be updated during routine patient care visits, and was to continue indefinitely. The research associate would hold the identification key in order to link newly received information with that already received for the particular patient.

[See additional file 1]

In the biobank scenario, blood samples were to be taken from patients during, but in addition to, routine patient care. The samples were to be retained indefinitely. The information garnered from the blood samples would be linked with the diabetes registry using a common study ID. The combined biobank and registry were intended to serve as an ongoing resource for studying biological markers of diabetes and conducting pedigree studies.

[See additional file 2]

Main Outcome Measures

Major questions asked were as follows:

• In terms of the *creation of registries*, we asked whether or not patient consent is required for inclusion in a registry, and the rationale. We also queried the duration of consent that is, whether it should last for the duration of the registry or if periodic renewal would be required and the reasoning behind their views on duration.

• As to the *operation of registries*, we inquired into the need (or lack thereof) for ongoing monitoring of the registry by the REB, and the types of information that would need to be reported. We also probed whether the REB would review the individual research projects utilizing the registry, and the factors that contributed to this decision.

• We asked whether the REB viewed *biobanks* as qualitatively different from registries, and the reasons behind their views. Further, we queried the need (or not) for consent and, if needed, its duration.

• We also inquired into any additional reporting requirements surrounding *biobanks*.

A number of issues were built into the scenario. These included the implications of requesting REB review without a specific set of research questions attached to the creation of the registry/biobank, but rather only a general research agenda. In the case of the registry, the data were to be sent offsite to the principal investigator's office for coding and removal of identifiers. For the biobank, a common study ID would be used for both the biological samples and the clinical data in order to facilitate linkage.

Analysis

Interviews were transcribed, checked for accuracy against the original audio recordings, and forwarded to interviewees to review for accuracy and for clarification where the initial response may have been unclear. Transcript review moved through several iterations that can be summarized into two stages. In stage 1, all co-investigators reviewed the first 11 interviews and, based on these, identified themes and sub-themes to pursue in the analysis and response categories. In stage 2, the interviewers and a graduate student reviewed all transcripts (including those that had been reviewed in stage 1), coded responses according to the themes identified, and summarized respondents' rationales. In some cases, additional themes emerged or additional nuances were identified for the original themes. When responses were difficult to categorize, the P.I. independently coded these sections. Answers and rationales were then discussed as a group to reach consensus. In a few remaining instances, answers were not classifiable due to a lack of clarity; this is noted where applicable in the results section.

To support the interpretations drawn by the researchers, short examples or typical statements have been included in the text. Quotations are presented in italics. Minimal editing has been done to preserve authenticity while ensuring readability.

Results

Thirty 90-minute face-to-face interviews were conducted with Chairs and/or Administrators (response rate 88%). In some cases, one or more other REB members also attended, to a maximum of seven in attendance. The median number of attendees was two.

Registry

Of the thirty sites, one refused to entertain the scenario regarding the creation of the registry, indicating that its creation was not connected with any specific research question and therefore falls outside its mandate. Their concern was a blurring of the concept of creation of research infrastructure with that of review of research protocols, and that approving the infrastructure would open the door to unapproved data uses by the researcher. The remainder of questions in this section were skipped for this site. The other twenty-nine sites responded.

In response to the question as to whether patient consent is required for inclusion of her/his data in the registry, twenty-three of twenty-nine sites answered affirmatively. Reasons included the planned collection of identifiable data; the intention to utilize the data for research in future; the fact

that identifiable data would be going offsite; and the plan to collect data prospectively, meaning that there would be ongoing contact with the patients and therefore seeking consent would not be onerous. Sixteen of these sites indicated they would not be sympathetic to an argument by the researcher that seeking individual consent is impracticable.

Six sites indicated that consent would not be required for creation of the registry. Three of these did not consider this to be research; one indicated "this sounds more like ongoing chart review", and another that "it's an exploratory study on a large volume of data." Two of the sites would not require consent because the data would be stripped of direct identifiers prior to its entry into the registry. Two sites not requiring consent would place conditions on the creator of the database – i.e., either an information letter to patients or notification with opt-out.

Of the twenty-three sites that would require consent, there was a high degree of variation as to limits on its duration. Twelve agreed, but for differing reasons, that the patient's consent would run for the duration of the registry in the absence of significant change. Of these, two sites saw no reason for periodic renewal of consent; five indicated providing an option to withdraw would obviate the need to require consent renewal; and three sites were motivated by the fact that they would require consent for specific research studies utilizing the registry. Another reason given was that the registry would lose scientific validity over time if periodic consent were required. Five sites would require periodic renewal, with the periods ranging from every subsequent patient visit to once every five years. This was viewed as feasible given that the patients are to be followed in the course of routine clinical care. Four sites were undecided, indicating that the duration of consent would be decided on a case-by-case basis. One site's answer was indecipherable and we were unable to get clarification on follow-up.

Twenty-four of twenty-nine sites would require periodic reporting to the REB by the registry custodians. Along with standard information for progress reports, the content of such reports would include registry-specific information such as how the registry is being managed, who has access, the evolution of the population (i.e., enrolments and withdrawals), and the source(s) of funding of the registry.

In the case of the five remaining sites, one was undecided, in one case the answer was unclear, in one case the question was skipped, one indicated it would only require reporting in case of amendments to the registry, and the final site would not require periodic reporting due to a lack of resources for follow-up.

The twenty-nine sites were also asked whether specific research projects utilizing the registry would require REB review. Twenty answered in the affirmative, although three of these twenty indicated that such review would likely be expedited (i.e., not reviewed by the full REB). One site said 'no', while six provided responses conditional on the circumstances; for three of the six, review would not be required if the data was de-identified; for two, it would depend on whether there were substantial changes to the protocol consented to upon establishment of the registry; and for one, review would only be required if dramatically different uses were to be made of the data (e.g., linkage to blood samples). Two sites were undecided.

Registry Combined with Biological Samples

One REB viewed the creation of a biobank with linkage to the registry information as outside the scope of REB scrutiny (the same REB that had indicated that registry creation was outside its scope). Of the remaining twenty-nine sites, twenty-three viewed the biobank information as qualitatively different from other types of personal health information, while six indicated the difference was at most a question of degree. One site stated that there is no difference; all information requires sensitive handling, whether or not it has genetic markers. Those that stated the difference is one solely of de-

gree generally regarded information from the biological sample as being more sensitive, replicable, commercializable, and predictive. Of the sites that viewed it as qualitatively different, reasons given were its intra-familial and inter-generational nature; the implications for insurability and employability; the potential uses in deciding on paternity; and its regional or group implications, including discrimination on the basis of race.

The twenty-nine sites were unanimous with regard to the need for patient consent for blood samples to be placed in the biobank. All six of the sites that had not required consent for participation in the registry would now do so.

In terms of duration of consent for the biobank samples, six stated that its duration was time-limited, eleven indicated there would be no time limit for retention, five were undecided, in three cases the answer was unclear, and in four cases the question was skipped. Note that two of the sites that would require periodic re-consent for the registry alone would not require it when the biological samples were combined with the registry. These findings demonstrate indeterminacy on the part of REBs, as revealed by one site's statement: "We don't have to provide answers to all these questions. They're not all answerable."

Of the six sites who said consent would be time-limited, one stated that "blood is different" and another that its potential uses are endless, unlike registries. For some of these sites, samples or linkages would be destroyed after a set time period, ranging from five to twenty-five years. Those indicating no time limit to consent sometimes included one or more qualifiers, such as a withdrawal option, and notification should there be significant changes to the biobank. Some additional requirements identified were: full REB review in the first year of operation; bio-collection treated as a separate protocol; periodic report on the activities and outcomes of research using the biobank; and scrutiny of physical security measures. As with the diabetes registry, one site would not require periodic reporting due to lack of REB resources.

Study Limitations

Interviewees had been told that the interviews would take at maximum ninety minutes. Since questions were openended, it was necessary at times that the interviewer skip some questions in order to complete in the promised time frame. This led to some incompleteness in results.

Note that this study was constructed around hypothetical situations. An REB faced with a real-life application for approval would have the opportunity to request further details and to deliberate at length. Further, the outcomes measure was what sites said they would do, based on these hypothetical facts. Not all of the sites had handled all of the types of requests included in our scenarios. Thus, some of the answers may have reflected their understanding of current guidelines, rather than reflecting past practice. In addition, responses may have been shaped in accordance with what the interviewee expected the interviewer wished to hear.

Discussion and Conclusion

We found that participants were more attuned to issues surrounding biobanks as compared to registries, despite similarities regarding their creation and long-term research potential. This is not surprising given that the TriCouncil Policy Statement (TCPS), a statement agreed to by the major federal research funding agencies in Canada which aims to ensure the ethical conduct of research, is silent as to registries. Also, there is a dearth of literature, both in Canada and internationally, concerning the role of REBs vis-a-vis registries. There is also a significant degree of variation in how the sites in our survey indicated they would handle research proposals for creation and use of these entities. For example, six of the twenty-nine sites entertaining the scenario would not require patient consent for the entry of personal information into a registry, whereas all twenty-nine would require consent for entry of blood samples into a biobank. At least two factors are at play in creating the consensus as to

biobanking. First, participants saw the scope of potential research activities to be much more broad for biobanks in comparison to registry information. Indeed, the limits for biobanks were identified as unknowable. Second, the TCPS does contain guidance as to human tissue, including the explicit requirement of informed consent to its collection and use [2].

Accompanying this greater familiarity is a dramatically higher level of concern on the part of sites regarding biobanks. One referred to biobank information as a 'gray box' in that its potential future uses are at present unknowable. Others referred to such information as providing a "total picture of the person" or "a window into one's soul", and that "the sum is greater than the parts". These vivid and dramatic descriptors are indicative of trepidation on the part of participants regarding genetic information. There is a significant degree of ambivalence in the literature on biobanks as to whether or not genetic information is inherently different from other types of health information. Some argue that all personal health information is potentially sensitive [3]. Others lean to "genetic exceptionalism"[4,5] despite the fact that other types of information may also implicate family or community as well as the individual, and may be highly sensitive (e.g. HIV status or psychiatric record). The majority of sites in our study (23/29) viewed genetic information as qualitatively different, thus weighing in on the 'exceptionalism' side of the debate.

Given this acutely higher level of concern regarding biobanks, it is surprising that an equal number of sites would not require periodic renewal of consent for registries and for biobanks. Specifically, sixteen sites would permit the entry of information into a registry to run indefinitely or were undecided, and sixteen sites would either permit consent to banking of a blood sample to continue indefinitely into the future or were undecided. One of the sites that would not require periodic renewal of consent for the biobank in contrast to the registry provided this explanation: "No, because once the sample is given, it's for life, you don't go a second time...up to now it's once and for all." These findings give rise to serious concern about consent practices regarding biobanks, especially since the samples are often retained long-term. After describing the general standards for informed consent for research involving human subjects in the U.S., Natalie Ram notes that " [a]gencies and courts have been hesitant to impose similar consent requirements on researchers obtaining human tissue for use in research, and human tissue research has therefore become a particularly thorny problem for traditional formulations of informed consent."[6]

One of the fascinating differences between sites with regard to their concerns or lack thereof with identifiability of registry data revolves around at what point in the process they were focussing on. Sites with concerns looked at an earlier period of time than entry into the registry – i.e., the fact that identifiable data were to go offsite to the principal investigator's office prior to being de-identified. One site indicated they would simply not allow release of personal information out-of-house, as had been proposed. The sites that were not concerned indicated that the data was de-identified upon entry into the registry. At least one REB member expressed trust that researchers would safeguard the personal information and not attempt to re-identify individuals.

Expansion continues apace for registries and biobanks. This results in a need for critical analysis of suitable roles for REBs and subsequent guidance on these topics. A first step is to establish a dialogue on these issues, especially regarding registries; it is hoped that this project facilitates such discussion. Registries are of burgeoning importance in response to demands for evidence-based decision-making and the growth in numbers of epidemiological studies. They give rise to a number of privacy and consent issues that outstrip current guidance and yet will need to be dealt with by REBs.

A second step will be the provision of urgently needed guidance regarding appro-

priate uses of information in biobanks and registries. One site referred to the rapidly changing context of genetics, and indicated that "...we're still disoriented." Sections of the TCPS on biobanking have not been updated since 1998 despite significant changes in practice combined with a huge expansion in their importance and significance. The Canadian Institutes of Health Research has developed a voluntary Best Practices code for the handling of personal information in health research [7]. While registries are addressed in the document, recommendations are currently very broad; more specific guidance as to both registries and biobanks would be in order for future editions. Further, we call on the Interagency Panel on Research Ethics to undertake a review and redrafting of parts of the TCPS of direct relevance to registries and biobanks. Accompanying this should be an education programme covering these topics aimed at researchers, REB members, and privacy commissioners.

Third, we urge that REBs adopt an active role in guiding the creation of registries and biobanks. This holistic approach responds to the development of multi-project research platforms as opposed to simply individual projects. Several sites were concerned about jurisdiction and lack of specificity in being asked to review infrastructure; one site indicated that "we shouldn't be collecting data until we know what the future use might be...this is just a little too wide open, it's a fishing expedition." However, it is our position that since registries and biobanks are indeed being created, it makes sense that any obvious potential problems be addressed up-front, prior to the infrastructure being developed. This will result in greater efficiency and less work later for both researchers and REBs, and the avoidance of future problems. The concern about a 'fishing expedition' can be allayed by the fact that the individual research projects relying on the platform should still be subjected to REB review.

Fourth, the development of one or more specialized REBs with expertise in the area of registries and biobanks is well worth considering. Models that could be adapted exist in the form of committees that specialize in screening access to databases and in the governance of biobanks [8].

And finally, in the longer term, we suggest the development of governing legislation. This would provide a superior form of guidance and control, given the sensitivity of personal health information generally and of genetic information in particular. This is particularly pertinent if use and/or disclosure of personal health information, including genetic material, without consent is under consideration. Caulfield et al. suggest that an authorization model for genetic databases may be superior to the present consent regime, but that legislation would be needed prior to adopting such a model [9,10].

The development of legislation would not be free of complexities. For example, health and information are both primarily within provincial jurisdiction. All provinces have legislation governing information in the public sector, and most now also have legislation that covers aspects of information-handling in the private sector. There is also federal private sector legislation [11]. There is a lack of consistency as to the impact of these various statutes on the conduct of research, and often a lack of clarity. Thus, drafters of legislation would need to take into account these issues and contingencies. However, the difficulties are not insurmountable, and there is an obvious sense of need. To paraphrase one of the sites in our study:

Some of the decisions should be taken by authorities above local REBs. Rules should be clarified so that each local REB does not have to take decisions. Such fundamental decisions [should] not rest upon the shoulders of local REBs. The consequences of certain decisions can impact on people or populations, which makes even more [persuasive] the case for the need for a regulatory framework on banks.

Additional material

Additional file 1

Creating a Diabetes Registry. *Scenario for Registry.*

[http://www.biomedcentral.com/content/supplementary/14726939-9-17-S1.doc]

Additional file 2

Prospective Collection of Biological Samples for Diabetes Biomarkers and Pedigree Studies. *Scenario for Biobank.*

[http://www.biomedcentral.com/content/supplementary/14726939-9-17-S2.doc]

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THE CONDITION OF INTRACARDIAC HEMODYNAMICS IN PATIENTS WITH RHEUMATIC FEVER AND CHRONIC RHEUMATIC HEART DISEASE

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Findings of inspection parameters of intracardiac dynamics at 51 patients with rheumatic heart defects in interrelation with activity of inflammatory process and character of a heart defect (25 sick mitral a heart disease, 26 sick aortal a heart defect) are given in this work.
The echocardiography was spent on the device "Toshiba SSH-40" (Japan), with use of recommendations American echocardiography society.
At comparison of parameters echocardiography at I and II degrees of activity at patients with aortal and mitral defects of the heart the most expressed changes are found out at II degree of activity of inflammatory process that confirms the influence of activity degree on parameters of central hemodynamics , and condition improvement - about adequacy of therapy.

Many researchers consider a rheumatic fever (RF) as unique cardiovascular disease, which has not been enough studied yet. [4; 9; 12; 14].

According to WHO report, acute rheumatic fever (ARF) and chronic rheumatic heart disease (ChRIH) still remain the most widespread cardiovascular diseases in children, teenagers and young age adults, affecting annually at least 12 million people and being the reason of 332 thousand of lethal outcomes [5; 18].

In the last 15-20 years, the clinical picture of RF has undergone major changes. Many authors notice the rarity of severe course of rheumatic carditis, the decrease of fatalness and reduction of disease recurrence rate, the tendency of disease to transit into monosyndromic forms, the increase of few symptomic and latent variants of current, etc. [7; 17].

According to data of many authors, the frequency of primary rheumocarditis is very great and is from 88,5 up to 100 % [1; 6]. Simultaneously, from other data the frequency of heart affection at the first attack of rheumatism enough moderated - 50-69 % [13; 11] and even low - 3-38 % [8]. These results difference can be explained hardly only from positions of polymorphism of clinical symptoms and variants of primary RF course in various regions and countries of the world.

In this connection, it is necessary to emphasize the importance of study instrumental methods (phonocardiography, echocardiography, dopplechocardiography) in early diagnostics of reumocarditis [2].

Carditis is the main sign of rheumatic process activity the expressiveness of which reflects a degree of inflammatory process activity. However, at the minimal activity of an inflammation or its absence by laboratory data, manifestation of carditis persists more often having a permanent current. Against a background of valvular affections rheumatic carditis can aggravate the intracardiac hemodynamics condition which has been connected with a degree of inflammation .activity.

The aim of research

To study the parameters of central hemodynamics in patients with rheumatic fever and chronic rheumatic heart disease against inflammatory process activity.

Material and methods

51 patients with RF and ChRHD have been investigated aged from 23 till 37 years, of 25 have been mitral heart failure, 26 - aorta heart failure.

Randomization made by the character of failure, parity of their components, and remoteness of disease and stage insufficiency blood circulation (IBC), when grouped by degree of activity.

Central hemodynamics was estimated according to echocardiography findings performed on « Toshiba SSH-40 » (Japan), equipped by electronic gauges with fre-

quency of ultrasonic waves of 2,5-3,5 MHz, by a standard technique with use of American echocardiography association recommendations (ASA) [15].

The study made before treatment and after three-month treatment course. The patients were examined with a prone position on left side. Study of structures of heart made in B-and M - modes with use of standard positions: parasternal positions on long and short axes, top five-chamber and high apical as well. They registered and then were measured more than 3 consecutive intimate cycles for breath effect leveling.

The obtained results were averaged. There measured the following parameters of heart structure: diameter of an aorta, disclosing of aortic valve, the cross-section size of left atrium at the end of diastole atrium, finite diastolic size of left ventricle (FDSLV), finite systolic size of the left ventricle (FSSLV), thickness of lateral wall of left ventricle in diastole (ThLWLV), thickness of ventricular septum in diastole (ThVSD).

The following parameters were counted against a background of the obtained data: finite- diastolic volume (FDV) and finite- systolic volume (FSV)of LV were counted by L.E.Teichgolz et all.:

FDV = 7 / (2,4+ FDSLV) *FDS^3, ml, where FDS - finite- diastolic size of the left ventricle in a phase of diastole, measured on peak waves of R an electrocardiogram.

FSV = 7 / (2,4+FSS) *FSS^3, ml, FSV - finite-systolic size of left ventricle in a phase of diastole;

- Fraction of emission:

FE = ((FDV - FSV)/FDV) * 100, %;

- Fraction of reduction:

FR = ((FDS- FSSShFDS) * 100, %

- Shock volume:

ShV = FDVLV -FSVLV, ml;

- Minute volume of blood:

MVB = ShV* RHC, ½/min. (rate of heart contractions)

- myocardium mass of LV:

MMLV = 1,04 * ((FDSLV+ ThVSD +ThLWLV)^3 - $FDSLV^3$) - 13,6, (g), where ThVSD – thickness of ventricular septum, ThLWLV – diastolic thickness of lateral wall of LV, FDS - finite-diastolic size of LV.

- Myocardium mass rate of LV: MMRLV = MMLV/P g/m^2

Results and discussion

Table 1 noted the accurate difference between the parameters of the control and patients with rheumatic heart disease (RDH) and mitral (stenosis and failure) and aortal (stenosis and failure) heart defect. When grouped the patients with II stage of BF included. However, the change of parameters of central hemodynamics in RHD was established much earlier [3].

We analyzed the influence of inflammation activity on cardio dynamics. So, the parameters of the left atrium (LA) in mitral defect with II degree of activity were above 21,4 %; FDR - 6,6 %; FSS - on 17,3 %; FDV - 16,0 %; FSV - 48,3 %; FE – was less 6 %; FR - 8,2 %; ThLWLV and ThVS practically did not differ; MMLV was above 9,1 %. The parameters systolic arterial pressure (SAP) were above 3,9 % at II stage of activity as well; diastolic arterial pressure(DAP) was less than 1,5 %; RSC was above 14,7 % in II stage of activity.

At comparison of parameters of Echocardiography at I and II stages of activity in patients with aortal heart defect (stenosis and failure) the differences in parameters of central hemodynamics were revealed as well. So in difference from I degree of inflammatory process activity, II degree of activity at aortal defect was characterized by more marked changes from FDS which was above 14,6 %; FDV - 1,7 %; MMLV - 0,9 % whereas FR was below 5,9 %; the other parameters of the big difference were not revealed.

This circumstance still indicates the influence of a degree of inflammatory process activity on the parameters of central hemodynamics, the improvement of parameters can also testify the adequacy of therapy, which is important for the forecast of disease as a whole.

Table 1. Echocardiography parameters at patients mitral and aortic heart diseases with I and II degree of activity of an inflammation (M±M)

№	Parameters	Control (n=20)	Mitral valvular disease		Aortal valvular disease	
			act I (n=12)	act II (n=13)	act I (n=14)	act II (n=12)
1	LA (cm)	3,08 ± 0,06	3,45 ± 0,04*	4,19 ± 0,09*^	3,69 ± 0,08*	3,86 ± 0,09*
2	FDS (cm)	5,02 ± 0,07	5,75 ± 0,05*	6,13 ± 0,10*^	6,13 ± 0,11*	7,18 ± 0,14*^
3	FSS (cm)	3,31 ± 0,05	3,69 ± 0,08*	4,33 ± 0,12*^	4,10 ± 0,12*	4,26 ± 0,01*
4	FDV (milliliter)	120,68 ± 4,31	160,16 ± 3,56*	185,82 ± 7,09*^	190,64 ± 6,05*	194,01 ± 8,02*
5	FSV (milliliter)	45,17 ± 1,28	57,60 ± 2,54*	85,42 ± 6,12*^	78,18 ± 4,36*	79,12 ± 5,02*
6	FE (%)	62,24 ± 0,91	58,06 ± 1,48*	54,53 ± 1,44*	60,36 ± 1,19	59,12 ± 2,01
7	FR (%)	33,71 ± 0,68	34,25 ± 0,91	31,45 ± 0,79^	33,10 ± 0,86	31,12 ± 0,75*
8	ThLWLV (cm)	0,90 ± 0,02	1,14 ± 0,01*	1,13 ± 0,01*	1,21 ± 0,02*	1,25 ± 0,01*
9	ThVSD (cm)	0,94 ± 0,01	1,04 ± 0,02*	1,05 ± 0,01*	1,11 ± 0,01*	1,16 ± 0,01*^
10	MMLV (g)	158,72 ± 7,23	253,14 ± 7,02	276,12 ± 10,12*	309,05 ± 8,76*	312,02 ± 6,16*
11	SAP (millimeter of mercury)	118,26 ± 2,48	120,95 ± 2,66	125,76 ± 3,17	126,66 ± 4,25	128,02 ± 3,12*
12	DAP (millimeter of mercury)	75,92 ± 1,61	67,18 ± 3,35*	66,20 ± 3,35*	50,05 ± 3,69*	50,01 ± 2,14*
13	RHC (min)	72,31 ± 1,12	83,10 ± 2,17*	95,31 ± 3,31*^	86,68 ± 2,81*	85,18 ± 1,13*

The note: * P <0,05 - authentic distinction between parameters of the control and compared groups;
^P <0,05 - distinctions between parameters I and II degree of activity are authentic.

Thus, the shift of cardio dynamics parameters is more marked in RHD patients with II degree of inflammatory process activity than in the ones with I degrees of inflammatory process activity .Therefore, the changes of parameters of central hemodynamics correlate with the activity of inflammation which can aggravate_BF. The hypertrophy and dilatation of LV develops at insufficiency of mitral and aortal valves when maintained adequate minute volume of blood. In conditions of a significant volumetric overload dilatation of LV starts to advance the rate of mass myocardium increase. At a microscopic level in this phase it has been observed the increase in distance among cardiomiocytes, development of myocardium sclerosis characterized for pathological simulation of LV [3].

As a rule, the rheumatic affection of mitral valve is marked in its adjusting affection. Prolonged rheumatic endocarditis leads to morphological changes of mitral valve: cusps get thicken, become rigid, grow together on comissures, tendinous fibers change, shorten. Echocardiography displays the dilatation of the left departments of heart, various directed diastolic movements of thickened mitral cusps and the absence of their systolic connection, which leads to mitral regurgitation.

Doppler study plays a very important role in diagnostics of mitral insufficiency at any degree of manifestation. The best method of the presentation of mitral regurgitation is color Doppler scanning [16] as it possesses high sensitivity, and its{his} use does not require much time. Color Doppler scanning gives the information about mitral regurgitation in real time. Though presentation about the direction and penetration depth of regurgitating jets can be obtained in pulse doppler mode, color scanning is more reliably and technically easier, especially at extrinsic regurgitation.

From the apical access mitral regurgitation looks as the flame of light blue color directed to the left atrium appearing in a systole. To register mitral failure and identify the degree of its manifestation the method of color scanning for sensitivity approximates to X-ray contrast ventriculography [10].

In rheumatic aortal insufficiency, ECG observes destructive changes and incomplete connection of aorta valves accompanied by aortal regurgitation; increase of diastolic size of LV and LA and increase of ascending part and roots of aorta as well.

In M-modal study diastolic thrill of anterior cusp of aortic valve serves as the main attribute of aortal regurgitation.

Nowadays it is established, that presence or absence of diastolic thrill of anterior cusp of mitral valve at aortic regurgitation depends on what cusp is affected, and this defines the direction of regurgitating jets.

Colour Doppler scanning reveals the big variety of the direction of regurgitating jets in different patients; when it is directed to anterior mitral cusp, trembling of cusp is observed

In severe aortal failure M-modal study registers also early closing of mitral valve [16]; this finding testifies hemodynamics disorders, requiring intensive therapeutical and surgical treatment. The examination of contractility of left ventricle, its volume, form and mass can give the valuable information for mass identification of aortal failure.

Doppler examination plays leading role in diagnostics of aortal insufficiency and mass identification. Pulse Doppler examination and particularly color scanning were more sensitive than other methods of diagnostics of aortal failure, including invasive methods.

In regurgitation revealing, occupying all diastole on doppler spectrum, control volume is moved on ventricle to find out the penetration depth of regurgitation jets into it. If the jet comes more than one third of depth of ventricle, the degree of aortal failure is rarely mild.

Thus, in softly marked RF_and carditis the diagnostic value of ECG increases and is

to carry out in dynamics in ARF and RHD, and in BF connection.

The given circumstance specifies once more to the influence of degree of inflammatory process activity on the parameters of central hemodynamics, the improvement of parameters can also testify about adequacy of therapy, that is very important for the forecast of disease as a whole.

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FORECASTING DAILY ATTENDANCES AT AN EMERGENCY DEPARTMENT TO AID RESOURCE PLANNING

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Background: Accurate forecasting of emergency department (ED) attendances can be a valuable tool for micro and macro level planning.
Methods: Data for analysis was the counts of daily patient attendances at the ED of an acute care regional general hospital from July 2005 to Mar 2008. Patients were stratified into three acuity categories; i.e. P1, P2 and P3, with P1 being the most acute and P3 being the least acute. The autoregressive integrated moving average (ARIMA) method was separately applied to each of the three acuity categories and total patient attendances. Independent variables included in the model were public holiday (yes or no), ambient air quality measured by pollution standard index (PSI), daily ambient average temperature and daily relative humidity. The seasonal components of weekly and yearly periodicities in the time series of daily attendances were also studied. Univariate analysis by t-tests and multivariate time series analysis were carried out in SPSS version 15.
Results: By time series analyses, P1 attendances did not show any weekly or yearly periodicity and was only predicted by ambient air quality of PSI > 50. P2 and total attendances showed weekly periodicities, and were also significantly predicted by public holiday. P3 attendances were significantly correlated with day of the week, month of the year, public holiday, and ambient air quality of PSI > 50.
After applying the developed models to validate the forecast, the MAPE of prediction by the models were 16.8%, 6.7%, 8.6% and 4.8% for P1, P2, P3 and total attendances, respectively. The models were able to account for most of the significant autocorrelations present in the data.
Conclusion: Time series analysis has been shown to provide a useful, readily available tool for predicting emergency department workload that can be used to plan staff roster and resource planning.

Background

The ability to predict daily attendances at the emergency department (ED) of a hospital is valuable at a micro level for planning of staff rosters, and at a macro level for financial and strategic planning. Time series analysis has been applied in emergency medicine to forecast workload (patient volumes) and to study the impact of selected factors on the provision of patient care at ED [1-10]. A time series is a sequence of measurements made over time. If a forecasting method is used to predict the time series, the difference between the actual value and the predicted value measures the error in prediction. The ultimate test of any forecasting method is the size of these errors, and a best-fit model is a model which minimizes the error.

Most published studies using time series were based on seasonal factors only and were developed for forecasting overall demand for ED services [2-7]. Since there is wide variation in disease severity and acuity among patients presenting at the ED, clinical services and resources required will likewise vary considerably. The experiences gained from studies carried out in Western countries may not necessarily apply to local conditions, as there are multiple factors that might contribute to the fluctuation of the daily attendances at an ED in Singapore.

The purpose of this paper is to identify the local factors associated with the daily attendances at ED, and to make predictions based on these local factors. As resources are dependent on patient acuity levels, the forecast is also stratified by patient acuity categories (PAC).

Methods

Setting

The study was carried out in an emergency department in a major public sector acute care regional general hospital in Singapore. The hospital has the highest number of ED attendances and the highest proportion of

acutely ill patients among five public sector acute care general hospitals in Singapore. Permission to conduct the study was granted by the Chairman, Medical Board of the hospital.

Data

Data used in the study was counts of daily patient attendances at ED between July 2005 and March 2008 (1,005 days), extracted from the ED administrative database. Patients who presented at the ED were classified as P1, P2 and P3 by the patient acuity category scale (PACS) used in all public sector hospital emergency departments in Singapore for resource allocation. P1 cases are most acutely ill and need immediate clinical services and treatment, P2 being acutely ill but can wait to be treated, and P3 being the less acutely ill patients who can wait longer to receive services (Table 1). Other data collected for the study included public holiday, and local weather factors (ambient temperature, ambient air quality measured by PSI, and relative humidity). The selection of the potential predictors was based on literature, local observation and availability of data. Singapore is a tropical country where the range in daily temperature throughout the year does not vary very much, hence daily average temperature was used.

Table 1. Patient classification by patient acuity category (Definition given by Ministry of Health (MOH) of Singapore)

Patient acuity category	Description
P1	Patients of resuscitation, cardiovascular collapse or imminent danger of collapse, required to be attended to without a moment's delay
P2	Patients of non-resuscitation, major emergency or ill and non-ambulant or having severe symptoms and trolley based
P3	Patients of minor emergency or ambulant with mild to moderate symptoms

Study design and methods

Univariate analysis of daily ED attendances and their association with potential predictors was carried out using general linear model, and significance testing using t-test where probabilities > 0.05 was considered statistically significant.

Time series analysis for identifying significant predictors as well as for forecasting daily ED attendances were carried out using established time series analysis procedures, the most popular time series analysis technique being auto regression integrated moving average (ARIMA) [11] model. ARIMA is a class of models, which are represented by (p, *d*, q)(P, *D*, *Q*)$_S$, where *p* is the order of autoregres-sion, *d* is the order of differencing (or integration), and *q* is the order of moving-average; (P, D, Q) are their seasonal counterparts; and *s* is the seasonal period [12]. Both weekly and yearly seasonal periodicities were taken into account in this analysis.

ARIMA models were iteratively applied to P1, P2, P3 and total patient attendances using data of the first 24 months to train, data of the following 6 months to test, and that of the following 3 months to validate. Elsewhere, models are usually trained and their performance evaluated on the test data; finally the model with least error is chosen as best-fit model. This strategy, however, leads an optimistic estimation of the performance of the chosen model since the data used for training and testing are identical with the data used for performance evaluation. Therefore, in this study, we used a third data set for performance evaluation (model validation).

The model with the lowest mean absolute percentage error (MAPE) calculated on the test data and a non-significant Ljung-Box test (p > 0.05) was chosen as the best-fit model, where MAPE was defined as [13]:

$$MAPE = \sum_{i=1}^{N} \frac{|\tilde{x}_i - x_i|}{x_i}$$

where x_i denotes the observed number of daily attendances at date i, X_i denotes the predicted value of x_i. Ljung-Box test is commonly used in ARIMA model for measuring the difference between the real time series and predicted series by the model. A non-significant p-value (> 0.05) of the test means that the model well represents the observed time series. A MAPE of 0% denotes a perfect fit of the model when applied to the validation dataset. The best-fit model was then used to forecast prospectively and validated. As far as we know, there is no specific definition of "good accuracy" of a model. It is usually taken to be a non-significant p-value of the model by Ljung-Box test ($p < 0.05$) and a MAPE of < 20%. If the MAPE is less than 5%, the model performance can be regarded as being excellent.

Independent variables included in the model as potential predictors of daily ED attendances were public holiday (yes/no), ambient air quality measured by pollution standards index (PSI), average daily ambient temperature and average daily relative humidity. The seasonal components of weekly and yearly periodicities in the time series of daily attendances were also studied. The National Environmental Agency (NEA) of Singapore adopts the PSI developed by the US Environmental Protection Agency that provides easily understandable information about daily levels of air pollution. A range of 1-50 is considered good, while that 51-100 was moderately unhealthy, and >= 100 was unhealthy [14]. The readings on most days in Singapore were within good range. Therefore, we categorized PSI (> 50 and <= 50) for better statistical power.

The predictors at preceding days may also affect current ED attendance, or a lag association. It is defined as correlational dependency of order *k* between each i'th element of the series and the (i-k)'th element and measured by autocorrelation (i.e. a correlation between the two terms), and *k* being the lag [15].

All statistical analyses were done in SPSS version 15, using automated identification of best-fit models from each dependant variable based on performance measure, where probabilities less than 0.05 was considered statistically significant. Lag association was also automated by SPSS.

Results

Descriptive analysis

On an average, there were about 400 daily attendances at the ED during the period July 2005 to Dec 2007. These comprise 8% P1, or approximately 30 cases per day. P2 and P3 patients together accounted for about 92% of total daily attendances (Table 2). About 70% of P1 attendances were for severe respiratory and heart conditions; while approximately 80% of P3 attendances were for trauma, viral infection and gastrointestinal diseases. P2 cases were a combination of P1 and P3 dominant conditions. Significant daily variations were noted, with daily P1 attendances ranging from 10 to 72 cases, P2 attendances ranging from 96 to 239 cases, and P3 attendances ranging from 138 to 307 cases.

The secular trend is one of increasing trend in total attendances, especially from 2006 onwards (Fig. 1). Fig. 2 shows weekly fluctuations. The higher total attendances on Monday were contributed mainly by P2 and P3 cases, while higher attendances on Sunday were contributed by P3 cases. Fig. 3 shows higher attendances from May to July, being contributed mainly by P3 cases. There was no yearly fluctuation in P1 attendances.

Univariate analysis

Table 3 shows a significant upward secular trend in the number of attendances; with a monthly increase of 2.2 total attendances during the study period. These were contributed by a monthly increase of 0.3 cases of P1 and 2.1 cases of P2. On public holidays, there was an average of18 more P3 attendances per day. Average ambient temperature was associated with about 6 more P3 attendances per Celsius degree increase.

Moderate ambient air quality (PSI > 50) was correlated with an average of 8-9 more P1 and P2 attendances per day. Overall, humidity was negatively correlated with P1 and P2 cases.

Table 2. Mean daily attendances at emergency department by patient acuity category

Patient acuity category	Mean daily attendances (95% confidence interval)		
	Training data	Testing data	Validation data
P1	30.1 (29.5–30.7)	31.6 (30.6–32.6)	32.8 (31.4–34.1)
P2	162.4 (160.8–164.1)	178.5 (175.8-11.3)	198.5 (194.6–202.4)
P3	204.5 (202.2–206.8)	211.4 (207.1–215.8)	201.0 (194.9–207.1)
All	400.4 (397.5–403.2)	425.1 (419.9–430.2)	435.4 (428.4–442.3)

PI: Patients of resuscitation, cardiovascular collapse or imminent danger of collapse, required to be attended to without a moment's delay
P2: Patients of non-resuscitation, major emergency or ill and non-ambulant or having severe symptoms and trolley based
P3: Patients of minor emergency or ambulant with mild to moderate symptoms

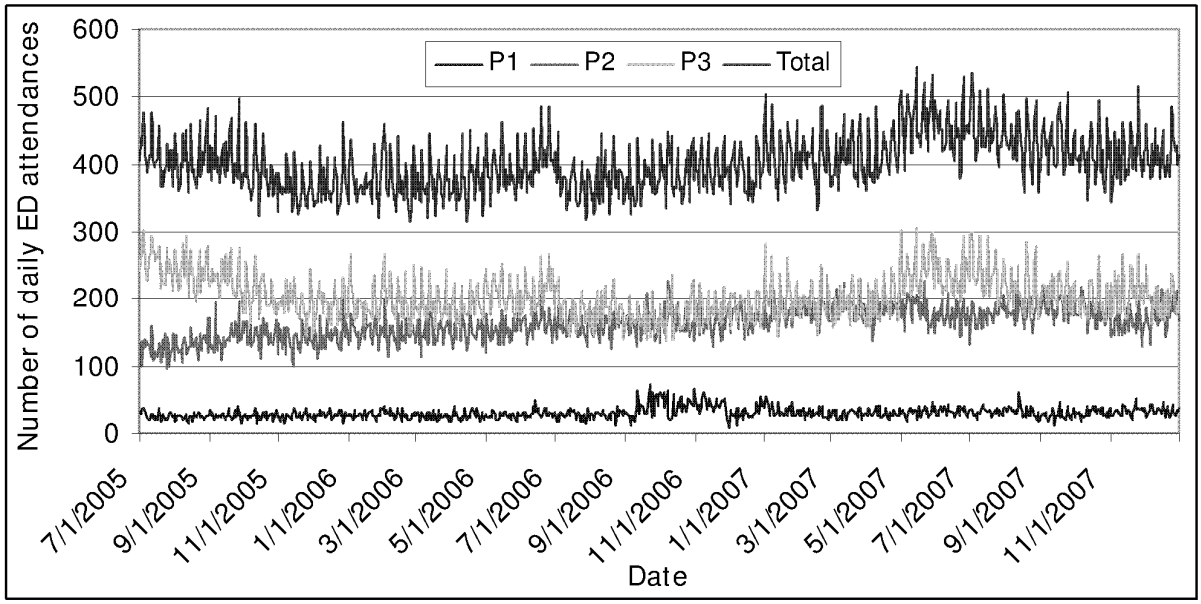

Figure 1. Daily attendances at emergency department by patient acuity categories, Jul 2005 to Dec 2007

Time series analysis

As shown in Table 4, by Ljung-Box tests, the p-values of the best-fit models were not significant, which means all the four models closely represented the observed time series. The best-fit model for P1 was ARIMA(0,1,1), which is a non-seasonal and non-stationary moving average model. The best-fit model for P2 was ARIMA(1,1,1)(1,0,1), which is a seasonal non-stationary auto-regression integrated with moving average model. The best-fit models for P3 and total attendances were ARIMA(0,1,1)(1,0,1), which are seasonal non-stationary moving average model.

All the four data series had linear trend since all 'd's in the best-fit models equal 1. P1 attendance did not show any weekly or yearly periodicity and was only predicted by ambient air quality of PSI > 50. P2 and total

attendances showed weekly periodicities in the time series analyses, and were also significantly correlated with public holiday. P3 attendance was significantly correlated with day of the week, month of the year, public holiday, and ambient air quality of PSI > 50. The maximum lag between PSI > 50 and P1 cases was two days; there was no lag between PSI > 50 and P3 cases. The maximum lag between public holiday and P2, P3 and total cases was one day (Table 4).

P1 yielded a MAPE of 16.9% on validation; or forecasts of the model had an average error of 6 out of an average 33 attendances per day. The models for P2, P3 and total attendances performed better in the daily prediction of attendances, with a MAPE of 6.7%, 8.6% and 4.8%, respectively.

Fig. 4 shows the observed and predicted time series for P1, P2, P3 and total attendances overlap with each other to a great degree. The scatter plots of observed vs predicted attendances by the four best-fit models shows that the points to be distributed along the diagonal line (Fig. 5); i.e. the models were successful in accounting for most of the significant autocorrelations present in the data.

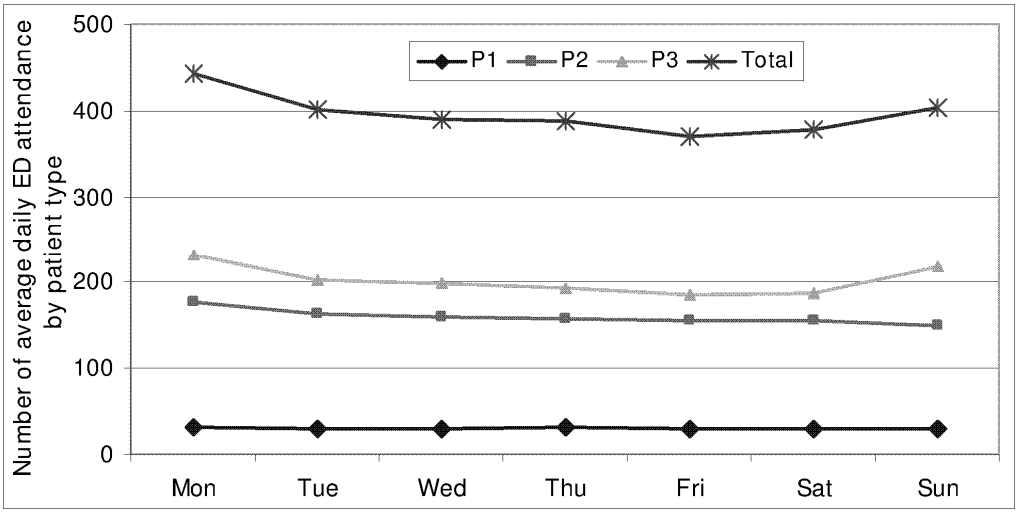

Figure 2. Average daily attendances at emergency department by day of the week, Jul 2005 to Dec 2007

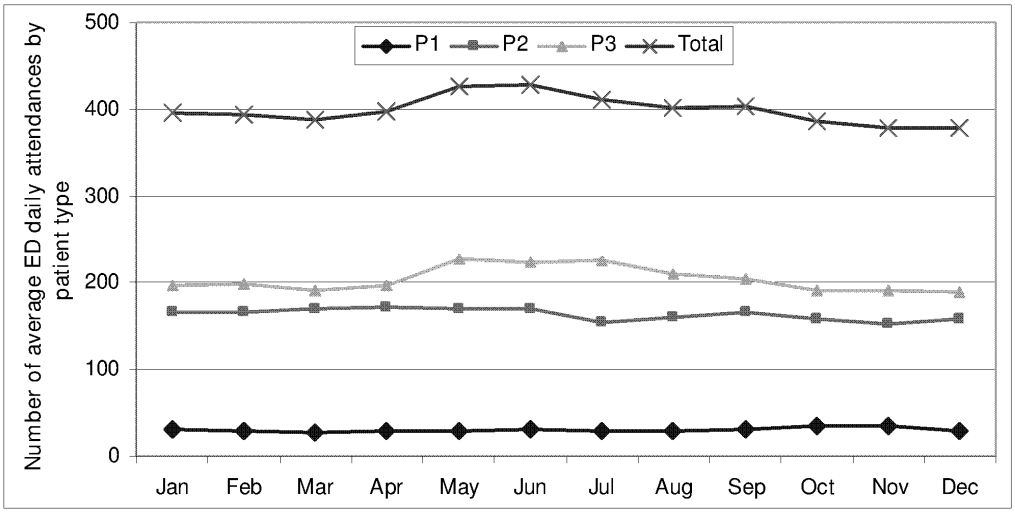

Figure 3. Average daily attendances at emergency department by month of the year, Jul 2005 to Dec 2007

Table 3. Univariate analysis of daily attendances at emergency department by predictors

	P1		P2		P3		Total	
Predictors	MD	p value*	MD	p value	MD	p value	MD	p value
Time (in months)	0.3	< 0.001	2.1	< 0.001	-0.1	ns	2.2	< 0.001
Day of the week: Sun	0.9	ns	-4.6	ns	34.3	< 0.001	27.6	< 0.001
Mon	3.0	0.005	19.8	< 0.001	48.0	< 0.001	66.5	< 0.001
Tue	0.5	ns	8.0	0.005	17.6	< 0.001	26.0	< 0.001
Wed	1.1	ns	2.7	ns	11.7	0.001	10.6	0.014
Thu	1.4	ns	0.8	ns	9.3	0.008	10.3	0.016
Fri	0.3	ns	-1.3	ns	-1.1	ns	-6.8	ns
[Sat]	0.0	-	0.0	-	0.0	-	0.0	-
Month of the year: Jan	0.1	ns	0.1	ns	5.5	ns	5.3	ns
Feb	-2.2	ns	0.3	ns	6.7	ns	3.9	ns
Mar	-3.5	0.012	3.8	ns	-1.6	ns	-2.0	ns
Apr	-2.3	ns	5.4	ns	4.9	ns	7.8	ns
May	-2.1	ns	3.1	ns	35.2	< 0.001	37.0	< 0.001
Jun	0.4	ns	4.3	ns	31.4	< 0.001	37.9	< 0.001
Jul	-2.5	0.041	-10.7	0.002	33.6	< 0.001	21.0	< 0.001
Aug	-2.5	0.039	-6.3	ns	18.9	< 0.001	11.3	ns
Sep	-0.3	ns	0.2	ns	12.3	0.006	13.7	0.019
Oct	2.7	0.029	0.3	ns	1.3	ns	4.9	ns
Nov	3.2	0.011	-9.9	0.005	6.3	ns	-0.4	ns
[Dec]	0.0	-	0.0	-	0.0	-	0.0	-
Public holiday (Yes)	0.9	ns	-11.7	0.009	17.8	0.003	7.7	ns
Ambient temperature	0.0	ns	0.5	ns	5.5	< 0.001	6.2	< 0.001
Relative humidity	-0.1	0.039	-0.3	ns	0.3	ns	-0.8	0.007
PSI > 50 (Yes)	8.7	< 0.001	8.2	ns	-29.2	< 0.001	-13.2	ns

[]: reference group
PSI: pollution standards index
MD: mean difference
* using t-test
ns: not significant

Table 4. Best-fit ARIMA models and their predictors by patient acuity category

				MAPE (%)	
Patient acuity category	Best-fit model	No. of predictors	Predictors (maximum lag correlation)	Test	Validation
P1	ARIMA(0,1,1)	1	PSI > 50 (2 days)	18.2	16.8
P2	ARIMA(1,1,1)(1,0,1)	1	Public holiday (1 day)	7.7	6.7
P3	ARIMA(0,1,1)(1,0,1)	2	Public holiday (1 day), PSI > 50 (0 day)	7.2	8.6
All	ARIMA(0,1,1)(1,0,1)	1	Public holiday (1 day)	4.4	4.8

ARIMA: auto-regression integrated moving average
MAPE: mean absolute percentage error
(p, d, q)(P, D, Q): p is the order of auto-regression, d is the order of differencing (integration), and q is the order of moving average; P, D, Q are their seasonal counterparts

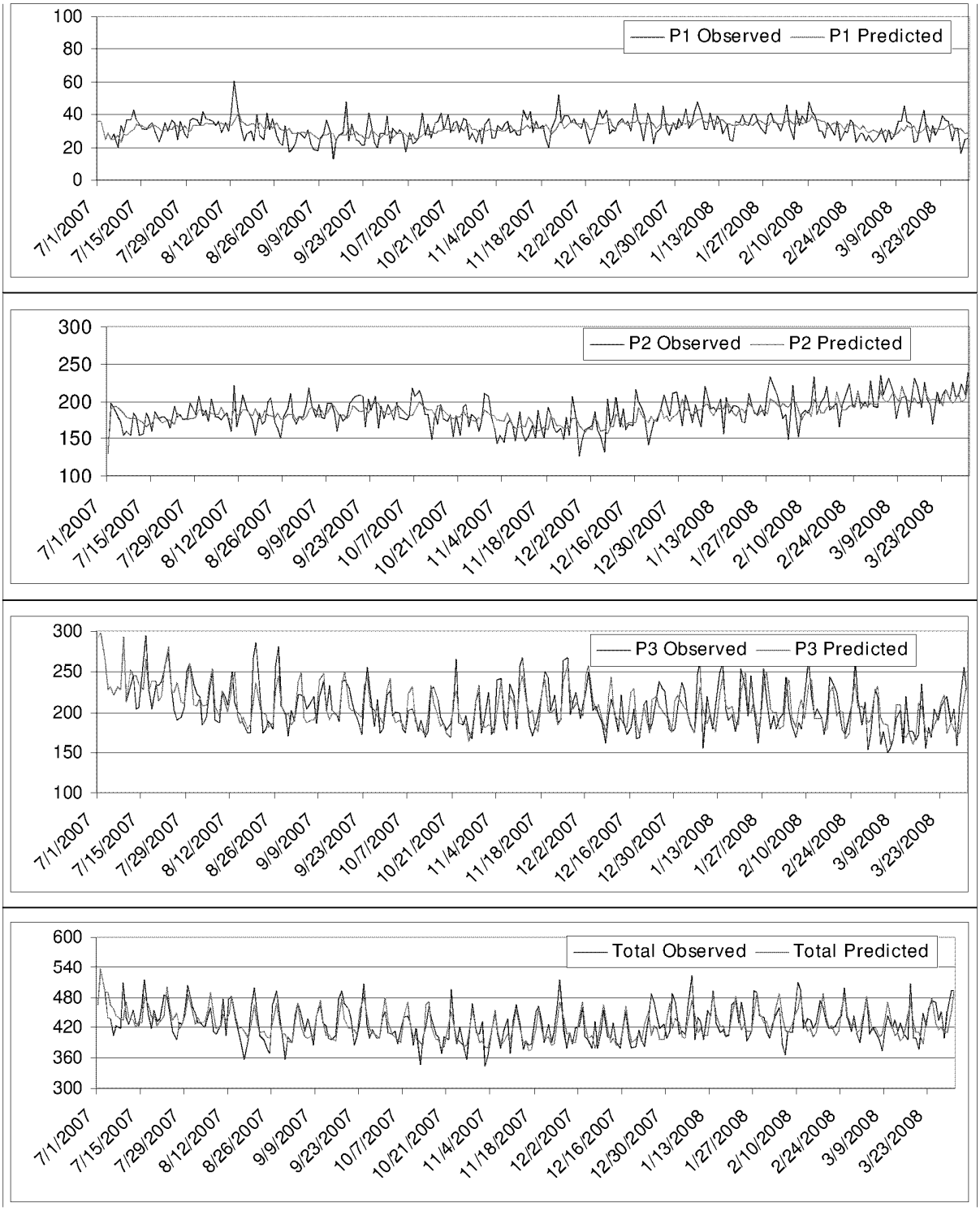

Figure 4. Observed and predicted daily attendances at emergency department by patient acuity categories, Jul 2007-Mar 2008

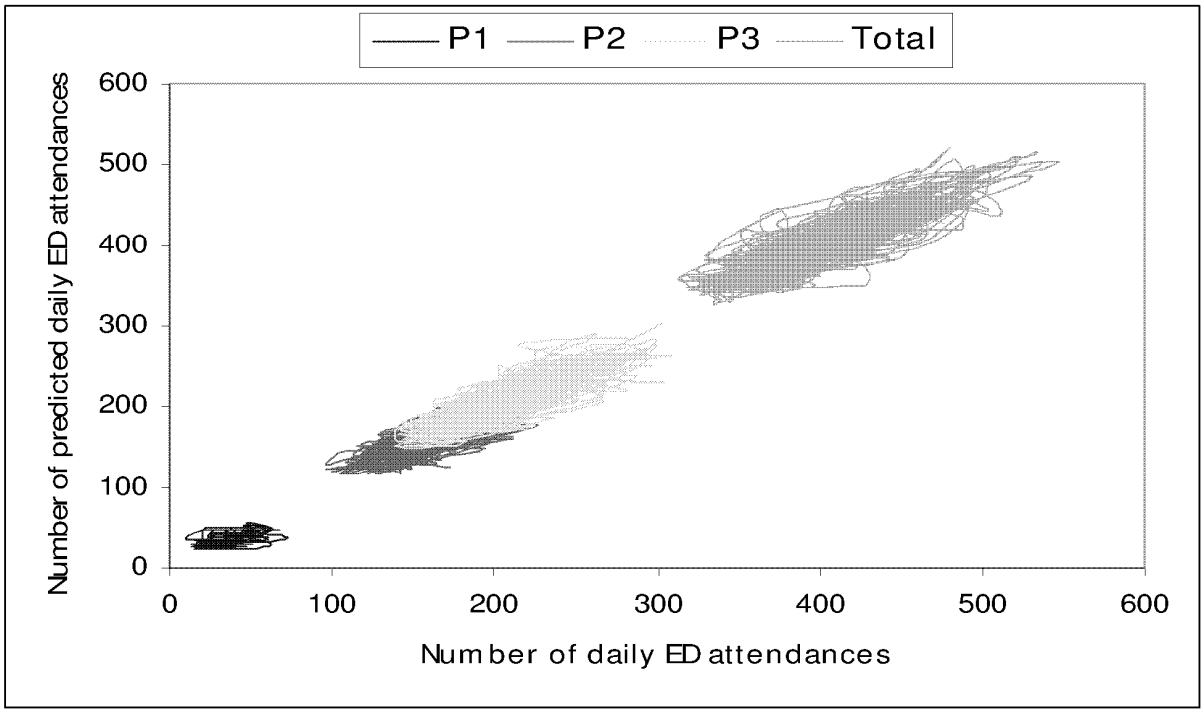

Figure 5. Scatter plot of numbers of daily attendances at emergency department by patient acuity categories, observed vs predicted, Jul 2007 - Mar 2008

Discussion

Although emergencies are difficult to foresee, this study demonstrated that daily patient attendances at ED can be predicted with good accuracy using the modeling techniques in time series analysis. During the study period, the daily variations noted were quite significant, with daily P1 attendances ranging from 10 to 72; P2 attendances ranging from 96 to 239; P3 attendances ranging from 138 to 307. The model developed has identified factors associated with these variations in a local setting; which in turn were used to forecast future workload. Although the P1 model showed the highest prediction error due to the very small number of daily P1 attendances, it still demonstrated good forecasting ability. Unlike other studies [6,8], this study showed that daily total ED attendances were not predicted by weather conditions. This could be because Singapore is a tropical city with little variation in its hot and humid weather conditions throughout the year. While there was no seasonal fluctuation, higher P1 attendances was predicted by moderate or poor ambient air quality (PSI > 50). This could be due to severe respiratory and heart diseases among the vulnerable elderly population, which make up the 70% of P1 cases, and as reported by other studies [16-18]. On the other hand, PSI > 50 was significantly inversely correlated with P3 attendances; i.e. fewer P3 attendances on days with high PSI. Singapore's national advisory on days with moderate to poor PSI follow that of US EPA; to reduce outdoor activities especially among those with compromised heart and lung conditions. Reduced outdoor activities during days of bad PSI may possibly account for this as attendances for trauma associated with minor accidents also decreased.

There were predictable higher weekly attendances on Sundays and Mondays, contributed by P3 cases. This is attributed by the closure of primary care facilities, mainly of the public sector on Sundays and public holidays; and the build-up of demand on Mondays. Similarly public holidays were also strongly correlated with higher P3 attend-

ances when the primary care facilities are closed. There were also higher monthly attendances from May to July, contributed by P3 cases. This is attributed to the perennial seasonal dengue outbreaks and mid-year influenza activity.

Similar modeling and predicting framework can be extended to time series analysis of different intervals, such as hourly, weekly, monthly or yearly, as well as for different disease groups. The model's performance is based on historical trends. It is imperative for the forecasts to be iterative and updated regularly as more data is available in order to improve the prediction performance. In this case, the model is updated 3-monthly and the framework has been put into practice, where the model is run weekly to forecast the workload the following week. The forecasts have been used by the ED management to plan its staff deployment on a weekly base.

In addition to the immediate weekly forecasts, the model has also been used to plan longer term ahead. The study has shown higher daily P3 attendances due to the seasonal dengue and influenza outbreaks mid-year. Moreover, there were also higher P1 and P3 attendances associated with high PSI readings caused by transbound-ary air pollution from the seasonal forest fires in neighboring countries. These secular annual forecasts help the department plan staff headcounts and budget allocation a year in advance.

The study has helped us understand the factors associated with variation of daily ED attendances in a local setting and develop a model to forecast the daily attendances. To our knowledge, it is the first such study in Singapore. This study suffers from a few limitations. One is that there may be other factors affecting the daily ED attendances, like the availability of other primary care facilities and their workload which may predict ED attendances. Another limitation is the use of average daily temperature. Although the temperature range throughout the day may not be wide, maximum and minimum temperature could be more useful as a predictor. Also, we did not evaluate alternate forms of the predictor variables (e.g., squared, cubed or other non-linear forms) in this study, which may give better prediction of ED attendances.

Conclusion

Forecasting methods are useful in healthcare management. Accurate prediction of patient attendances will facilitate timely planning of staff deployment and allocation of resources within a department or a hospital. The hospital where the study was carried out is a regional hospital, with its catchment of patients geographically determined. The approach proposed and lessons learned from this experience may assist other four regional hospitals and their emergency departments to carry out their own analysis to aid planning and budgeting. Overall, it allows for a basis of macro-planning and allocation of budget by the Ministry of Health, which up to now is based on an average aggregated incremental percentage annual growth.

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A SURVEY OF ATTITUDES AND FACTORS ASSOCIATED WITH SUCCESSFUL CARDIOPULMONARY RESUSCITATION (CPR) KNOWLEDGE TRANSFER IN AN OLDER POPULATION MOST LIKELY TO WITNESS CARDIAC ARREST: DESIGN AND METHODOLOGY

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Background: Overall survival rates for out-of-hospital cardiac arrest rarely exceed 5%. While bystander cardiopulmonary resuscitation (CPR) can increase survival for cardiac arrest victims by up to four times, bystander CPR rates remain low in Canada (15%). Most cardiac arrest victims are men in their sixties, they usually collapse in their own home (85%) and the event is witnessed 50% of the time. These statistics would appear to support a strategy of targeted CPR training for an older population that is most likely to witness a cardiac arrest event. However, interest in CPR training appears to decrease with advancing age. Behaviour surrounding CPR training and performance has never been studied using well validated behavioural theories.

Methods/Design: The overall goal of this study is to conduct a survey to better understand the behavioural factors influencing CPR training and performance in men and women 55 years of age and older. The study will proceed in three phases. In phase one, semi-structured qualitative interviews will be conducted and recorded to identify common categories and themes regarding seeking CPR training and providing CPR to a cardiac arrest victim. The themes identified in the first phase will be used in phase two to develop, pilot-test, and refine a survey instrument based upon the Theory of Planned Behaviour. In the third phase of the project, the final survey will be administered to a sample of the study population over the telephone. Analyses will include measures of sampling bias, reliability of the measures, construct validity, as well as multiple regression analyses to identify constructs and beliefs most salient to seniors' decisions about whether to attend CPR classes or perform CPR on a cardiac arrest victim.

Discussion: The results of this survey will provide valuable insight into factors influencing the interest in CPR training and performance among a targeted group of individuals most susceptible to witnessing a victim in cardiac arrest. The findings can then be applied to the design of trials of various interventions designed to promote attendance at CPR classes and improve CPR performance.

Background

Definition and epidemiology of out-of-hospital cardiac arrest

Cardiac arrest refers to the sudden cessation of cardiac mechanical activity as confirmed by the absence of signs of circulation [1]. The victim collapses when the cardiac mechanical activity becomes too limited to provide adequate blood flow and oxygen to the brain and muscles. The victim is perceived to be lifeless if no vital signs are detectable (responsiveness, pulse, respiration). Electrical cardiac activity (ventricular fibrillation [VF], ventricular tachycardia [VT], or pulseless electrical activity [PEA]) seen on a cardiac monitor may become the only sign of vital activity. In the absence of cardiopulmonary resuscitation (CPR) and/or electrical defibrillation, such electrical cardiac activity is followed by asystole and then by death in a matter of minutes.

Cardiac arrest remains the leading cause of mortality in North America. The incidence of out-of-hospital cardiac arrest in Canada is estimated to be 55 per 100,000 of population [2], resulting in more than 17,875 deaths annually. Coronary artery disease is the most frequent condition leading to car-

diac arrest [3]. More than 40% of all deaths from heart disease occur suddenly, and often constitute the victim's first manifestation of heart disease [4]. Sixty-five percent of all cardiac arrests occur outside the hospital setting [5], where the overall rate of survival to hospital discharge rarely exceeds 5% [2]. Survivors have a quality of life (Health Utilities Index Mark 3) similar to the general population [6]. Most commonly, cardiac arrest victims are men in their sixties. Canadian cardiac arrest victims collapse in their own home 85% of the time and 50% are witnessed by a family member or bystander [2]. However, bystander CPR rates remain low in Canada, and rarely exceed 15% of all cases in Ontario [2].

The Chain of Survival

The American Heart Association "Chain of Survival" illustrates important concepts in the community response to out-of-hospital cardiac arrest [7]. The chain metaphor implies that cardiac arrest care is only as strong as its weakest link among the four links in the chain: 1) Early access: When dialling 9-1-1, a caller is put in communication with personnel that will appropriately dispatch police, fire, emergency medical services (EMS), or all three. In the case of a medical emergency, the call will rapidly be transferred to a medical dispatch centre. Dispatch Officers collect information on the nature of the medical emergency and dispatch the appropriate EMS unit(s), often as more information is being collected. 2) Early CPR: CPR can be defined as a succession of lung insufflations and chest compressions performed by a rescuer with the intention of restoring spontaneous circulation. Although police, fire, and EMS paramedics have all been trained to perform CPR in cases of cardiac arrest, it is what occurs during the first minutes before their arrival that is most crucial to the victim. A victim is almost four times more likely to survive a cardiac arrest event when receiving citizen bystander CPR before emergency personnel arrives [OR 3.7 (95% CI 2.5-5.4)] [8]. 3) Early defibrillation: Defibrillation occurs when myocardial cells in a chaotic or abnormal electrical rhythm, VF or VT, are depolarized at the same time by the delivery of an electrical current. This results in the re-establishment of a rhythmic and organized heart beat. Defibrillation can only occur when the heart exhibits disorganized electrical activity and is never successful in the case of asystole or PEA. 4) Early Advanced Care: Advanced cardiac life support care is defined by the use of definitive airway management such as endotracheal intubation, intravenous access and administration of drugs. Such drugs serve the purpose of increasing the coronary per-fusion pressure by increasing peripheral vascular resistance (Epinephrine, Vasopressin), or to promote arrhythmia termination either alone by acting on myocardial cell electric action potential and/or by facilitating defibrillation (Lidocaine, Procainamide, Amiodarone). This being said, early advanced care failed to improve survival to hospital discharge in the largest prospective pre-hospital study conducted to date [8].

Low bystander CPR rates

Data from Seattle indicates that a survival rate of 30% can be achieved for witnessed VF cardiac arrest victims receiving bystander CPR [9]. Other communities such as Akita and Otsu, Japan report overall survival rates from cardiac arrest of 15% and 9%, respectively, in association with bystander CPR rates of 49% and 29% [10]. In comparison, citizen bystander CPR and overall survival rates are rather modest in most Canadian provinces, rarely exceeding 15% and 5% respectively [2].

Various attempts have been made to improve bystander CPR rates in the past. Two very popular and contrasting approaches are mass CPR training events and targeted CPR training of family members of patients suffering from cardiovascular disease. The objective of the mass CPR training is to teach as many CPR providers as possible from the general population in a group setting. Although mass CPR training events can reach groups of a few hundred to thousands of participants at a time [11-14], these events usu-

ally attract young participants unlikely to witness cardiac arrest. In addition, they are not cost-effec-tive[15] and their effect on survival has not been demonstrated. Targeting the population at large may not achieve the desired goal of increasing bystander CPR rates [16,17].

The second approach, targeted CPR training, involves spouses and other family members of cardiac arrest victims, the people most likely to witness the event [18-20]. Many authors have suggested targeting family members of patients with known cardiovascular disease for CPR training [21-32]. As few as 9% of this target group have generally received CPR training, while the highest rate is found in Detroit at 47.4% [20,33-36]. Although one study associated advancing age with failing to succeed in CPR training [37], other publications show a high success rate in the older population group [38-40]. While some authors suggest the addition of counselling to deal with the extra responsibility and stress associated with being a potential CPR provider [41,42], CPR training was shown to decrease anxiety, and increase emotional adjustment in family members of cardiac arrest survivors [43-45]. Since 40% of cardiac arrest victims never had any documented cardiovascular disease preceding the event [4], targeting only family members of patients with known cardiovascular disease may not achieve the desired goal. Instead, we should find ways to target the whole population at risk, namely the male and female population aged 55 and older.

Irrespective of the teaching method, retention of CPR knowledge and skills is poor [46-48]. The Heart and Stroke Foundation of Canada currently recommends yearly retraining [49]. There is a large amount of literature demonstrating a significant decrease in CPR knowledge and skills after one year [50-62]. Trainees may go back to pre-training skill levels as early as six months after their CPR class [63-67]. Some evidence exists that retraining may be protective against a decline in CPR skills [68].

Barriers to CPR training

Authors have asked many people why they were not interested in taking a CPR class. A common response from lay persons is that it simply never occurred to them that CPR training was something they should be doing. Interest in CPR training appears to decrease with advancing age [6973]. When a group of elders were asked why they had not sought CPR training in the past, most gave no specific reason, or mentioned the inconvenience of having to leave the house, bad health, or cost [74,75]. Some respondents did not understand why they should perform CPR when they can call 9-1-1 [76]. Other common reasons for not seeking CPR training were lack of time or interest, inability to find a course, physical limitations, fear of contracting HIV, or fear of being sued despite the absence of any successful lawsuit for having provided CPR [77,78]. To the contrary, the notion of negligence and failure to provide support could theoretically have legal consequences [79]. There is a lack of consistency among what various studies have found, and none of them clearly demonstrated which factors were most susceptible to influence someone's decision to seek CPR training.

It is also important to address the fear of contracting an infectious disease. Historically, tuberculosis and polio were major concerns on the minds of potential rescuers [80]. In our time, HIV and hepatitis B have replaced those diseases [80,81]. Two surveys published in the late eighties reported that up to 50% of CPR students and instructors alike believed HIV to be transmissible despite standard precautions or simply from giving mouth-to-mouth to a manikin [82,83]. In another survey published during the same period, 90% of homosexuals knew that HIV could not be transmitted from mouth-to-mouth ventilations [84]. No case of HIV, hepatitis B, hepatitis C, or Creutzfeldt-Jakob disease has ever been reported as a result of providing basic CPR to a victim or a manikin [85,86]. There are only three documented cases of horizontal transmission of HIV to

health care professionals and they all involved a significant amount of blood and the absence of basic precautions [85]. In a time where people are better educated about the transmission of communicable diseases, we need to re-examine what effect the fear of HIV has on bystander CPR.

Barriers to CPR performance

Besides fear of disease transmission, there exist other deterrents to bystander CPR. Mouth-to-mouth ventilation is an intimate act that may influence the decision of potential rescuers to perform CPR [87,88]. Willingness to perform CPR appears directly related to the closeness of the relationship with the victim [13,25,34,75,89-92]. In a survey conducted in 1995, 68% mentioned they would perform only chest compressions on a stranger [93]. Other conditions such as vomit, dentures, blood, body odour, and alcohol smell may be unexpected, and have been associated with reluctance to provide CPR to a cardiac arrest victim [94-97]. Nobody knows what impact these conditions have on bystander CPR rates.

CPR certification is associated with increased confidence in one's ability to provide care, which in turn is associated with an increased helping behaviour [27,33,98-101]. But CPR training is still not an assurance of action when the time comes for the rescuer to apply what he or she has learned [102]. Social scientists have studied the effects of ambiguity and the presence of other bystanders on helping behaviour. The more obvious it is that actions are required in a specific situation, the more likely it is that someone will help [103-106]. It has been suggested that people are often unable to make the decision to help rather than choosing not to help [104]. Furthermore, it has been demonstrated that overall helping behaviour decreases with an increasing number of bystanders, a phenomenon known as diffusion of responsibility [106-110]. Although the likelihood of finding someone with CPR training in a crowd increases, the helping behaviour of that rescuer will be reduced by the presence of the other bystanders. Simple and complex behavioural methods have been postulated to address those issues, most of them involving one form or the other of behavioural or cognitive approaches to teaching helping behaviour, but none specifically during CPR classes [111-113]. Once again, we do not fully understand what truly motivates an individual to perform CPR or not when it is necessary to do so.

Theory of Planned Behaviour

While it remains unclear from previous research if situation-specific factors such as the ones mentioned previously affect the likelihood of CPR-related behaviours, it may also be that general constructs known to affect other health-related behaviours are also relevant. Examination of CPR training and performance behaviours have never been studied in the context of these more general theories, despite their utility in explaining a wide variety of health behaviours [114-118]. For example, the theory of planned behaviour (TPB) proposes that the strength of an individual's intention (or motivation) to engage in a behaviour, and the degree of control they feel they have over that behaviour (perceived behavioural control) are the proximal determinants of engaging in it [119]. The TPB also proposes that intention strength is determined by three variables: attitudes towards the behaviour (a product of beliefs about its consequences and evaluations of those consequences), subjective norms (a product of perceptions of the views of other individuals or groups about the behaviour, and the strength of the individual's desire to gain approval of these groups) and perceived behavioural control (a function of beliefs about factors likely to facilitate or inhibit the behaviour - these might include organizational constraints and patient preferences). The TPB has been shown to predict a range of individual health related behaviours with some success [120,121] (e.g. recent meta-analyses have suggested that the TPB can account for around 20% of the variance in health behaviour [122-124]). To our knowledge, the TPB has never been utilized to study bystander's motivations with regard to CPR training and

performance. However, early studies suggest that it is a useful, systematic tool to identify barriers to and facilitators of change and hence appropriate forms of intervention [122-128].

Systematic review of the literature on bystander CPR determinants

CPR is a crucial yet weak link of the Chain of Survival for out-of-hospital cardiac arrest. We sought to understand what is known about the determinants of bystander CPR and factors associated with successful CPR training by conducting a systematic review of the available literature [129]. Eleven electronic databases, one trial registry, and nine scientific web sites were searched. In addition, hand searches were performed and six content experts were contacted. All communications pertaining to WHO should learn CPR, WHAT should be taught, WHEN to repeat training, WHERE to give CPR instructions, and WHY people lack the motivation to learn and perform CPR were reviewed with restriction. Publications were grouped by category and recommendations were developed using a standardized classification system based on level of evidence.

A total of 252 articles were included out of 2,409 located. Differences in their study design precluded a meta-analy-sis. Twenty-two recommendations were classified. Recommendations with the highest scores (A, I-2) were: 1) Dispatch-assisted CPR instructions; 2) Teaching CPR to family members of cardiac patients; 3) Braslow's self-training video; 4) Maximizing time spent using manikins; and 5) Teaching concepts of ambiguity and diffusion of responsibility. Other examples include: Mass training events (C, II-3), pulse taking by laymen (D, I-2), and CPR using chest compressions alone (E, I-2).

This exercise resulted in the evaluation and classification of the potential impact of interventions designed to improve bystander CPR rates. These results will help identify common barriers and facilitators to CPR training and CPR performance for the purpose of the current project, more specifically for the purpose of including theoretical constructs represented in the literature.

Objectives

The overall goal of this study is to design and conduct a survey to better understand the behavioural factors associated with successful CPR knowledge transfer in independent-living older Canadians (aged 55 or older).

Specific objectives are:

To conduct semi-structured qualitative interviews to identify factors influencing CPR training and performance behaviours;

To develop a survey instrument about factors influencing CPR training and performance behaviours based on a systematic review of the literature [129], the results of the semi-structured interviews, and theoretical constructs from the Theory of Planned Behaviour;

To conduct a telephone survey among an independent-living population aged 55 or more using the survey instrument, and to identify factors and strategies that might be targeted by knowledge translation interventions.

Methods/Design Study design

A multi-phase approach will be taken to develop, pilot-test, and administer a telephone survey examining the determinants of CPR training and performance among a population aged 55 or older. In the first phase, data will be used from a recently completed systematic review of the literature [129] to inform the development of a semi-structured interview guide designed to identify barriers and facilitators to a) obtaining CPR training, and b) actually performing CPR, among our target population. Interviews of people aged 55 and older will be carried out until information saturation is achieved; we estimate no more than 20 interviews will be necessary. In the second phase, relevant barriers/facilitators to the two CPR-related behaviours from the interviews will inform development of a pilot telephone survey using the theoretical framework provided by the Theory of Planned Behaviour. In the third phase, a telephone survey will be con-

ducted on individuals over the age of 55 to identify which combinations of barriers, facilitators, and theoretical constructs best predict intention to receive CPR training and/or to perform CPR on a cardiac arrest victim.

Method of assessment and data collection

Phase one - semi-structured interviews

The purpose of this phase of the research is to identify and describe barriers and facilitators about CPR training and CPR performance among our target population, and examine this group's perceptions of the factors influencing their behaviour. This will be accomplished by conducting semi-structured interviews on a convenience sample of people from the target population. Data from this preliminary work will be used to describe all relevant barriers/facilitators to these two target behaviours in this high impact population, and inform the content of the larger scale telephone survey.

An interview guide will be developed using the results of the systematic review [129]. A research assistant will be trained in interviewing skills and will conduct the interviews either in person or over the telephone.

Approximately 20 individuals (male and female) from the urban and sub-urban Ottawa region will be interviewed. While 6-8 participants are often enough for a homogeneous sample, 12-20 are commonly needed when looking for disconfirming evidence or trying to achieve maximum variation [130-132].

The interviews will yield a large quantity of data. To monitor the progress of the interviews and permit follow-up of issues that may emerge from the data, interviewing, transcription, and analysis will proceed concurrently. The audio-tapes will be transcribed verbatim and verified by the interviewer prior to analysis. Data will be imported into a qualitative software package (Nu Dist NVivo™) to facilitate thematic coding, evaluation and analysis [133]. The analysis will be consistent with the methods used for thematic analysis and thick description [130,132,134,135].

Phase two - survey devlopement

The purpose of this phase is to use the data generated from the interviews to develop and pilot test a psychometrically sound telephone survey instrument examining issues around our two target behaviours in the context of a well-validated theoretical framework.

Based on now-standard methodologies for developing context-specific measures of the general constructs proposed in the Theory of Planned Behaviour [124,125,136138], a content analysis of the qualitative data generated from the interviews (by at least two researchers) will identify: 1) the most frequently perceived advantages and disadvantages of performing the behaviour (behavioural beliefs); 2) the most important people or groups of people who would approve or disapprove of one's performance of this behaviour (normative beliefs); and 3) the list of the perceived barriers or facilitating factors that could hamper or facilitate adoption of the behaviour studied (control beliefs). The two behaviours under study will be "seeking CPR training" and "providing CPR to a cardiac arrest victim". The survey will be organized using the theoretical constructs of the Theory of Planned Behaviour which measure: behavioural intentions, attitudes, subjective norms, and perceived behavioural control. Assessments for each of the four theoretical constructs will include direct and indirect belief-based measures; each measure will use a minimum of three items on a 7-point Likert scale. The first draft of the questionnaire will be developed using standard question stems and responses to measure beliefs most often listed (usually 75% of all beliefs stated) [136].

An initial draft of the survey will be circulated around the extended project team to ensure face and content validity. We will pilot the survey with 10 participants twice over a two week period for clarity, acceptability, and test-retest reliability. Data from the pilot survey will be analysed for temporal stability and internal consistency using stan-

dard techniques and revised if necessary [139].

Phase three - survey administration

The purpose of this phase of the research is to survey our target population using the survey instrument developed in the survey development phase.

We intend to recruit a representative sample of people over the age of 55 in the Canadian population. Our respondents will be stratified by province (excluding the territories), and urban (greater than 100,000 population) versus rural communities.

The survey will be administered using random digit dialling. The administration protocol will include a pre-test of 10 interviews, a minimum of 12 calls/attempts to each random telephone number to obtain a call outcome, and one attempt to convert all first refusals. Ten percent of all interviewers' work will be monitored for quality assurance purposes. We anticipate a response rate of at least 60%.

Data analysis

The primary hypotheses of the third phase of the project (Survey Phase) will involve examining whether constructs comprising the Theory of Planned Behaviour are significantly related to our two primary outcomes. Specifically:

Hypothesis 1: Attitudes, subjective norms, and perceived behavioural control will be significant predictors of intention to engage in CPR training, and

Hypothesis 2: Attitudes, subjective norms, and perceived behavioural control will be significant predictors of intention to engage in intention to perform CPR in appropriate circumstances.

Analysis of the survey data will first involve descriptive statistics describing the most commonly cited barriers/ facilitators to our two target behaviors. Analysis of Hypothesis 1 and 2 will be carried out by multiple regression. For each of the two target behaviours (intention to engage in CPR training, intention to perform CPR), a blocked multiple regression will test the strength of relationship of these outcomes with the constructs predicted by the Theory of Planned Behaviour; i.e. the constructs of attitude, subjective norms, and behavioural control will be added into the model as a block, and any additional constructs suggested by the Interview Phase added to the model to see if it contributes to the model over and above the factors discussed in the Theory of Planned Behaviour.

In addition to standard regression modelling, we will also produce a structural equation model of our data. Structural equation modelling (SEM) allows the researcher to model not only direct relationships between constructs and outcomes (e.g. is perceived behavioural control related to actual behaviour?), but also indirect relationships through intervening constructs (e.g. is the effect of perceived behavioural control on intention mediated by other constructs?). Because the constructs in the structural model are determined theoretically rather than statistically, this technique is useful for testing the validity of whole theories within a single analysis. Furthermore, SEM does not assume perfect measurement of the constructs, as does regression, but rather explicitly measures and excludes error in the measurement variables from the definition of the constructs.

Sample Size

Power calculations for multiple regression analysis depend on the number of cases per predictor variable. A minimum sample size of 50 + 8 m, where m is the number of predictor variables, is recommended for testing the multiple correlation, and 100 + 8 m for testing individual predictors [140,141]. The two behaviours under study will be "seeking CPR training and providing CPR to a cardiac arrest victim". The survey will be organized using the theoretical constructs of the Theory of Planned Behaviour which measure: behavioural intentions, attitudes, subjective norms, and perceived behavioural control. Assessments for each of the four theoretical constructs for both behaviours under study will include direct and indirect belief-based measures; each measure will use

a minimum of three items on a 7-point Likert scale. Our survey will require a minimum of 146 respondents (assuming three confounders per theoretical construct). We will over sample to handle incomplete data, and target 200 participants.

Ethics approval

This study has been approved by the Research Ethics Board of the Ottawa Hospital (protocol # 2007751-01H).

Discussion

The proposed survey will address important knowledge gaps in our understanding of the barriers and facilitators of CPR training and CPR performance. Several attempts have been made to elucidate these behaviours in the past. For the most part, these consisted in poorly developed and constructed surveys, with no follow-up intervention based on their findings.

The results of the proposed survey, based on scientifically developed theoretical constructs, will provide invaluable insight into factors influencing the interest in CPR training and performance among a targeted group of individuals most susceptible to witnessing a victim in cardiac arrest. We plan to apply our findings and evaluate their impact during randomized controlled trials of various interventions designed to promote attendance at CPR classes., and CPR performance. The results of this survey should contribute to the development of the updated version of the Guidelines for Resuscitation in 2010, and offer scientific evidence to support a paradigm shift in the approach to CPR training in the community. Ultimately, the most reliable measure of impact from all proposed interventions will be an unequivocal increase in bystander and survival rates for out-of-hospital cardiac arrest victims.

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MOLECULAR MECHANISMS AND MANAGEMENT OF TRAUMATIC BRAIN INJURY – MISSING THE LINK?

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We read with great interest the recent review article by Veenith *et al*. published in the *World Journal of Emergency Surgery* [1]. In this paper, the authors provide an overview on the epidemiology and pathophysiology of traumatic brain injury (TBI), and present an update on TBI-induced apoptosis, intracranial gene regulation and pharmacological approaches to ameliorate secondary brain injury. The authors are to be congratulated for outlining this important and constantly evolving topic of global importance. Unfortunately, our initial excitement about this paper, which promised to disclose the "missing link" between molecular pathology and new treatment concepts for TBI [1], was not justified. We believe that important pathways in the pathophysiology of TBI and resulting therapeutic concepts were not addressed in the review article. We would therefore like to comment on the missing aspects in the article by Veenith and colleagues [1], in order to provide a more balanced and comprehensive perspective on the topic.

Beyond a doubt, a detailed description of the molecular neuropathology of TBI represents a challenging task, which is difficult to describe in just a few paragraphs. However, the authors could have expanded their article to include some of what we consider "key" pathways in the cellular and molecular pathophysiology of TBI (Figure 1). For example, the role of neurotoxic proteases, nitric oxide and phospholipases released by damaged tissue, the impact on blood-brain-barrier breakdown by recruited and local inflammatory cells, and the activation of the innate immune system, e.g. the complement system, as a crucial mediator of posttraumatic neuroinflammation, are not mentioned or discussed in the paper. The section devoted to apoptosis provides the reader with some basic textbook information and definitions, but may have benefited from an additional update on the current literature in the field of neuronal apoptosis in TBI. Similarly, the paragraph on gene regulation appears to represent a random selection of candidate genes without a rationale being provided on how alterations in gene regulation may relate to the pathophysiology of TBI. Several references cited refer to studies related to cardiovascular disease, rather than head injury. Most importantly, this section of the manuscript fails to stress the clinical relevance of pathological alterations in gene expression.

Finally, as a minor comment, the authors should pay more attention to accuracy in the citation of the pertinent literature. For example, reference #10 is claimed to support a statement on interleukins and cerebral edema, when in fact the citation refers to a publication on programmed cell death in nematodes. Several other examples of inadequate reference to the literature could be mentioned. Finally, the title chosen by the authors appears problematic. The authors claim to provide the *"missing link"* between molecular mechanisms and therapeutic concepts in TBI. Unfortunately, the review article fails to provide a bridge between the two entities. In addition, many of the current therapeutic approaches and promising new strategies in search of the pharmacological "golden bullet" are missing [2]. While alterations in gene expression may be an interesting finding and promising target for future scientific approaches, we are still far from bringing the gene therapy concept from "bench to bedside" for an acute traumatic disorder such as TBI.

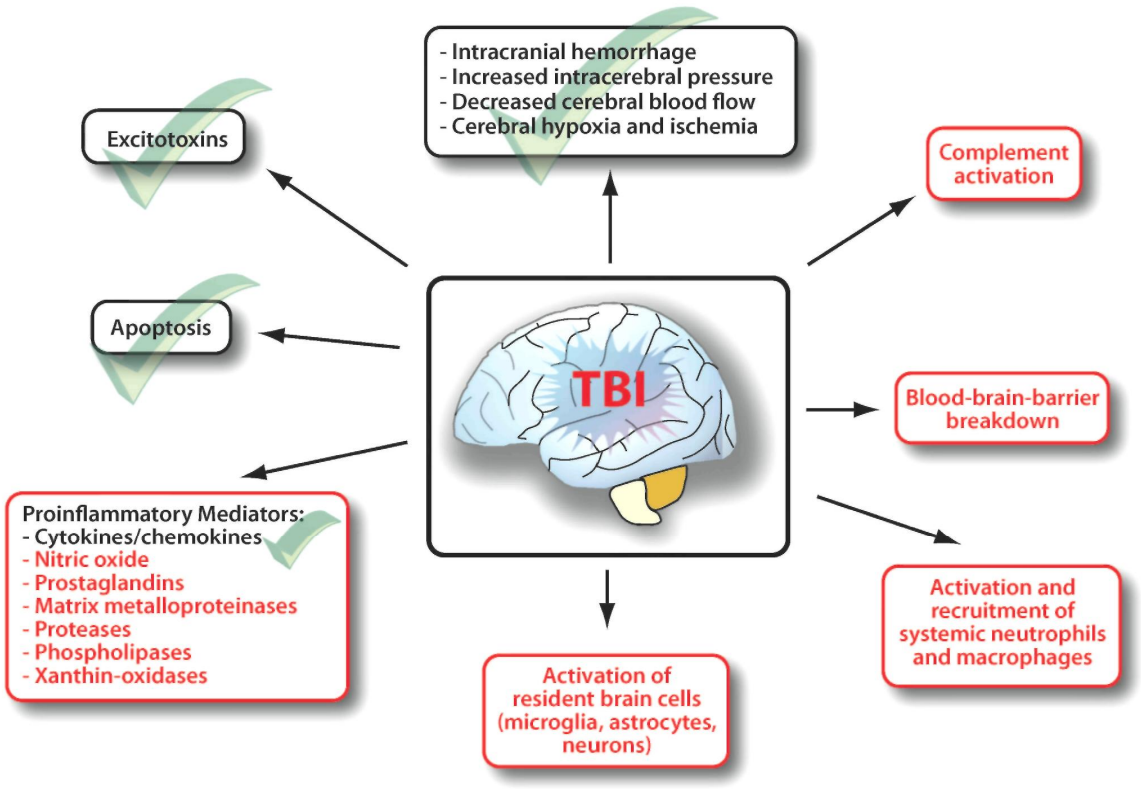

Figure 1. Simplified schematic of the complex neuroinflammatory response following traumatic brain injury. Checkmarks indicate the areas discussed in the review article by Veenith and colleagues [1], while the red boxes designate pathophysiological pathways of additional interest.

In summary, we realize that providing an encompassing and scientifically accurate review on the topic represents a virtually impossible task. We are therefore grateful for the review by Veenith *et al.* [1] and we hope to contribute to the authors' search of the "missing link" between molecular pathophysiology and new therapeutic concepts in TBI by the identification of additional pathways of interest (Fig. 1).

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Materials of Conferences

STUDY OF STATUS OF VITAMIN D IN CASE OF DEGENERATE AND DYSTROPHIC DISEASES OF JOINTS

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Osteoarthrosis (OA) takes a leading place in the structure of diseases of locomotorium organs. Roentgenological symptoms of OA manifest themselves at more than 85% people older than 60 years and clinical ones are evident at 12 (1,2). Studies of this aspect of osteoarthrosis in Kazakhstan were not conducted.

The aim of the given research is study of the content of vitamin D at patients affected by osteoarthrosis.

Materials and Methods

Research was conducted at the arthrology department of Astana Research Institute of Traumatology and Orthopedy. Forty six patients were examined, their average age being 58,4 ±3,6 years. OA was diagnosed on the basis of unified criteria worked out at the Institute of Rheumatology RAMN. Roentgenological criteria according to Kellgren J. H. and Lawrence J. S. were used.

Patients were divided into 3 groups. The first group consisted of women with OA disease still having menstrual cycle (n=8). The second group was presented by women with OA disease in menopause (n=24). The third group consisted of men with OA disease at the age from 40 to 72 years (n=14). Control group consisted of practically healthy people (n=10). Vitamin D was defined by the method of immunofermental analyses. Research was conducted at the laboratory of clinical immunology according to instructions of the producing company.

Results and Discussion

As it is known, involutive changes in bones and joints seriously affect the course of OA and there is a direct correlation between the age of a patient and heaviness and prognosis of a disease. The total number of patients was 46, more than a hall of them being older than 60. According to assessment of functional defect of joints patients having II and III stages dominated.

Average value of vitamin D concentration in patients having menstrual cycle was 38,1 ± 5,8 nmol/l, it was 49% lower than in a control group (66,6 ±15,5 nmol/l; $p<0,02$). It was stated that 19 patients in postmenopause group had 35,01±7,5 nmol/l, which was lower than in a control group ($p<0,001$). In the third group 9 male (64%) showed reduction of vitamin D, average value of vitamin D concentration for men was 34,9±21,5 nmol/l which differed statistically from the control group ($p>0,5$). Deficit of D vitamin manifesting clearly for elderly people may be explained probably by insufficient exposure to sunshine and decreasing skin ability of synthesis of vitamin D (2,6). Anomalies of this kind are not compensated by the substances entering inside with the food, as dairy products do not contain sufficient quantity of vitamin D. Deficit of vitamin D accompanies and complicates the deficit of calcium which is also common for a large number of elderly patients. It is the evident, that a category of patients under observation does not reflect condition of all patients in a full degree, however it represents some kind of a "model" of a high risk group, exposed to not only osteoporosis but osteoarthrosis as well(3,4,5).

Thus, it was stated that the majority of examined patients with degenerate and dystrophic diseases of joints had deficit of vitamin D which speaks in favour of conducting substituting therapy, caused by vitamin D deficit.

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BIOHEMICAL MARKERS OF THE BONE METABOLISM UNDER OSTEOARTROSIS

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A problem of osteoarthrosis (OA) has got a special medical and social significance due to the growth of this disease (1). Nevertheless, condition of bone metabolism at OA is not properly studied. It is known that osteocalcin (OCC) is synthesized by osteoblasts. OCC is growing in the period of menopause. It is correlated with the decrease of mineral density of osseous tissue in a lumbar section of a spinal cord.

Materials and Methods

The given research was conducted at the arthrology department of the Research Institute of Traumatology and Orthopedy. The group under research consisted of 46 patients with OA. Their average age was 58, 4±3.6 years. Patients were divided into 3 groups: female patients still having menstrual cycle (the first group; n=8); female patients in postmenopause (the second group; n=24) and male patients with OA (the third group; n=14). Control group included practically healthy people (n=10).Studies of OCC content were conducted in laboratory of clinical immunology of NIITO according to producer's instructions.

Results and Discussion

The levels of serum OCC were evaluated at 32 women (8 with menstrual cycle and 24 in postmenopause, not treated with glucocorticoids) and at 14 men.

Initially, the level of OCC for women having menstrual cycle was higher for one patient (12, 5%); for other patients it corresponded to a norm, decrease of OCC level was not observed. In the second group four women (20, 8%) in menopause (duration from 8 to 18 years) showed increase of OCC level and had a lot of injuries of joints (from 12,6 to 16,6; ESR from 16 to 20 mm/h). An average level of OCC in general was – 19,6±5,1 ng/ml; for women with menstrual cycle - 21,26±3,075 ng/ml; for women in postmenopause – 26,4± 6,3 ng/ml, these differences statistically being reliable in comparison with patient's age (according to R. Spirman=0,40; p=0,020). The level of alkaline phsphotasa at the initial stage of observation was normal at 38 (82, 6%) female patients, a slight decrease was noted at 8 (17,4%) cases; increase of alkaline phosphotasa was not observed. Six from 24 female patients with the observed decrease of alkaline phosphotasa were in postmenopause (duration from 6 to 12 years). Comparison of initial level of markers of osseous exchange to clinical and laboratory data characterizing OA was conducted. The level of OCC in general did not correlate with laboratory data for OA.

Thus, according to data collected in the process of research the level of marker of osseous formation – OCC increases in the group of women in postmenopause having OA, reflecting the growth of intensivity of osseous exchange in general. For women in postmenopause, probably, it is initiated because of hormonal disturbances. According to these data the increase in level of marker of osseous formation is associated with the decrease of mineral density of osseous tissue.

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IMMUNE RESPONSE TO BENZO(A)PYRENE IN LUNG CANCER PATIENTS

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In our previous works we studied the presence of antibodies (AB) to fluoro-methyl-benzaanthracene conjugate – bovine serum albumin (FMBA-BSA) in healthy people, breast, gaster, large and straight intestine cancer patients. We managed to detect the antibodies of all the three classes of immunoglobulins and also to find out clear isoallotypic differences in the formation of AB to FMBA-BSA between healthy and sick people; between various organs cancer patients; between one focalization, but various course forms cancer patients.

The purpose of the present work is to study the presence of antibodies to the benzo(a)pyrene – bovine serum albumin (BP-BSA) conjugate in lung cancer patients (LC), to define their isoallotypic features, the ratio of the AB classes at this pathology and to try to define the diagnostic value of these factors.

The blood samples of 110 males – LC patients and 100 healthy males without any lung diseases in the past medical history served as the test material for this research. The serum was separated from the whole blood and frozen at -70^{o} C, then the definition of antibodies to BP-BSA by means of the modified immunoenzyme method developed in our laboratory was carried out. The obtained results were expressed in relative value units (RVU/ml).

The studies were carried out using the reagents of the DakoCytomation firm (Denmark) and the "Humareader" (USA) and "Pikon" (Novosibirsk, Russia) firms' equipment.

As a result of the carried out research it was found out that the blood serum of both LC patients and healthy males contained A, G, M classes' antibodies to the BP-BSA conjugate. Their content in the experimental and control groups authentically differed in all the three classes of immunoglobulins. In the LC patients the IgG antibody level is considerably higher, than that in the control group, a different picture being observed for the IgM antibodies.

At the analysis of the AB formation character in the smoking males it was found out that authentic differences between the control and experimental groups were observed for the IgG and IgM antibodies. In the non-smokers authentic differences retain only for the IgM antibodies. No dependence on the stage of the disease concerning the content of the antibodies to BP-BSA was registered.

On the ground of the obtained results we introduced a relative factor – the ratio of the IgG antibody level to the IgM antibody level. In the result of comparison of the experimental and control groups in this factor it was found out that in case of the lung cancer development its value increases almost by an order in all the groups considered.

References:

1. Every one of the examined people, either sick or healthy, has G, M and A classes' antibodies to BP-BSA in blood.

2. Authentic differences between the lung cancer patients and healthy males are detected in all the three classes in the general group, in IgG and IgM – in the group of smokers, in the IgM – in the group of non-smokers.

3. In the course of carcinogenesis an IgG antibody level increase and IgM antibody level decrease occur.

4. In the lung cancer patients the IgG/IgM factor value increases almost by an order compared to the control group.

5. We suppose that the IgG/IgM factor can be used at the health status monitoring of the lung cancer risk group persons (coke and by-products process, chemical, mining and heat and power plants' workers).

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AGE-RELATED IMMUNOHISTOCHEMICAL CHANGES OF THE THYROID GLAND DURING EARLY POSTNATAL DEVELOPMENT IN RATS

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Thyroid gland comprises two parts which are different in structure, function and origin, namely follicular and parafollicular compartments with thyrocytes and calcitoninocytes as the main cellular populations in them accordingly. Thyrocytes constitute simple epithelial lining of the follicles and originate from the endodermal epithelial lining of the pharyngeal floor, while calcitoninocytes may either be present interfollicularly or included in the follicular epithelial lining being separated from the colloid by the intertwining processes of the neighboring thyrocytes, they originate from the 4th pharyngeal pouch populated by the neural crest cells and are considered to be APUD-cells (**K.Pacak et al., 2001; J.Seidel et al, 2003; J.Dadan et al., 2004; M.K.Irmak et al., 2004; Y.Kameda et al., 2007**). For a long time calcitoninocytes were thought to have no significance for the calcium metabolism control, but later investigations revealed their important role in stress-related activation of the hypothalamo-hypophyseo-thyroid axis (**N.Pondel et al., 2000; V.Rajkovic et al., 2001; M.A. Titova et al., 2003; V.I.Loginov, 2007).** Recently evidence was provided that close functional interactions between the two cellular types are controlled by the paracrine mechanism (**B.Sawicki et al., 2002; R.L.Zbuckie et al., 2007; M.Gutiérrez-Mariscal et al., 2008)**. After birth thyroid gland undergoes significant structural and functional changes in the follicular compartment (**S.K.Banu et al., 2001; 2002; D.G.Moreira et al., 2005).** The dynamics of the parafollicular cell population and their interaction with the follicular cells after birth was not described before.

The objective of the present study is to evaluate age-related changes in the follicular and parafollicular compartments of the thyroid gland in the growing body.

Thyroid gland of the Spargue-Dawley rats aged 14 days (preweaning period), 21 days (weaning period) and 30 days (infant period) was sampled, fixed in formalin, embedded in paraffin, serially sectioned and stained by hematoxylin-eosin and immunohistochemically for thyroglobulin (marker of thyrocytes) and calcitonin (marker of calcitoninocytes) using biotin-streptavidin-peroxidase complex technology with subsequent image analysis of the immunohistochemically stained sections by the Leica image analyser (Germany) with Leica QWin sofware (Great Britain).

The results obtained demonstrated that during early postnatal ontogenesis in rats both follicular and parafollicular compartments undergo significant morphological and immunohistochemical changes which may be quantitatively evaluated. These changes include morphometric parameters of the follicles and distribution of the calcitoninocytes and thyrocytes in the parenchyma of the thyroid gland. It was shown that in the follicular compartment the developmental changes include an increase of the average thyrocyte height and follicle diameter (difference between the 14-day and 30-day old rats being significant, $p<0,05$), while the numeric density of the follicles was significantly reduced from preweaning to infant period, and changes of the activation index with age did not reach a level of significance. The volume density of the thyrogobulin-immunoreactive cells was slightly higher in the weaning rats compared to the preweaning pups and in the infant rats compared to the weaning one, while in the infant rats it was meaningfully increased ($p<0,05$) compared to the preweaning animals. The volume density of the calcitoninocytes was increasing with age reaching the level of significance by the infant period. Correlation analysis demonstrated that in the preweaning and weaning rats negative correlation between the number of calcitoninocytes and thyrocytes was insignificant, while by the infant period this correlation became strong and significant ($r=-0,71$; $p<0,05$). These observations demonstrate that by the infant period the thyroid gland of the growing rats reaches certain level of functional maturity, which may contribute to the developing adaptational potential of the body in the changing environmental conditions to which thyroid gland is extremely sensitive. This observation should be taken into consideration in evaluation of the adaptational changes of the thyroid gland as a peripheral link of the hypothalamo-hypophyseo-thyroid axis under stress conditions.

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CLINICAL PECULIARITIES OF OUT-HOSPITAL PNEUMONIA AMONG ELDERLY PATIENTS

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Out-hospital pneumonia (OHP) is one of the most distributed diseases of respiratory organs. Significant factor of risk development is the elderly age.

The aim of investigation is to analyse and clear up the clinical peculiarities of course of out-hospital pneumonia among elderly patients.

Material and methods. There were observed 229 patients of elderly age (60-74) with OHP. The patients with severe damage of internal organs were not included in the group of investigation. The verification of diagnosis was made on the base of clinico-laboratory methods of investigation, according to diagnostic standards in treating patients with pneumonia. Dynamic observation, complex laboratory and instrumental-functional investigation were done in conditions of curative-prophylactic institutions of Astrakhan.

Results of investigation. The bacteriologic investigation gave the possibity to find etiologic factor of OHP in all 229 patients. Identificated excitors were distributed in the following type: Streptococcus pneumoniae – 35,2%, Haemophilus influenzae – 23,8%, Staphylococcus aureus – 4,8%, Enterobacteriaceae – 7,6%, association of gram-positive and gram-negative flora in 28,1% cases. Given results were coordinated with literary data about etiology of pneumonia in persons of elderly age groups. Pneumonia was confirmed in all patients roentgen logically. 120 patients showed low lobe pneumonia, 75 right side, 39 – left side localization. 70 patients showed upper lode right side pneumonia, 35 – by-side low lobe pneumonia.

The analysis of course of disease in 229 observed patients of elderly age with OHP found out the clinical peculiarities of the following types: slight expression of symptoms, difficulty in determination of nature during percussion of parts in lungs, frequent absence of acute onset of disease, frequency and expression of disturbances of central nervous system (mixture of consciousness, slow reaction, disorientation), weak general condition, decrease of physical activity, losing of capabilities of self-service, appearance to the first front of symptoms in superficial diseases in clinical picture, prolong resorption of lung infiltration, difficultiens in making differentiated diagnosis between first and second character of pneumonia. «Gold standard» in diagnostics of pneumonia: fever, cough, sputum, leucocytosis, lung infiltration, all of them were found out in 47% of cases among elderly patients, it was lower than in patients of young age (difference is significant statistically, 95% of proving). Among patients of elderly age the OHP was in 37,4% in patients with elderly age. Bed-day in patients of elderly age was 24,4 days, in young persons – 15,2/

Received data showed the necessity of careful care to verification of diagnosis in case with OHP in persons of elderly age.

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APOPTOSIS REGULATION IN SINCYTIOTROPHOBLAST AT HERPETIC LESION

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The activity change of sincytiotrophoblast nuclei apoptosis, which is under the control of apoptosis regulators sAPO-1 and Bcl-2 and proinflammatory cytokine TNFα, is a leading pathogenetic phenomenon at a herpetic lesion. A poor quantity of research on the given problem has defined the purpose of the presented work, which consisted in the sincytiotrophoblast nuclei apoptosis intensity and behavior appraisal depending on the herpetic infection aggressiveness and functional activity of the systems regulating the apoptosis.

20 mature placentas taken during the term birth process from practically healthy mothers - the control group, 30 - from the women with a severe form of the disease (HSV-1 antibody titer - 1:12800) and 20 - from the women with an average severity form of the disease (HSV-1 antibody titer - 1:6400) served as the test material for the study. To get the placental extract (villous chorion) the placental tissue washed from blood cells in the PBS solution was homogenized. The supernatant fluid was aliquoted and stored at -20 ^{0}C before the EIA was carried out. To detect the sAPO-1, Bcl-2 and TNFα expression the “Bender Med Systems” (Austria) firm’s sets were used. The HSV-1 verification and the disease intensity were estimated on the IgG antibody titers’ dynamics in the peripheral blood with the help of standard test-systems of the “Vector-Best” firm (Novosibirsk). The morphologic detection of apoptosis was performed on paraffin sections of the uterine cake owing to the DNA fragments’ end marks according to the ISEL-method. The statistical data processing was performed by means of the computer program “Computer-aided periodic health examination” using the t-criterion of Student.

The carried out system analysis testified that in cases of severe form herpetic infection in the period of gestation a statistically authentic growth of the sAPO-

1 indexes in placental extracts up to 1174,77±17,34 pg/ml (in the control - 514,8±8,05 pg/ml; p<0,001) was registered. At the disease average severity the sAPO-1 level didn't exceed the values of 963,3±12,72 pg/ml (p<0,001). A simultaneous determination of the TNFα in placental extracts depending on the herpetic infection aggressiveness in the period of gestation illustrated a unidirectional growth of average indexes of the cytokine up to 91,33±0,55 pg/ml (p<0,001) and 72,32±0,71 pg/ml (p<0,001), accordingly, at the severe and average severity form of the disease (in the control - 21,63±0,38 pg/ml). Meanwhile, the Bcl-2 values in placental extracts at the herpetic lesion were of the multidirectional character. The severe course of the disease in the period of gestation was attended by the Bcl-2 level decrease up to 28,16±0,60 ng/ml (p<0,001), whereas at the average intensity of the disease the protein indexes increased up to 46,87±0,86 ng/ml (in the control – 8,73±0,32 ng/ml; p<0,001). Together with that the sincytiotrophoblast nuclei apoptosis intensity was evaluated. The antigenic load increase associated with 4,0±0,06% of apoptosis nuclei, and an average level of antibodies conformed to 2,5±0,04% (in the control - 1±0,07%; p<0,001). The represented data allow concluding that the formation of resistance to the Fas-dependent apoptosis mediated by the Fas/FasL system is indicative of the sincytiotrophoblast in conditions of a herpetic lesion. Moreover, the sAPO-1 hyperexpression had no affect on the apoptosis occurrence. Maybe, the TNFα expression increase at the simultaneous weakening of the Bcl-2 protective action has become one of the probable causes of the sincytiotrophoblast nuclei apoptosis induction at the herpetic infection.

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EARLY DETECTION OF ARTERIAL REMODELING IN ARTERIAL HYPERTENSION

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Scientists' attention is being increasingly focused on the issue of vascular membrane condition in arterial hypertension (AH), with a view to preventing vascular diseases. Consequently, research in this field is currently a topical issue. Since noninvasive methods have been developed, a number of studies came to rather contradictory results on arterial elasticity in AH.

The aim of this research was to assess arterial elasticity during AH development, with the aim of early detection of vascular remodeling.

We examined 56 men, aged 38,7 ± 2,6. The 1st group consisted of 17 persons with high normal blood pressure – prehypertension, the 2nd group counted 24 patents with essential stage 1 hypertension, who did not receive any antihypertensive therapy. A control group included 15 healthy young men of the same age. The vascular elasticity was measured by the pulse wave velocity (PWV) method, using sphygmograph appliance «Polispektr-12» (Company «Neurosoft», Ivanovo). The data were statistically treated by the methods of descriptive statistics and software program «Statistica 6.0».

The research results showed a reliable increase of PWV for both muscular and elastic arteries in the study groups. Elasticity in the muscular arteries changed more intensively. For example, in the 1st group the muscular PWV doubled, in the 2nd group – increased by 36% (p<0,05) in comparison with the control group. PWV in the elastic arteries also rose, according to the hypertension stage: elastic PWV increased by 22% in the 1st group and by 24% (p<0,05) in the 2nd group. Expected unfavorable increase of the elastic PWV by more than 12 mps, which is an independent risk factor for cardiovascular diseases, was found at 9% of the patients: 1 person in the 1st group and 4 men in the 2nd group.

To sum up, signs of arterial remodeling appear at the prehypertension stage and 1 stage arterial hypertension. Measuring PWV at early stages of AH let detect a risk group in the population as early as possible.

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PATHOLOGIC SITUATIONS AIDING DEVELOPMENT OF RADICULOMYELOISCHEMIC DISORDERS AT LUMBAR OSTEOCHONDROSIS

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At disk herniation there is a range of factors promoting lumbar osteochondrosis clinical signs' manifestation and, especially, circulatory disturbances in spinal cord and spinal roots. Their timely diagnostics and release, no doubt, create favourable conditions for the given vertebral column pathology treatment improvement.

With this objective in view we have carried out a detailed retrospective analysis of 1848 lumbar osteochondrosis patients' integrated survey and treatment data.

Among the patients the occurrences of radiculoischemia were detected in 302 persons (16,3%), myeloischemia – in 111 patients (6,0%). Among the myeloischemic syndrome patients in 83 (74,8%) cases it was combined with occurrences of radiculoischemia. Hence, the radiculoischemic syndrome or radiculomyelopathy occurred in 330 surveys (17,9%).

Thereat, it was detected that against the background of intervertebral disks' changes there are factors promoting the manifestation of clinical signs of circulatory disturbances in spinal cord and roots.

A narrow spinal canal detected in 24 patients (7,3%) is referred to these factors. The vertebral foramen stricture was found out in 79 cases (23,9%). The vertebral foramen stricture was either congenital or acquired. The acquired stricture was conditioned by changed bone structures, hernial outpouching of the intervertebral disk, the cicatrical-adhesive process in this region and various combinations of these factors. From 330 radiculoischemic syndrome patients the instability in spinal motional segments was found out in 117 (35,4%) persons, that allows considering this pathological situation as one of the factors promoting circulatory disturbances both in the radiculae and spinal cord. One of the causes of circulatory disturbances in the spinal roots and spinal cord is the cicatrical-adhesive process development both in the pre-surgical period and especially after a surgical aggression. Among the radiculomyeloischemic syndrome patients the cicatrical-adhesive process in the region of radiculae at the disk hernation level was found out in 46 persons (13,9%). And, finally, in 13 persons (3,9%) the development of radiculomyeloischemic phenomena was conditioned by the appearance of a liquor block as a result of a well-marked compression of the intervertebral disk by the hernia and the presence of cicatrical-adhesive changes at this level.

The analysis of remote results of the operative therapy of diskogenic lumbar radiculomyeloischemias in 267 patients allowed establishing that after an essential or complete regression of ischemic disturbances in the long-term post-surgical period the circulation disturbance relapse in the spinal cord and radiculae took place in 25 persons (9,4%).

Clinically it was manifested by the pain syndrome nascence or spurt against the background of a favourable or relatively favourable post-surgical period for the period of not less than a year. Then acutely (within several hours) or subacutely (within several days) a well-marked clinical picture in the form of a radiculoischemic or radiculomyeloischemic syndrome developed.

The data analysis of the integral survey of 25 patients with a diskogenic post-surgical relapsing radiculomyeloischemic syndrome allowed establishing that the operated intervertebral disk hernia relapse occurred in 14 persons (56,0%), the cicatrical-adhesive process availability in the region of surgical aggression – in 6 patients and the combination of diskal hernia relapse and epiduritis – in 5 cases (20,0%).

However, the ischemic disturbances in long terms after surgical interference were registered in the patients earlier operated on the lumbar osteochondrosis without radiculomyeloischemic phenomena in the pre-operative period. From 330 patients with the presence of radiculomyeloischemic disturbances a similar situation was observed in 12 persons (3,6%).

In such cases the progression of degenerative processes in the intervertebral disks adjacent to the operated one takes place. This very fact aids the development of the radiculae' and the attending vessels' compression in the presence of functionally meaningful vessels at this level.

Clinically it is manifested by the radiculalgia nascence or spurt in remote terms of the favourable post-operative period. In all the 12 persons a well-marked clinical picture of radiculoischemia or radiculomyeloischemia developed acutely (within several hours) or subacutely (within several days) for the period of not less than 3 years after the operation.

We define a similar manifestation of the disease in the patients earlier operated on the lumbar osteochondrosis not complicated with ischemic disturbances as a syndrome of diskogenic post-operative remote ischemia of the spinal cord and radiculae.

The cause of the nascence of circulatory disturbances in the spinal cord and roots of the spinal nerve can be not only the development of hernial outpouching of the intervertebral disk at another level, but also progressing pathological changes in the region of surgical aggression in the form of a cicatrical-adhesive process and instability in the lumbar spine. A similar manifestation of the disease occurred in 3 patients from 12 earlier operated on the lumbar spine osteochondrosis not complicated with ischemic disturbances.

The findings testify that:

1. At disk herniation there is a range of factors promoting the manifestation clinical signs of circulatory disturbances in the spinal cord and spinal roots. The narrow spinal canal, vertebral foramen stricture, cicatrical-adhesive process, instability in spinal motional segments and liquor block are referred to them.

2. In 9,4% of the cases in remote terms after the operation a relapse of the radiculomyeloischemic syndrome occurs due to the earlier operated intervertebral disk hernia relapse, the cicatrical-adhesive process development in the region of surgical aggressionor combination of the diskal hernia relapse and epiduritis.

3. In 3,6% of the patients earlier operated on the lumbar osteochondrosis without radiculomyeloischemia phenomena the ischemic disturbances conditioned by both intervertebral disk hernia at the level neighboring to the operated one and epiduritis and instability of the spine in the region of surgical intervention develop in remote terms after the operation.

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INFLUENCE OF PHENIBUTE ON IMMUNE STATUS AND BEHAVIOR REACTIONS OF RATS WITH IMMUNE INSUFFICIENCY

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Appeared in last years numerous data about single neuroimmune regulator many physiological and pathological processes in organism eventuate topical research of neuroimmunomodulate properties of medicinal remedies.

The aim of this work is experimental research for influence derivative GABA – phenibute on immune and psychoemotional status of rats with immune insufficiency.

The experiment has been made with 70 rats of the line Wistar mass 200-250g. The animals were distributed on the groups: control group № 1 – the immunizing animals, receiving physiological solution; control group № 2 – the immunizing animals with immune insufficiency, which injected cyclophosphamide (once intraperitoneum in the doze of 125 mg/kg), with the aim of suppression of immune system. And the experienced group – animals with immune insufficiency receiving phenibute (intraperitoneum in the doze of 25 mg/kg in the space of an hour after injected immunodepressant). Immune status of animals were studied by reactions of hypersensitivity delayed type (RHDT) and passive hemagglutination (RPHA). By way of antigen load were used erythrocytes of sheep. Behaviour reactions of animals were studied in the test «Open field».

In the course of the carried our tests it was fixed that the single inside peritoneum leading cyclophosphamid in the doze of 125 mg/kg is conducive to simulate immune insufficiency showing of lowering index RHDT 28%, (p_1<0,05), suppression of production antierythrocyte antibody in RPHA 58% (p_1<0,05), and also change psycho emotional condition accompanying of lowering of motional and investigation activity in the test «Open field» (p_1<0,05).

The single inside peritoneum of phenibute in the doze of 25 mg/kg to the animals with the immunological insufficiency is accompanying with the stimulating action with the regard to the cell section of the immune reactivity, it reveals itself with the increase of the reaction index RHDT more than 50% not only by comparison with the animals from the control group № 2 (p_2<0,05), but more than 40% with respect to the exponents in the rats groups, receiving «placebo» (p_1<0,05).

In research of influence phenibute to formation antierythrocyte antibodies in RPHA is determined its modulate influence, it reveals itself with the increase of the reaction more than 50% to the group of animals, which for formation of immunosuppression injected cyclophosphamide. As compared with control №1 it didn't supervise to change of level of antibodies.

In research of influence phenibute on psycho emotional condition of immunodepression rats detected ability of preparation to correct changing behavior reaction developing in condition of cyclophosphamidinduce immune insufficiency. Under influence of phenibute occurs reconstruction of horizontal and directional investigation activity (p_2<0,05); decrease of defecation (p_2<0,05) and grooming (p_2<0,05), duration of friezing (p_2<0,05), and also increase of amount of passages through central zone «Open field» (p_2<0,05).

That's why, received results during experimental test showing of the ability of phenibute to liquidate acute immune disturbance, but correct changing behaviuor reaction, appearing in the result of immunopathology.

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INFLUENCE OF HOMEOPATHIC VEROSHPIRON ON THE MAMMARY GLANDS WITH CYSTIC MASTOPATHY IN THE EXPERIMENT

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According to the World Health Organization mammary gland cancer in women is the first (as far as localization is concerned) in the structure of morbidity which constitutes 18% of the total number of malignant tumours. In order to decrease morbidity it is necessary to investigate different ways of influence on the mammary gland precancer processes to which cystic mastopathy is related.

In the intact series veroshpiron contributes to development of the mammary glands. Under its influence there is slight enlargement of the ducts, height of the epithelium and increase in secretion. In case of cystic mastopathy 4 week course of veroshpiron in therapeutic doses causes manifested regress of the cysts. There is complete reverse development of the

cysts. The ducts are in big groups making lobules. The ducts are much narrowed and lined with cuboidal epithelium. The lumens of them are hardly distinguished. The scheme of introduction of potentias of veroshpiron:

- Group 1 – 6C 3 times a day during a month
- Group 2 –6C, 12C, 30C 3 times a day during a month
- Group 3 – 30C 3 times a day during a month

We investigated mammary glands in 25 virgin females of not thoroughbred white rats which were conditionally divided into 3 groups of experiment and 2 groups of control. Groups of the experiment got homeopathic veroshpiron according to 3 schemes perorally during a month. Groups of the control – group 1 cystic mastopathy control and group 2 cystic mastopathy control 1 month later after its receipt. Cystic mastopathy model with hexestrol introduced – control 6 weeks later: dilation of the ducts is cyst-shaped. They are lined with flattened epithelium. There are protein-fat masses in the lumens of the cysts.

Cystic mastopathy control 4 weeks later after its receipt: the ducts dilation of which is cyst-shaped are lined with flattened epithelium. The secret is sporadically present in the lumens. The other cysts have no contents.

The first group of the experiment with cystic mastopathy that got potentia 6C 3 times a day: the ducts are in groups of 10-12 ducts making lobules. The ducts are narrowed. Epithelium is cuboidal.

One of the observations shows incomplete regress of the cysts

- The duct is dilated to some extent
- Epithelium is cuboidal
- There is a little amount of the secret in the lumen
- The duct is surrounded by small streaks of fibrous tissue

The second group of the experiment with cystic mastopathy that got 6C, 12C, 30C 3 times a day: the ducts are in groups. Each group consists of 20-22 ducts in the form of a lobule. The ducts are narrowed. The lumens are slightly distinguished.

Mammary gland stroma: vessels are much dilated and with blood congestion.

Manifested regress of the cysts. The ducts are in small groups. Epithelium is cuboidal. There is remnant of the secret in the lumens.

Incomplete regress of the cysts. Along with much narrowed ducts with cuboidal epithelium there are few dilated ducts the lumens of which contain a little amount of secret.

The third group of the experiment with cystic mastopathy that got 30C 3 times a day. Manifested regress of the cysts. The ducts are in small groups. Epithelium is cuboidal. The ducts are narrowed.

Transitional stage of the regress of the big cyst. The ducts are jellyfish-shaped. Epithelium is cuboidal. There is remnant of the secret in the lumen.

Incomplete regress of the cysts against the background of wave scheme of introduction of homeopathic veroshpiron. Simultaneously dilated ducts with flattened epithelium, in the lumen there are protein-fat masses. The areas with much narrowed ducts with cuboidal epithelium.

Veroshpiron in homeopathic dilutions exerts its influence on the mammary glands with cystic mastopathy. Many observations show quite a high grade of regress in comparison with the control. Few observations show incomplete regress, but influence of veroshpiron causes restoration of the epithelium to the norm in comparison with the control. According to the mechanism of action veroshpiron is the similar preparation in hexestrol model of cystic mastopathy.

The results are of interest for oncologists and mammologists. Veroshpiron will be further applied in restorative medicine by joint efforts with international academy of classic homeopathy. It will be used in treatment of the patients with diseases of mammary glands in a homeopathic clinic.

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FUNCTIONAL DISREGULATION OF PERITONEUM AT VARIOUS INTENSITY OPERATIONAL TRAUMAS

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Introduction: The influence of an operational trauma on the peritoneal operant behavior up to the present moment is still an insufficiently explored problem.

Purpose: To define the operational trauma dimensions' influence on the peritoneal resorption.

Materials and methods: A new experimental model allowing estimating the peritoneal resorptive capacity was developed, patented and applied. There were 90 sexually mature Wistar female rats involved in the experiment. To evaluate the peritoneal physiological resorptive capacity the intact animals were administered a standard dose of the ethaminal solution (40 mg/kg) throughout 4 days intraperitoneally. On the 4th day all the animals were exposed to a surgical intervention: 1 group – a standard operational trauma, 2 group – subtotal hysterectomy and 3 group – total hysterectomy. The peritoneal resorptive function was evaluated indirectly by means of intraperitoneal ethaminal introduction and measurement of the time

length necessary for the surgical sleep to begin for 7 days.

Results: the peritoneal resorptive function research experimental model application defined that the time of physiological resorption made 5,15±0,89 min in the intact animals. The resorption at the various intensity operational traumas made: in the **1 group**: 1 day - 9,8±0,5; 2 day - 8,2±0,7; 3 day - 7,1±0,7; 4 day - 5,8±0,7; **5 day - 5,2±0,5;** 6 day - 5,1±0,7; 7 day - 5,1±0,5; in the **2group**: 1 day - 10,1±0,6; 2 day - 9,0±0,5; 3 day - 7,8±0,6; 4 day - 6,8±0,4; 5 day - 6,1±0,4**; 6 day -5,1±0,4**; 7 day - 4,8±0,7; in the **3group:** 1 day - 11,3±1,0; 2 day - 9,3±1,7; 3 day - 8,3±0,7; 4 day - 7,3±0,5; 5 day - 6,5±0,5**;** 6 day - 5,8±0,4; **7 day -5,1±0,4.**

Conclusions: So, the peritoneum responses to the operational trauma in the form of the peritoneal resorptive function inversive decline, a direct dependence of functional disorders' degree on the operational trauma' intensity being found out.

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THE GROUND IN DETERMINING LOAD DISTRIBUTION ON KNEE-JOINT

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Knee-joint arthrosis is the commonest pathology in locomotive apparatus. The key factor in the development of the disease is uneven load distribution on a knee-joint due to individual anatomical structure and disorders in biochemical parameters of a lower limb.

The aim of the study is to create a new method of determination of load distribution due to individual topographic and anatomical distinctions of lower limbs.

The method developed is based on computer transformation of topographic-anatomical distinctions and a combined application of medical visualization and orthopedic diagnostics. Our method is patented.

The first phase of the research is to construct a primitive load to simulate the model of a human body load. The second phase consists of determination of resultant force vector affecting a knee-joint. The vector direction depends on individual anatomo-biochemical characteristics of lower limbs. The last phase is devoted to construction of force distribution affecting a knee-joint along the surface, which individuality is determined according to computed and magnetic resonance tomographies. The apparatus-program complex for the determination of individual load distribution along a knee-joint was devised according to the method proposed.

Therefore, if to apply load distribution, the method makes it possible to forecast arthrosis development, treatment plan and pathology prevention. The grounds for surgical correction of axial deformation in the lower limbs to make load distribution normal also occur.

Possible application:

1. Diagnosis, treatment plan, pathology prevention;
2. Correction of axial lower limb deformation;
3. Individual endoprosthesis;
4. Orthopedic footwear fitting;
5. Sport medicine.

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ARTICLES OF CRAFTSMEN – UNOFFICIAL SYMBOLS OF RUSSIA

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The question about unofficial symbols of Russia is considered here. The idea that by no means all the handiworks mentioned in popular literature can be referred to "symbols" is declared. A brief description of the most relevant handiworks is given proceeding from the history of their origin. Some judgements of the author can seem to be disputable.

Not all tourists are aware of official symbols of the states, which they visit in their unqieted thirst for world cognition. And hardly anybody has the state flag or coat of arms for a keepsake to remember the visited country by. But as for unofficial symbols or, as it is common to say, "brands" of the countries, which they are going to visit, they are known to the majority of travelers. Let us put aside the "eatable" symbols such as Italian pizza, Swiss cheese, Russian pancakes, French croissants and other not less attractive pleasures of the table. The food will leave only vivid gustatory sensations in the memory. But our attention is attracted by the material traces remaining for long in hearth and home. It is unofficial symbols of Russia that will be discussed in the present article. Unofficial symbols picturesquely remind of some natural, cultural and other peculiarities of a visited country. They are, usually, souvenirs – articles of craftsmen, or job shop-type production, the tourist goods. Many souvenirs and articles of craftwork haven't been used for their intended purpose for a long time, but are still being in steady demand in tourists. First of all, it is connected with the fact that the majority of souvenirs has a pronounced national (folk) flavour.

Perhaps, there will no one, who would know nothing about Russian symbols, found. As per the List quoted in one of authoritative Russian editions, our country's unofficial world famous and popular symbols are – the Khokhloma painting, crystal from Gus-Khrustalny, Palekh lacquered miniature, Pavlov Posad shawls, Gzhel porcelain, Uralian malachite, Vologda lacework, Tula samovars, Orenburg woolen shawls, Dymkovo toys and Rostov enamel [4]. According to our reckoning not all of them are equally noteworthy. This list can (and even should) include Matryoshka nest-dolls, lapty (bast shoes), valenky (felt boots) and Semenov spoons. And vice versa, exclude Uralian malachite. Now in Russia mani malachite articles are made of imported material. Malachite has long since ranked first among ornamental stones of the Urals. The Uralian malachite is considered to be the most valuable one in the world market. But its deposits (Mednorudnyanskoye, Gumishevskoye) have been already depleted. There are large-scale deposits of malachite in Australia and the USA. In color and beauty of patterns there is nothing to be compared to the Uralian malachite.

When speaking about the other unofficial symbols, each of them has its own history.

The **Matryoshka** doll is one of the most popular and traditional Russia souvenirs. However, contrary to the established opinion, a Matryoshka is not an original Russian toy. Probably, one of the present-day Matryoshka's prototypes was a Japanese figurine of a Buddhist wise man named Fukurumu, inside of which there was a set of smaller figurines in order of size [10]. Another prototype of the Matryoshka was the "pisanka" – a hollow wooden hand-painted Easter egg made in Russia at all times. A bigger egg contained a smaller one, then a still smaller one, etc. [3]. The first Matryoshka appeared in Russia at the end of XIX century in Abramtsevo, near Sergiyev Posad in the Moscow area. Nobody knows a firm date of creating the Matryoshka. But in 1900 the Russian (Sergiyev Posad) Matryoshka was successfully exhibited in the World Fair in Paris. In the 20-30-s of XX century the

production of Matryoshkas was developed in other Russian regions, which became later traditional centers of their manufacture – Vyatka (Kirov), Semenov and Polkhovsky Maidan (Nizhny Novgorod Region). Later on Matryoshkas became manufactured in Voronezh, Tver and Novokuznetsk. Traditional Matryoshkas produced on the shop floors of the national artistic trades have their artistic features and hallmarks. Matryoshaks' names depend on the place of their production.

In parallel with the output of traditional Matryoshkas inmany regions of Russia there appeared authors' Matryoshkas. They are different variants of a Russian peasant girl in the folk clothing, Russian heroes, representatives of pre-revolutionary nobility and merchantry. There are Matryoshkas "a la Gzhel", "a la Zhostovo", "a la Palekh"; Matryoshkas – characters of tales - "Kolobok" ("Dough-boy"), "Repka" ("Turnip"), "Teremok" ("Palace") and others. A new event in the Russian Matryoshka painting is a "political" Matryoshka, which depicts Russian Tsars, Russian and foreign political and public figures, popular actors, etc.

Lapty, also being considered a "symbol" of Russia, figure in a multitude of sayings and proverbs. In Russian folklore the word "lapot" denotes a simpleton, an uneducated person. At the beginning of XX century Russia was often called a "lapot" country. And it was not by incident. All Russian countryside exclusive of the Siberia and Cossack areas wore lapty all the year round. Lapty were traditionally considered to be the shoes of the underprivileged – the poorest part of population [5].

Making lapty was a winter occupation of peasants being free from the field works. Lapty were weaved from the bark of many foliage trees: linden, birch, elm, oak, etc. The bast lapty, weaved from the linden bast, were thought to be the most durable and soft. For durability and warmth the prosperous peasants sewed on a leather sole to their lapty. Lapty were fixed on the foot with the help of long strings or leather laces. Lapty were made on one shoetree and there was no difference between the left and the right one (like valenky). Lapty were not a long-lasting footwear. In winter a peasant wore one pair of lapty not longer than 10 days, and in summer he treaded them down for 4 days.

Nowadays, the lapty lessened up to the size of a palm are weaved in many regions of Russia. Coins and banknotes are put inside such souvenir lapty by exotic lovers – "for luck".

Valenky – is a unique know-how of the Russian people. The advantage of valenky is that they are made without a single stitch, and therefore they are soft and comfortable. For this ingenious plainness a naïve-to-foolishness person is called a "valenok" in the popular folklore. The first records about Russian valenky occur in the chronicle of "The Lay of Igor's Warfare", XII century [9]. Originally valenky were short with cloth boot-tops. And only in XVIII century they acquired a customary look for us. The countrymen found valenky to be to their liking. Before that, as it is known, people in the country wore lapty summer and winter alike, they being frayed soon. Valenky were expensive. They were passed from one generation to another. The rural family, where all the members wore valenky was thought to be a prosperous one. In other families there could be only one pair of valenky for all.

Today there are factories to produce valenky in Russia and three CIS countries – Kazakhstan, Ukraine and Byelorussia. Usually valenky are made of sheep hair. But there can be goat, camel and even dog valenky. To make a pair of valenky (depending on the size) takes from 4 to 7 kg of wool. The souvenir and "glamour" valenky are made of any wool. There are orange, green, violet, burgundy valenky; embroidered valenky; valenky decorated with fur, strasses and tapestry [9]. There are Valenky Museums in Moscow, the city of Myshkin (Yaroslavl Region) and village of Urusovo (Mordovia). A specialized store "Russian Valenky", the main visitors of which are for-

eigners, was opened in Moscow in winter, 2005.

The **Semenov spoon** – is a souvenir having become a world famous brand [8]. In olden times the spoons, which peasants used in Russia, were solely made of wood. The center of spoon production was the city of Semenov, which was called the "Spoon capital" of Russia. The spoons were made by thousands of handicraftsmen-peasants living in the city and neighboring villages. Each of them had his own speciality: spoon-carvers, painters engaged in painting the "cloth" and lacquerers engaged in surfacing [2]. The availability of wood, closeness of trade centers, entrepreneurial spirit and virtuosity of local handymen promoted the craft development. Nowadays there are various painting motives on Semenov spoons: rowan-berries, raspberries, cherries and golden leaves of fanciful forms. The traditional motive – is a twig with a bunch of berries in the midst of herbs or fantastic flowers.

The **Khokhloma**. The name of the painting comes from the village of Khokhloma in the Nizhny Novgorod Region. The origin of the Khokhloma painting is referred to 1659 – the time of the first records about painted dishware [1]. The craft began from the spoon business. In XVII century there were fairs held, where they traded with spoons and painted wooden dishware. The closeness of navigable rivers and trade routes helped the development of the craft. The modern Kokhloma painting excels with the combination of gold with red and black (sometimes green) colors. The painting pattern includes herbs, berries, fruits and birds. The floral pattern with red and black elements against the golden background is considered to be invented in the second part of XVIII century [8]. After the exhibition of 1889 held in Paris the turned dishware and Semenov spoons became known to the whole world. In Germany a plant on the imitation of Khokhloma cups, which only vaguely resembled the Khokhloma [6], was even built. The secret of the Khokhloma "gold" – is in using the aluminum coating, which under the action of temperature becomes golden in color. Sometimes, instead of the aluminum powder the tin one is uses, and then a "silver" article is obtained. The Khokhloma today – is wooden dishware, furniture, various souvenirs.

The **crystal from Gus-Khrustalny**. The Gus Crystal Plant was founded in 1756 by a merchant from Oryol Akim Maltsov. Crystal and glass were founded at the plant. It worked on domestic raw materials. The articles of the plant were awarded the highest premium "Grand Prix" at the World Fair in Paris in 1900. The well-known Gus flagons with roosters and bouquets brought the world fame to the plant. The best articles made by the plant craftsmen are exhibited at both domestic and foreign fairs. Nowadays the plant keeps the status of an artistic production and is famous for its glass. The assortment of products is as follows: jugs, flagons (the eminent ones with roosters and bouquets among them), tumblers, stemware, vases, etc. Excursions are organized to the plant. During an excursion one can get acquainted with the production of colorless crystal and see the entire technological process – from blowing-out to packing. In the city of Gus-Khrustalny there is a museum of crystal. The collection of the museum contains the Gus Crystal Plant's specimen products beginning with the second part of XVIII century and up to the present-day production specimens.

The **Palekh lacquered miniature**. Palekh – is a village in the Ivanovo Region. It appeared, according to the chronicles, before XV century. Since XVII century the citizens of Palekh used to be famous as icon painters. By the beginning of XX century the development of icon painting in Russia practically passed away. In 1924 on the basis of ancient Russian icon painting traditions the "Workmen's cooperative association of ancient painting" was organized. In the association people occupied themselves with lacquered miniature painting on papier-mâché articles. This art has retained up to our time. The painting is performed by tempera colors against the black (sometimes red) back-

ground. The shading – "incision" by gold or whites is applied. The ornament is painted in gold or silver and is the finishing element of the miniature. The Palekh miniature is called "fairy". Caskets, powder-boxes, brooches, wall boards are painted on the topics of fairy-tales, Russian folk tales and songs. The most popular motive is the Firebird – a favorite character of Russian folk tales. In Palekh there is the Museum of Palekh Art, which contains a collection of lacquered miniature.

The **Pavlov Posad shawls**. From ancient times the shawl in Russia was a part of ladies' wear. Peasant women weaved shawls, decorated them with embroideries, stained patterns on them. Pavlov Posad is one of the oldest Russian textile centers. The first allusions about the shawls and wraps with bright floral prints are referred to 1795. A real fame came to the shawls in the second part of XIX century. In 1854 in Pavlov Posad a shawl-print factory was opened. Originally, the patterns were hand printed onto the ***shawl*** fabric using wooden blocks. The design and color of the shawl depended on the carved picture of print boards, where the pattern was printed onto the cloth from. Every color was printed from a separate board. The number of boards achieved several tens. Since the end of 1950-s the handicraft techniques had been gradually substituted by printing machines. Nowadays at the Pavlov Posad Shawl Manufactory more than 200 kinds of shawls, wraps and scarves have been produced. Luxurious floral bouquets with leaves prevail in the patterns. In the corners of the shawl there are big flowers, and the center contains small ones in the black, champagne, green, red, navy blue and wine-colored ground. Natural fabrics – silk, wool, cotton, are used for the shawls production. On the shop floor there is a museum with a collection of Pavlov Posad shawls and wraps.

The **Gzhel porcelain**. The origin of the word "gzhel" is connected with the verb "zhech"("burn"-"burn clay"). The first official allusion about Gzhel as the center of pottery industry was recorded in the clerical document of Ivan Kalita, the Grand Duke, in 1339 [7]. Since that time Gzhel, the center rich in clays and craftsmen, had become the supplier of the Tsar Yard. Peasants "zhgly" ("burned") the dishware, toys and ceramic tiles. In the middle of XVIII century the fame of a big ceramic region producing artistic majolica with multicolored painting in the white ground came to Gzhel. Five colors were used in the painting – yellow, green, brown, wine-colored and blue. Fantastic plants, cities and animals were depicted in the articles. Often the painting was complemented with stucco figures of humans, animals and birds. At the beginning of XIX century majolica gave the way to semifaience. The Gzhel porcelain with a traditional painting – cobalt blue in the white ground, was created in the 50-s of XX century. In 1980-s the majolica renaissance started. Nowadays the Gzhel craft unites the big and small villages located near Moscow and producing both majolica and porcelain (the "Gzhel Company"). A floral pattern is considered to be the Gzhel "trademark" one. Every article is hand painted. Only cobalt paint is applied, it becoming blue in color, when burnt. In some articles the "incision" by gold is used. The assortment is as follows: tea and coffee sets, vases, bottles of 1,23 liter, caskets, timepieces, lamps, etc. Excursions are organized to the shop floor. During the excursions one can get acquainted with the production traditions of the famous craft. Tourists are offered not only to see the artists' studios, visit the museum and the company shop, but also to drink tea from the Gzhel dishware.

The **Vologda lacework**. The Vologda lace craft was formed at the turn of XVIII-XIX centuries. Before XIX century tatting was a home art. In the 20-s of XIX century there was a lace manufactory, where bondmaids worked, was founded in the neighborhood of Vologda. The lace craft of the Vlogda Province achieved its prosperity in the second part of XIX century. Thousands of craftswomen were already occupied with tatting. The art of Vologda craftswomen was marked out at many domestic and international exhibitions again and again. The Vologda Lace Company was awarded the high-

est premium “Grand Prix” at the World Fair in Paris in 1937, the gold medal – at the Brussels Exhibition in 1958. The Vologda lacework peculiarity (“Vologda manner”) is a clear division into a large expressive pattern and a sheer airy background (grid). The patterns consist of openwork rhombs, quadrates, fans, ovals. Nowadays the Vologda lace (overlays, doilies, table-cloths, panels, etc.) is tatted by both folk lacemakers and professional craftswomen of the “Snezhinka” (“Snowflake”) factory.

The **Tula samovars**. Among water-heating devices a special place is taken by the samovar – a Russian tea machine, as it was called in Europe. Earlier not only water was boiled in samovars, but also food was cooked. In Tula the first samovar was made by Nazar Lisitsyn in 1778. Soon Lisitsyn had followers. The closeness to Moscow, the availability of rich mineral deposits and skilled metal craftsmen aided Tula, the city of gunsmiths, to become the center of samovar production in XIX century. Samovars were made of brass, copper, cupronickel, sometimes they were gold- or silver-plated. The samovar production proved to be remunerative. The handicraftsmen soon turned into manufacturers, workshops – into plants. The Tula samovar-makers excelled with boundless invention. It is not for nothing that a proverb was shaped about them: “Give a Tulavite a piece of metal and he will make a miracle”. Since the second part of XIX century none of the exhibitions in Russia and abroad dispensed with samovars [11]. The samovar was used not only at home, but was taken on journeys. For this purpose traveling samovars were used. They were odd in shape (cubical, cylindrical) and convenient in transportation (demountable stems were screwed on, handles fitted to the wall). At the end of XIX-beginning of XX century there were various samovars different in their intended purpose (coffeepot-samovars, traveling samovars) and arrangement (coal-burning, with kerosene furnace, demountable jug) produced. By the beginning of XX century the samovar had become an inseparable attribute of every Russian family. In 1956 the production of electric samovars (tea-urns) started in Tula. Since 1977 combined samovars uniting the operating principles of both coal-burning and electric samovars have been produced. And in 1964-1987 souvenir-samovars “Yasnaya Polyana” were being made. It is a 56 times reduced copy of the samovar in the memorial-estate of Lev Tolstoy. Today coal and electric samovars are produced in Tula. The business has no serial production. Usual nickel-plated samovars and painted ones (floral, natural, fairy motives) are made. The “Tula Samovars” Museum opened in 1990 is located in Tula. The exposition of the museum puts up to the history of the origin and development of the samovar craft. The museum can boast the oldest samovar of the Lisitsyns.

The **Orenburg woolen shawls**. The first information about goat wool articles appeared in XVIII century. The Uralian Cossack women took on knitting from Kazakhs and Kalmyks using Russian lacy ornaments. In 1862 an Orenburg craftswoman Maria Uskova was awarded a medal “For goat wool shawls” and a diploma at the World Fair in London. The Fair guests admired the white open-worked gossamers, which found room in a goose- egg shell, easily got through a wedding ring, weighed 250-300 g and warmed well. After closing of the Exhibition an English firm “Lipner” organized the enterprise “Imitation a la Orenburg” [7]. Little by little the goat underwool shawls became very popular all over Europe.

The Orenburg woolen shawl is so famous not only due to the knitters’ skill, but the goat wool quality as well. In the 300 km distance eastwards of Orenburg the Gurerlin mountains are situated. The wool goats are grazed there. There is a supposition that the wool goat got to the Orenburg neighborhood from the Himalaya through Kirghiz steppes and found its place with the local population. In true Orenburg shawls the woolen thread is spun separately. Then backwards it is winded up with a silk or very thin cotton thread. Such a shawl gets fluffy in the course of

wearing little by little and the wool doesn't spill. The shawls can be of two kinds – the "Orenburg" ones (made of gray wool with a plain middle and open-worked fringe) and "gossamers" (fine, open-worked, made of white or gray wool). To make one shawl it takes a handicraftswoman about 250 hours. In the Orenburg Museum of Fine Arts one can get acquainted with a collection of Orengurg shawls.

The **Dymkovo toy** – is a traditional Russian folk craft known from the end of XVIII century. The craft originated in the Dymkovo suburb (sloboda) at the edge of an old Russian city named Khlynov (Kirov now). The origin of the toy is connected with a folk festival called "whistler". In spring Yarila – the god of sun and fertility – was met with a gay whistle. The warbles and whistle of clay pennywhistles specially prepared for the festival were heard all over the whole suburb. The Dymkovo toy is molded out of the local red clay, burned and covered with a layer of chalk mixed in milk. On the whitening the painting in gouache mixed with an egg is performed [7]. The main colors are blue, yellow, orange, crimson red, green and black. The traditional characters are riders, mistresses, nurses, turkey cocks, roosters. Every toy is an authorship work existing in a single copy. The craft has no serial production.

The **Rostov enamel**. The Rostov enamel origin is not known for sure. Some researchers connect its appearance with the work of Jonah Sysoyevich the Metropolitan who was busy with the Rostov Pontifical House improvement at the end of XVII century. Others – with the rule of Joachim the Archbishop who established a Greek-Latin school in Rostov according to the edict of Anna Ioanovna. Since 1760-s the first references about the enamel workshop, which existed up to the end of 1780-s, had been mentioned in the Rostov Pontifical House inventories. Church orders from the most diverse cities of Russia were executed in the workshop. The icon frames, crosses and covers of manuscript books were decorated with the enamel [7]. In the second part of XIX the Rostov craftsmen pictured portraits, Rostov panoramas temples' and monasteries' views in the enamel. After 1917 together with the workmen's cooperative association creation the Rostov artists developed the floral painting. The present-day craftsmen of the "Rostov enamel" plant decorate icon frames, caskets, breastpins, bracelets, etc. with the enamel. The enamel is often combined with gold, gems and chasing. You can identify the Rostov enamel by ornamental floral compositions and landscapes. The "Rostov enamel" plant product's quality and genuineness warranty is its corporative trademark and a special coating of the base backside with a spotted blue color.

The enumerated unofficial symbols do not comprise all the diversity of the folk crafts' production, which takes an important place in the export of Russia. In the territory of our country there are also other symbols, which are though not that popular abroad. Every region of the Russian Federation possesses a potential for the production of folk crafts' articles and souvenirs reflecting the region's "identity". They are the symbols of not only Russian folk art and native culture, but also a contribution of Russia to the world cultural heritage.

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Materials of Conferences

MODERN MODEL OF EDUCATIONAL SYSTEM IN RUSSIA AND PROBLEMS OF TRAINING SPECIALISTS IN PEDAGOGICS

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On the 13th of September 2007 the Russian Federation President Council in priority national projects realization and demographic politics took decisions, according to which the Russian Federation Ministry of Education and Science organized work on forming the modern model of educational system for the period up to 2020 year, which is aligned to solve problems in innovation development of Russian economy.

The project of this model, its basic outlines are defined at present and are being discussed by the pedagogical communal. The authors of the educational model proceeded from the fact that the modernization of the educational system is the necessary condition in the process of innovation economy formation, which is basics of dynamic economic development and social society development, and the factor of national prosperity and security.

The following principles are laid into the basis of the modern educational society:

- openness of the educational system to external demands;
- the priority of project methods of teaching;
- competitive revelation and support of the leaders, who realize new approaches in practice;
- number of addresses of the resource support toolware;
- complexness of the taken decision.

The main distinguishing features of the new model are: the focus on the necessity to receive education during the whole course of the life (in the new model the education is considered as incomplete); the idea of flexible and incomplete educational course becomes the core for the innovations, which include all the levels and the components of the educational system; the transformation of the high education system for broad specialists (baccalaureate) into the core of the educational system; the students are granted a wide spectrum of master's degree programmes, programmes of professional and cultural training and retraining which are renovated systematically; the alienation of strict limits in the educational system, as the renewal of competences and the receipt of academical credits can take place even at the production of goods, knowledge, and technologies; the dominant feature in the system of persistent education is the self-dependent access of students to the educational resources and technologies; the student motivation, interest, inclination are considered as dominant and more expensive resulting resource in the new educational model; the orientation of the new model toward the true openness of the educational system, toward the formation of its network interaction with other institutions.

Purpose guiding lines in the development of education, which are defined in the new educational model, are presented by stages: by the 2012 year, by the 2016 year, by the 2020 year. These guiding lines propose fundamental staff changes, essential increase of competitiveness of a qualified teacher, the specialists in the industrial training, high school tutors and lectures. Traditionally a teacher (is a monopolist in giving and interpreting necessary knowledge) disappears from the stage. A new image of educational specialist should composed: an educational specialist should be an researcher, an educator, an adviser, a project leader, a tutor, a facilitator, etc.

All above mentioned calls forth the urgency of the changes in the educational system of high professional education, including pedagogical into the new multilevel system, which essentially differs from the monolevel in content and the organizational structure.

The decision of the transfer to bimodal training of highly qualified professional specialists, including specialists in pedagogics, was taken in 2007 year. In this connection since 2009 year the educational process in high schools will be organized with the use of the credit system, and this organization will take place in nonlinear scheme, the characteristics of which are the following: providing the system of high education with freedom in formation basic educational programmes; the institution of a new more complete planning system and educational process organization; the increase of the self-dependent student work; the broadening of the student possibilities in choosing the course or specialty of training, personal participation of every student in the formation of his individual curriculum; involving academic consultants into the process of education , who assist students in choosing educational trajectory, especially in the choice of educational discipline, etc.

The above mentioned conditions make of current importance the problem of acquirement by high school tutors and lecturer of professional skill – the organization of the educational and cognitive student activities, appropriate to the demands of the credit system.

Three forms of curriculum are planned to be used in the process of teaching each specialty:

- basic – stable curriculum – a general course (specialty), are used to determine the content and labour-intensiveness of each student;
- individual curriculum – which define the individual educational trajectory of students;

- educational work plans – which are used to form annual schedule of the educational process and the labour-intensiveness calculation of tutors' and lectures' work.

The basic curriculum will include three groups of disciplines, according to the level of obligation and the succession of learning the educational content: "A" – a group of disciplines that are compulsory for learning and have a strict order in time; "B" – a group of disciplines, that are compulsory in learning, but there is no strict order of learning them; "C" – the disciplines that a student learns at his discretion.

The noted fact intensifies the problem of projection and realization of the principal, substantial and processual components of the methodical system of student education by the departments of the high school in the context of the Bologna declaration demands. The deans will have to unify the curriculums of contiguous specialties in the context of nonlinear system of organization of the educational process.

There is some hope that a teacher trained in the context of the new educational model, will be able to form key educational competences: notional, cultural, cognitive, informational, communicative, social and working, personal (self-perfection).

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IMPROVEMENT OF EDUCATIONAL MANAGEMENT ON BASIS OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE CONTEXT OF A COMMON EDUCATION SPACE

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Modern civilization is marked by complex and multidimensional globalization that spreads widely and forms a basis for social development. Its transition to information society stimulates the use of information and communication technologies in almost all spheres of life and provides for the rapid formation of an integrated global information space.

Approaches to theory and practice of education and upbringing also significantly change under the influence of globalization, integration, informatization, distance and personality-focused learning. Use of innovative educational technologies is currently an objective need and condition for reaching high quality of the modern education.

Being one the most important parts of the social life, education forms intellectual potential of the society and individuals. Nowadays, it is being drawn in the process of modernization in an effort to: develop and implement a model of advanced continuing education system; improve methodology of content selection; improve teaching methods and structure that should agree with objectives of the student's personality development, which is one of the actual conditions of information society; create educational systems and teaching techniques, aimed at development of intellectual potential; improve educational management and communication, using a common professional-oriented database and information and communication technologies.

One of the priority tasks in the field of education is to make the management of educational system more effective in its two main dimensions: educational institutions and branch in general.

Use of modern information technologies expands the potential of educational management. The interesting point is that the technologies for improvement of the educational content and quality are of a much bigger importance than the technical questions of how to implement the information and communication technologies, in educational institution management and for the purposes of education authorities.

In this respect, one of the most important aspects is to achieve better transparency of the educational system, which can be provided by the use of the following technical factors: option of keeping digital records of plans, activities and results of the management, teachers and students; possibility to access open digital information sources via telecommunication channels.

Planning and management of the educational process are fundamental issues for an each particular educational institution, which are based on the information, general for all educational institutions. The areas of planning and management include: definition of the institution's activities (quantity and organization of educational institutions); human resources; available facilities and time; planning of learning process (development of curriculum and teaching hour plans depending on the staff availability); correspondence of curriculum and time (lessons schedule), taking in account possible limiting factors (working hours of the institution and teaching staff, facility limits); dynamic respond to planed and unexpected changes in educational process.

In order to implement these ideas, information and communication space of a particular educational institution should be integrated in the regional information and education system.

During transition towards this new model of education, student's personality is regarded as the biggest value of the whole educational process. Education and upbringing have the following tasks: information acquisition and processing (or, traditionally said, acquiring new knowledge); development of abilities and skills; development of attitudes [1].

Such model can successfully exist only on the basis of a common informational and educational

space that provides conditions for user's access to the information resources on a specific subject via interactive information and communication technologies. The main criteria of value, practicality and effectiveness of any innovations in education and upbringing are to serve for the good of an individual [2].

One of the aims of widely used new information and communication technologies in education is to create conditions for better and effective educational management, as these technologies provide communication between different participants of the educational policy - state, regions, communities, employers, educational institutions, teachers, students and their families.

Informatization of the educational system, providing its openness and unification, already creates a possibility for a dialogue between all its participants. Expanding informatization till the level of a competent educational society is the practical task that modern educational policy is currently facing.

Managing introduction of modern educational technologies at the institutional level means, that end products (educational and informational resources), tested in educational institutions, are accepted for general practice and their turn change it. Moreover, the managerial process aims to spread the use of new educational and informational resources. Educational authorities and heads of educational institutions should constantly pay attention to this process, and stimulate the expansion of modern innovative technologies in education.

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THE HUMANISTIC VALUE OF INTELLECT IN EDUCATION

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Today the problems of the humanization of education are studied widely enough. This is bound up with the fact that modern educational system has to train the new generation of people to live in the considerably changed society which still keeps on changing. In these quickly changing conditions a number of historically new tasks are set to the educational system one of whose functions is to transmit the culture from generation to generation.

The humanization problems have become especially keen in the second part of the 20th century owing to the development of regional and global crises. Modern education is to reveal and develop such phenomenological features that can help a man cope with new the new crisis and post crisis conditions preserving his morals at the same time.

In fact, some new technologies are created and some new educational projects are designed owing to multiple changes in modern educational structures of different levels. And these technologies and projects use the idea of humanization as the conceptual basis. When talking about the humanization of education they usually mean the necessity of upbringing a person who is able to master the rich culture of civilization on the basis of existing moral principles. It is supposed that on the basis of the new pedagogical approach introduced by the humanization both spiritual and physical features of a person will develop thoroughly, with harmony and without defects.

However, the models of the humanization of education don't basically consider the role of intellect and the technologies of its development. Having elucidated the humanistic value of intellect in education, we also considered the education potentialities in the upbringing of a man. The way of decision lies in conservation, mastering and improving the intellect.

For the knowledge, got during the process of education, to be integrity, a purposeful work of mind, its development, mastering the methods of creative thinking are necessary. But is it necessary to develop intellect? Is it so useful for the society? These questions and the like are more often repeated in connection of coming global ecological catastrophe and other similar crises.

The necessity of searching the ways out of crises leads to the understanding the urgency of humanization of a society, science and education as a short way to the harmonical development. But the humanization and its essence are understood differently. The view are different in the definition of the role which intellect plays in the process of humanization of education.

The notions "a soul" and "intellect" reflect a deep base of a man. A great number of approaches to the definition of intellect can be found in modern literature. But contemporary authors in their scientific works seldom consider a notion "soul" and its correlation with the notion "intellect". Such inequivalent reflection leads to their withstanding.

The approach according to which the intellect and a soul are in close unity allows solving the problem on the correlation of the intellectualization of a society and its humanization. The development of the intellect doesn't contradict humanization but is in its ontological base. Nowadays the correlation between a

soul and the intellect is in the fact that the intellect as a thin instrument with the knowledge of psychology can be used by a man for self-knowledge, necessary for the humanization of the society.

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GLOBALIZATION OF HIGHER EDUCATION: COMPARATIVE RESEARCHS

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The problems of globalization in education, joining of Kazakhstan to the Bologna process, its influence to the development of high school science, an openness of educational theories are considered in this article.

Globalization as the megatendency of development of education is traced in the most of the countries of the world. Globalization of education as the term can be found in works of international scientists and specialists. We shall note, that the process of globalization includes two directions (it is bilateral), i.e. on the one hand there are impulses sent by the countries generating integration processes, on the other hand - there is a desire of the country itself to be integrated into the world educational space.

In Kazakhstan the next key characteristics are traced:

⇒ "localization" - penetration and adaptation of the western methods and techniques, technologies and forms of education. However the internal content either remains the same, or undergoes serious adaptive processes (for example, credit system of education);

- " Horizontal communications " – introducing forms of western high schools in education system of Republic of Kazakhstan (for example, KIMEP); nascence of the international high schools based on partnership of two states and financed by them (for example, the Kazak-British technical university, the Kazakhstan-Russian university, etc.);
- Realization of joint scientific and educational projects;
- Openness of the education system that enable an increase of the number of foreign students, as well as opportunity of citizens of RK to learn, to improve their skills abroad. The portion of such students is gradually increasing (for example, amount of students who won the grant of the state program "Bolashak" to study abroad increased from 785 students in the period 1994-2004 and achieved 3000 ones from 2005). At the same time, on the other hand, an expansion of the education content by the "transnational knowledge" (new theories of various sciences);
- formation of distance learning system;

⇐Aspiration to enter into the international educational space enables the unification of levels of preparation (bachelor degree – master degree – PhDoctor degree), educational standards, recognition of educational documents, degrees, etc.;

- Unification of specializations according to the International standard classification of education (UNESCO)
- universities and the high schools Joining to the international and regional associations;
- The international accreditation of educational programs in the foreign centers of assessment and accreditation, etc.

The program documents and decrees on education development were accepted by Kazakhstan Government, the reforms on integration into world educational space are systematically introduced.

Nowadays the Ministry of Education and sciences of Republic of Kazakhstan goes through active negotiations on joining the Declaration of Bologna in 2009. Analysis of the Bologna process development history and its comparison, confront to the Kazakhstan reforms clearly illustrate the influence of decisions of Bologna agreements on trends of reform evolution in Kazakhstan. It is connected not only with Bologna process, but also with the process of globalization of a society, universal tendencies of educational policy of the developed countries and decisions made at the forums of UNESCO, forums of Ministers of Education of the countries OECD. In particular, the 6 tasks of the Bologna declaration of 1999 were transformed into the 10 tasks of the current period of development. Just in 2003 there was a significant qualitative turn - orientation to the European translation system of test units ECTS, to the uniform sample of the diploma supplement of UNESCO, to three-levelness of the higher and postgraduate education "the bachelor degree - a master degree – PhD degree", to the affiliating to process of the CIS countries, including our neighbor Russia. Since 2003 in Kazakhstan the credit system of study was actively introduced, since 2005 the postgraduate school of the first level named "aspirantura" and this one of the second level named "doctorantura" were transformed to Philosophy Doctoral studies. Now RK high schools have actively joined in process of the international accreditation of educational programs.

The Principles of Bologna process considerably transform modern Kazakhstan education, create really its new identity. More than 10 years of reforms to approach the Kazakhstan education to the international one, understanding of new tasks require a new mentality, a new way of thinking from teachers. However without high skilled internal potential of personnel of high schools, without national traditions and large methodical schools, without high methodical

preparation of teachers these significant transformations are impossible.

The question of transformation of the postgraduate study of the first level (aspirantura) and the second level (doctorantura) to the master and Ph Doctoral studies is ambiguous. The Soviet system of science (candidates and doctors) is more specialty-oriented and designated that corresponds to modern development of a science. In our opinion transition to unique PhD degree is one step back at the preparation of the scientific staff. One can evaluate it by comparing the list of scientific specialist branches of RK and the classifier of specialist branches of the high and postgraduate education of the doctoral studies PhD. Now in RK the question to leave as it is the scientific degree of the doctor of sciences is discussed. The degree of Ph Doctor is recognized as educational (academic) and a scientific degree close to the candidate of sciences..

After evaluating all pluses and minuses, we are for the integration into the European educational space. Its advantages are the mobility of students and teacher, of specialists, the transparency of the educational levels, availability of the European education, opportunity of continuation of education abroad, strengthening of a high school science, etc. However there is a necessity of a competent educational policy of our state that can in advance predict how to resolve difficult questions and arising problems with the least losses, as softly as possible.

We emphasize a great value of development of the high school as the “research and innovative university”. Al-Farabi Kazakh National University is the leader of the Kazakhstan education, takes the first place in a Kazakhstan high school rating. Here the great attention was always paid to education and development of scientific schools, expansion of a scientific infrastructure of the university. The university conducts annually more than 200 scientific researches, about 60 of them are international i.e. with foreign partners. Modern integration processes activated comparative researches of education. It is connected as with the analysis on the macrolevel that is analysis of developments of national education systems, so as comparative researches on the microlevel that means educational theories and technologies of education.

The openness of the Kazakhstan education allows to compare our high schools to foreign partners. In April 2008 the group of the Kazakhstani teachers of al-Farabi KazNU directed by professor G.K.Akhmetova passed training in CALT UCL of the London open university. The first comparative evaluation of researches in the field of education and the techniques of education in our university and these ones in UCL has allowed us to allocate following similar positions in approaches:

- research of globalization and internationalization of education, preparing of the international curriculum;
- planning and organization of educational environments, including electronic;
- planning and organization of education process;
- application of active methods of education and electronic education;
- application of methods of problematic education, etc.

From the scientific and practical points of view differences are:

Kazakhstan	Great Britain
Terminology: educational technologies, technology of education, etc. In our didactics the next concepts are intelligibly defined and divided.: methods of training and methods of teaching, laws and principles of training, etc There is a term of education as education of qualities of the specialist, etc.	The next terminology is often used: strategy of training, tactics of training, etc. The Main idea of training: designing of knowledge by students themselves. For techniques of training the key ingredients of training are defined; principles of training are developed for use of each method. Techniques of how to use the certain method of training are more detailed. The role of the teacher-facilitator is constantly detailed, etc.

Nowadays technologies of education are based on the idea of independent construction \forming of knowledge by students (construction knowledge) in foreign methodology of education. And we speak more often about the transfer of system of basic knowledge, and then about education of skills to expand, fill up the knowledge with “construction of knowledge in system”.

We discussed some questions of pedagogical science and its development with English colleagues. However, they tell about the theory of education, psychology of education, avoiding to use the concept of pedagogics. Such approach explains absence of uniformity in terms, unequivocal understanding of categories of a pedagogical science and complicates precise statement of problems. Studying of German, Italian and other European traditions shows another approach. In a high school practice foreign teachers use well known technologies of active training in small group, problem training, etc. In the base of developed detailed technologies Dr. M. Weyes offers three ideas: stimulation of the deep approach, taxonomy SOLO of

Biggs, taxonomy of 6 basic cognitive levels of Blum. In Kazakhstan great value is attached to development of pedagogical innovations, for example, to works of S.T.Shaubaeva, S.N.Loktionova, etc. Features of innovative education are: (a) work on an advancing, an anticipation of development; (b) an openness to the future; (c) an orientation on the person, his/her development; (d) obligatory presence of creativity elements; (e) partner type of relations (cooperation, coauthorship, mutual aid), etc. We together with the Senior Teacher of The General and Ethnic Pedagogics faculty in the Al-Farabi Kazakh National University. M. Sadvakassova have collected more than 120 innovative methods of education which are presented in the study-guide “Innovative methods of education or How to teach interestingly”.

Comparison of theoretical positions of the Kazakhstan and foreign pedagogics allows to speak about similar development of the theory (the theory of education and pedagogics), however we lag a bit behind in practical realization and we had to work a lot.

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EFFECT OF TRADITIONAL THERAPY ON OF LIPID PEROXIDATION IN PATIENTS PSORIASIS

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In recent years, the trend of increased incidence of psoriasis. One of the pathogenetic elements in the development of psoriatic disease is an imbalance in the processes of lipid peroxidation (LPO). Studies confirm that the inflammation and the stress associated with activation of lipid peroxidation, which may indicate the severity and extent of pathological process. However, the literature lacks data on the relationship between gender and rational farmakokorrekthion of severe psoriasis.

The purpose of the study - the identification of particular changes in lipid peroxidation in patients with psoriasis, psoriatic arthritis (PA) and psoriatic eritrodermy (PE) on the background of traditional therapy.

Materials and methods. A study performed with the participation of 96 patients with psoriasis in the phase progression of the process on the basis of the Kursk Regional Clinical STI clinic. In the control group included 30 healthy persons, representative for age and sex. Clinical and laboratory studies (malondialdehyde (MDA), superoxide dismutase (SOD)) conducted before and after the course of traditional therapy to conventional standard methods. To evaluate the clinical efficacy of treatment using the calculation of the index PASI. Statistical processing of the data was carried out using the program "Statistica 6.

The results of the study. Studies have shown that the MDA had a tendency to increase in the survey group. Maximal changes in MDA (4,36 ± 0,08 mol / l; $p < 0,05$) were observed in patients with PA, the index of PASI they amounted to 52,4. In remission after treatment (index of PASI = 7,8), decreased rates of activity MDA to 3,78 ± 0,12 mol / l ($p < 0,05$).

Conclusions. Clinical forms of psoriasis, the incidence of the skin, the duration of the next exacerbation, severity of current dermatosis is directly dependent on the processes of lipid peroxidation. Evaluation of gravity flow of psoriasis (with an index PASI) were important criteria for stratification of rational pharmacotherapy of patients. Application of an integrated standard psoriasis therapy in the phase progression of the disease improves quality of life.

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PRINCIPLES OF MANAGEMENT IN STUDENTS’ SOCIAL-ENVIRONMENTAL EDUCATION SYSTEM

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The problem of students’ social-environmental education (SSEE) investigation carried out by us allowed establishing that its efficiency depends not only on the organization’s principles observance, but also on this process’ management principles accounting. The following principles can be referred to them: the one of SSEE connection with rational nature management in everyday life and activity; management and self-management conformity; variability; alternativeness and complementarity of educational perception of social-environmental relationships; social-environmental liability formation.

Let us reveal the features of each requirement. So, **the principle of SSEE connection with rational nature management in everyday life and activity** is conditioned, first of all, by a common scientific principle of general connection, second, by the principle of consciousness and activity unity generally recognized in native psychology and pedagogy (S.L. Rubinstein, A.N. Leontyev and others). In the considered context this principle means, on the one hand, social-environmental knowledge, abilities and skills formed in specially created conditions, on the other hand – the society and nature cooperation knowledge acquired in their direct interaction, in particular: in labour activity,

the subject of which natural environment and resources appear; artistic activity, where nature appears as an object of learning and reflecting its properties and connections by specific means; other activities somehow involved in social-environmental relationships. Together with that, in both cases, students should be persuaded of the necessity of prudent management of natural potential, its protection, recovery and restoration; the necessity of getting true knowledge about the interaction of society and nature, its present-day state and development trends, obligation of ecologically rational behavior and activity. Considering this principle in terms of building an integral pedagogical process in conditions of a HEI, it should be noted that the formation of a cognitive component of readiness of students for the rational nature management must be coupled with the formation of motivation-requirement and operation-activity components, continue in real practical activities on saving and relishing the environment of people. Thereat, a special emphasis is made on the possibilities of the chosen vocation in solving social-environmental tasks, the potential of collective relationships able to negotiate the contradictions arising in the system "nature – society"; the possibility of everyone to contribute to the environmental friendliness idea propagation in all fields of production and non-production activities. The educating value of involving students in social-environmental practical activity consists in its socio-natural orientation, intellectual content, socially meaningful relations being formed in the process of its actualization; organizational and moral nature. This principle requires not only participating of students in social-environmental activity at the local level, but also studying the features of nature and society interaction at the regional and global levels, the acquaintance with achievements in the area of settlement of contradictions and conflicts accumulated by the world human experience.

The principle of management and self-management conformity in the process of students' social-environmental education proceeds from the following two main positions: pedagogical system management and personality self-management within the structure of this process. The core of the HEI educational process management consists, in the eyes of scientists, in a regular action on its content, structure and efficiency preconditions for the purpose of theoretical and practical up-dated training of specialists; in creation of optimal external and internal conditions for the future specialist' personality successful formation, rational use of educational opportunities of all forms of educational work. Giving it in other words, the pedagogical process management in a HEI supposes the performance of the main pedagogical functions: analysis, definition of objectives and planning, organization, control, regulation and correction for the purpose of this process improvement or its changing into a new more qualitative state. The self-management of a personality consists in managing its state, activity and way of living. The essential components of self-management are as follows: self-study, self-esteem, self-organization, self-control and self-regulation. Proceeding from these two positions, the essence of the considered principle is defined. It supposes such a requirement, when the external side – management – creates external conditions for the students' social-environmental education process successful functioning: methodological, financial-material, personnel, etc. The internal side – self-management – promotes the digestion by students of the social-environmental experience, the main components of which are developed in curricula and syllabi, training aids and other sources; the involvement in vigorous activity concerning rational nature management; the advocacy of social-environmental knowledge among great masses of population. The most important condition in this cooperative process is the agreement of objectives, content, managerial and self-managerial activity, selected combination of methods, means and forms of cooperation, forged external relations with all the subjects of the natural management process.

The principle of students' social-environmental education variability (varians – lat. varying) supposes the existence of many possible variants of students' education in the environmental area. In this case the variability is referred to all the integral pedagogical process elements: objectives, content, methods, means and forms of organization, control. As applied to objectives the variability concerns their concrete manifestations, specific tasks solved in the defined already conditions: educational institution, group, etc. However, the changing operative goals and problems should, nevertheless, proceed form the central objective of general ecological education – the formation of environmental liability of everyone irrespective of its peculiarities. The students' social-environmental education variability is found in modification of educational normative documents existing today (curricula and syllabi, training aids, etc.), in development of new educational conceptions reflecting the system "nature – society" and taking into account "… the intellectual climate of the epoch, the dominating axiological-ideological orientations, the richness of spiritual requirements of the society" (N.M. Mamedov).

The procedural side components' variability is traced in the variety of methods, means and forms of social-environmental education of our youth, in their different combinations aimed at the optimization of the teacher and students' cooperation process connected with the social-environmental interaction experience digestion, in the use of cognitive, educational and self-educational activities' various kinds and methods, the involvement of students in the process of close cooperation with natural environment for the purpose of its studying, protection, recovery and restoration. On the other hand, the existence of various ap-

proaches to the students' social-environmental education problems solution allows every its participant, teachers and students in the first place, to exercise as well the right to choose the variant of preparation for the establishment of harmonic relations with natural environment in conditions of a HEI; to choose such a variant, which, besides educational and vocational tasks, could promote the revelation of abilities of a separate personality, its development, realization of creative potential. The principle of variability concerns also such an element of the pedagogical process, which management appears. In this context the principle requires to choose the management variant corresponding to the conditions: its principles, content, character, style, management cycles. The principle allows humanizing the educational process; that, in its turn, reflects on the results of not only education in the area of environment, but also the training of specialists possessing ecological culture and able to manage their conduct and activities in the natural habitat, to create necessary foundations for a further development of the present and future generations.

The principle of alternativeness and complementarity of educational perception of social-environmental relationships is closely connected with the previous one. Let us remind you that an alternative (alternative – lat. one of two) means a necessity of choice between mutually exclusive possibilities. The obligation of this principle in the students' social-environmental education is defined by the necessity of modern science variable development, what is mentioned by many scientists (A.D. Ursul, N.M. Mamedov and others). In conditions of the educational process in a HEI this principle requires studying social-ecological relationships from positions of various sciences, natural as well as humanitarian; searching a general methodological foundation combining various conceptions of nature and society cooperation; revealing complimentary resources of specifying the peculiarities of this cooperation and reflecting them within the framework of scientific knowledge. Together with that, the principle allows drawing the information represented by not only the science, but also other forms of social mind: philosophy, politics, right, art, ethics, religion. In short, the considered principle supposes the necessity of including social-natural objects, phenomena, processes, various social mind spheres, every one of which reflects one aspect of social-environmental relationships in the process of cognition, what doesn't enable inferring cause-and-effect relationships by virtue of complexity and non-single-nature of real processes. The establishment of objective causes of any phenomena is possible in terms of various sciences integration, using the "nature – society" system studying methods and means developed by different sciences.

One of the most important principles of the students' social-environmental education process management appears **the principle of social-environmental liability formation**. The liability is understood by psychologists as the performed-in-various-forms control over the subject's activities in the context of performing the rules and guidelines accepted by him. This principle was formulated by Russian scientists I.D. Zverev, I.T. Suravegina, N.M. Mamedov in terms of general environmental education of school children. By the environmental liability the degree of freedom of a human in conditions of environmental necessity as the oneness of consciousness, emotion and will, as the worldview basing on concrete knowledge is meant. The considered principle requires a conscious observation of moral principles and standards of cooperation with the environment in accordance with the perspective of sustained development of the society, harmonious social-environmental relationships by the students in the process of learning the chosen trade, and also in their further professional activities. Mastering the profession will allow students to learn its possibilities to negotiate social-environmental contradictions, to acquire methods of environmental damage liquidation, to restore nature's productive, cultural and health-improving potential, to reveal new opportunities for its being learned and included in the process of vital activity. The principle supposes that the development of environmental liability in conditions of a HEI is performed in both study and extracurricular time, in various activities: academic, cognitive, labour, research, social, artistic, etc. The most important direction of ecologically advisable activities, wherein the sense of responsibility and obligation grows strong, appears the one connected with the unmediated enhancement of the nearest environment, with one's and other people's healthy lifestyle. In the context of the considered principle the opinion of psychologists emphasizing that liability for making a decision and its success (especially in a collective) is largely defined by the development level of this collective – a student group, for example – its solidarity, common value system, emotional identification with regard to the natural environment, in particular, should be entertained.

Summing the above said up, let us point out that the observance of management principles together with the ones of students' social-environmental education process organization will promote a more successful solution of various educational and professional problems, harmonization of social-environmental relationships.

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SOCIAL-ENVIRONMENTAL EDUCATION OF STUDENTS: DEMAND-MOTIVATING ASPECT

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The investigation of the students' social-environmental education phenomenon as a special activity requires studying the most important component of its structure – the demand-motivating one. In connection with this there appears the necessity to define the essence of motives of this kind of education within the framework of the activity approach and marking out certain classifications in the most general form.

It should be noted that the detection of proper psychological aspects of the considered motives is not included into the content of this problem. The challenge is to infer those motives, which reflect the activity of the personality and society in cooperation with natural habitat, on the basis of the accumulated theoretical experience on the problem of behavior and activity motivation. The composition and place of educational motives in the field of social-environmental relations is defined by the psychological structure of natural management as the process taking place between the society and nature. At the heart of the schematic construction of this kind of activity there is a model of general architecture of the psychological activity system developed by V.D. Shadrikov. The source is the human biosocial structure. Thus, the psychological system-structural model of natural management includes: demand – motive – objective – real practice – program – environmental assets' use result. This very model in our research projects the system of students' social-environmental education. By virtue of the fact that in the psychological science there are still many unsettled problems connected with driving forces of human activity and behavior, a common approach to the problem of motivation, its terminology, formulation of basic concepts the students' social-environmental education structural components' consideration in the context of the activity approach was carried out only at the level of general directions.

So, the necessity of social activity in the natural habitat (social-environmental activity) defines the corresponding demands of the society and personality, so-called social-environmental demands: natural, psychological, pedagogical, ethic, economic, social, labour ones. The satisfaction of these demands of the society in recent years resulted in the perception of the necessity to rehabilitate the environment providing life and activity of the human and humankind. We call these demands environment-restorative. The achievements of natural scientists (I.P. Gerasimov, V.S. Preobrazhensky, N.F. Reimers and others), and in the last years also the representatives of various sciences, who associate different sides of the human existence in one way or another (S.N. Glazachev, N.M. Mamedov, N.N. Moiseyev, L.V. Smolova, V.A. Yasvin and others), demonstrate the necessity of not only studying the environment, its resource potential and its use in the satisfaction of various demands, but also the necessity of protection, restoration and rehabilitation of this environment providing a further sustainable development of the society. In other words, the biosocial essence of the human appears today as the source of a new demand – the demand for preservation of the environmental conditions and assets for the present and future generations, for everything living on the planet.

The satisfaction of this demand, vital for the human and the society, requires a corresponding activity transforming the relations with nature. However, it is necessary to prepare all the sections of population, the student youth, future experts connected directly or indirectly with the natural habitat, in particular, for such transforming activity, that is why the motives of rational natural management should be formed in the graduate education as well. In connection with this it is necessary to distinguish the motives of rational social-and-ecological activity (natural management) proper and the motives of education in the context of this activity. Resting upon one of the last definitions of the motive (P.I. Pidkasisty, V.A. Mizherikov) by the **motives of rational social-and-ecological activity** we mean various motivations defining the activity of the subjects (society or personality) in the interaction with the environment, its orientation to the rational (within the limits of norm and measure) use of environmental assets with account of living circumstances. And by the **motives of education in the context of social-and-ecological activity** we mean such motivations, which define the directivity of personal activity on the acquirement of social-and-ecological knowledge, social-and-ecological skills and experience of creative and emotional-axiological attitude towards nature. In modern psychology the term "motive" is used to define different phenomena, states evoking activity of the subject. The role of the motive can be performed by demands and interests, inclinations and emotions, attitudes and ideals. In our case the forms of manifestation of the motive are the same, but, first of all, they are connected with social-environmental relationships and their reflection in specially created conditions of the educational institution. So, general motives reflecting the content of social-and-ecological activity of people are defined by various groups of human demands and manifest themselves in the last. In the social-and-ecological activity motives classification offered by us we proceeded from the classification of demands (N.F. Reimers, 1994) conditioned by internal qualitative and quantitative factors. These demands and possible motives are represented by the following four groups. The **general human demands**:

- biological (anatomico-physiological, physical or natural) ones define the following motives of social-and-ecological activity (felt-needs of SEA): the *need for* physical existence of a human - maintaining

normal thermal, radiological and magnetic-wave background; normal water and air composition; well-balanced food; healthy sleep and other kinds of relaxation; protection against various diseases and anthropogenic contaminations; biological information-spatial comfort, i.e. protection against under- and overpopulation; a comfortable natural habitat; motion; labour; mobile activities; certain life and labour space; etc.;

- ethological-behavioral (psychological) ones cause the *need for* belonging to an ethological group in the context of the developing property of an individual; a psycho-emotional contact; having an own ethological group; a certain ethological "climate" (for example, pace of living, etc.); an ethologically comfortable dwelling, "ethological landscape" (the combination of the natural habitat with the "second" and "third" nature); etc.

- ethnic demands define the *need for* ethnic independence; comprehension of one's own people's objective existence as an ecological-social-economic aggregate; belonging to an ethnically independent group; a sustainable existence of one's own ethnos; "home" nature scenery adequate to the ethnos history; the "second", "third" nature impressed in the "ethnic memory" since childhood (architecture, cultural landscapes, etc.);

- social (social-psychological) demands require the *need for* civil liberties warranted by law or customs; guarantees (constitutional or traditional-social ones) providing confidence in the future; moral standards of communication between people and with natural environment; freedom of knowledge and self-actualization; education of social groups of various hierarchy; free mix with equals; understanding one's own sex and age and following them in accordance with social norms; individual stereotypes and tolerance of the society to them; a uniform informative-cognitive environment; a certain social background for the rest groups' demands' satisfaction.

The marked out groups of motives are of the most general, approximate character. The satisfaction of the marked out demands, realization of the motives are possible under the condition of implementation of laws of the society and nature interaction and rational natural management. In other words, the present-day critical condition of the natural environment dictates the demand and necessity of these laws' observance. Let us show the correlation of the natural management principal laws (N.F. Reimers, 1994) and the motives marked out by us and defined by these laws.

- the law of environmental assets' limitation (exhaustibility) – the necessity of natural resources conservation;

- the law of productive forces' development correspondence to the natural resource potential of social progress – the necessity of keeping balance between the productive forces and natural resource potential in the course of development;

- the law of research intensity increase of social evolution – the necessity to increase the research costs in the area of social-ecological relationships;

- the law of natural resource potential loss – the necessity to increase the labour and energy costs for the use of natural resources within one formation, mode of production and technology;

- the rule of natural systems' reforming measure – the necessity to observe the measure in cooperation with the natural habitat;

- the rule of (inevitable) chain reactions of "rigid" control over the nature – the necessity of accounting the inevitable chain reactions happening because of technical management of the nature and being able to cause man-made disasters;

- the rule of naturality or the rule of an old automobile – the necessity of accounting the loss of technical devices' efficiency (in the course of time) and, in connection with this, the social cost increase for their support;

- the rule of "sloppy control" over the nature – the necessity of nature management taking its laws into account;

- the law of a joint action of natural factors – the necessity of accounting all the aggregate of the factors in the course of using any natural resource;

- the law of maximum – the necessity of prevention of any ecosystem's overwork resulting finally in self-destruction of the system;

- the rule (law) of territorial ecological balance – the necessity of accounting the territorial- ecological balance;

- the rule (law) of component ecological balance - the necessity of observance and accounting the component-ecological balance;

- the law of decreasing (natural) fertility – the necessity of accounting the tendency of natural fertility reduction as a result of human intervention;

- the law of the end product's environmental capacity reduction - the necessity of accounting the tendency of natural substance reduction in the social product average unit;

- the law of the involved natural resources' turnover rate increase – the necessity of accounting the involved natural resources' turn-round growth trend against the rate of growth of production itself, etc.

Natural management with due consideration of its laws and social motivation requires to observe one more the most important condition, which is equal to a law – the law of natural environment protection, its restoration and rehabilitation. This law, the main one at the present time, comprising social-ecological relationships defines more private laws – the principles forming a normative attitude of the human and society to the nature. N.F. Reimers gives the following of them: the law of pebble-leather; the law of irremovability of wastes and/or side effects of production (husbandry); the law of waste amount constancy for

technological purposes; the rule "environmentally friendly is economic" (the conservation of natural resources is finally profitable both in social and economic relationships); the laws of component-ecological balance, territorial-ecological balance, internal dynamic equilibrium; "iron laws" of nature conservancy of P. Ehrlich; the principle of uniqueness; the principle of reasonable sufficiency and tolerability of risk; the principle of information insufficiency; the principle of instinctive denial-acknowledgement; the principle of illusive prosperity or euphoria over first successes; the principle of remoteness of events; the rule of economic-ecological perception of J. Staikos; the law (aphorisms) of B. Commoner (everything is connected with everything; everything should get somewhere; the nature "knows" better; nothing is given for free).

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GOALS, TYPES, PROBLEMS AND PROFESSIONAL-SPECIALIZED GRADES FOR SPECIALITY "MACHINES AND APPARATUSES OF CHEMICAL INDUSTRIES" FOR 3RD GENERATION EDUCATIONAL STANDARD

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1. Goals of higher professional education for direction of "Energy- and resource saving processes in chemical technology, oil chemistry and biotechnology" of specialty "Machines and apparatus of chemical industries" in education and personality training.

1.1. In the field of education goals of higher professional education for direction of "Energy- and resource saving processes in chemical technology, oil chemistry and biotechnology" of specialty "Machines and apparatus of chemical industries" are:

- training in the foundations of human, social, economic, mathematical, scientific, general engineering and professional knowledge, enabling the graduate to work successfully in the chosen field, have a universal and specialized professional competence, contribute to their social mobility and stability in the labor market, successful career, that, in general, should provide economic and technological security of the Russian Federation in the field of advanced technologies.

1.2. In the field of personality training goals of higher professional education for direction of "Energy- and resource saving processes in chemical technology, oil chemistry and biotechnology" of specialty "Machines and apparatus of chemical industries" are:

- formation of social and personal qualities of graduates: dedication, organization, hard work, responsibility, citizenship, patriotism, communication, tolerance, strengthening morality, creativity, obschekulturnye needs, cultural, linguistic and adaptive research, scientific and professional ethics, perseverance in achieving objectives ability of arguments to defend their professional interests and the interests of its professional staff, endurance and physical training.

Graduates professional activity area

Graduates of direction of "Energy- and resource saving processes in chemical technology, oil chemistry and biotechnology" of specialty "Machines and apparatus of chemical industries" professional activity area includes: scientific and project developing institutions, production, technological and machine building plants, project design bureau, production labs, institutions of equipment certification, government environment and ecological control and monitoring organs, education facilities of different forms of ownership. Graduate of specialty "Machines and apparatus of chemical industries" can work on any post allowed by Russian Federation law and departmental documents for people with higher professional education concerning training area and work experience.

Professional activity objects

Professional activity objects of graduates of direction of "Energy- and resource saving processes in chemical technology, oil chemistry and biotechnology" of specialty "Machines and apparatus of chemical industries" are:

- technological plants, production and production equipment of main chemistry (production of mineral acids, alkaline, salts, fertilizers, carbon, soot, chemicals, etc.);
- technological plants, production and production equipment of processing of carbon materials (oil refineries, gas plants, coal and coal shale processing plants);
- technological plants, production and equipment of heavy and precise organic synthesis (production and processing of plastic masses, artificial and synthetic fibers, elastics, rubbers and rubber products, artificial resins and glues, etc.);
- technological plants, production and equipment of heavy and precise organic synthesis (production of silicon materials, semi-products and dyes, artificial liquid fuel, pesticides, herbicides, pharmaceuticals, surfactants and detergents, etc.);
- processing, manufacturing and manufacturing equipment of energy materials (manufacture of gunpowder and explosives, solid and liquid rocket fuels, etc.);
- processing, manufacturing and manufacturing equipment and recycling of nuclear fuel;

- processing, manufacturing and manufacturing equipment of ultrafine and nanomaterials;

- processing, manufacturing and manufacturing equipment and disposal of chemical weapons;

- processing, production equipment and production of microbiological synthesis (production of protein-vitamin concentrates, yeast, alcohol, lysine, etc.);

- processing, production and equipment to protect the environment from harmful gas emissions, contaminated wastewater reclamation and recycling of solid industrial and domestic waste;

- processing, manufacturing and equipment manufacturing of construction materials and products (cement, bricks, ceramics, glass, concrete and concrete products, etc.).

Professional activities of graduates

- production and technological activities;
- design activity;
- research activity;
- scientific and pedagogical activity;
- organizational and managerial activities.

Specific types of professional activity, for which mainly graduate is prepared must determine the content of its educational program, developed by higher education institution in conjunction with interested employers.

The objectives of the professional activities of a specialist

Preparing graduates is a multi, interdisciplinary nature, provides an opportunity to activities related to the solution of fundamental problems in the area of chemical plant and of technology: search for new competitive on the world market design technology and environmental equipment, implementation of modern and advanced technologies and production processes of various products to ensure reliability, durability and safety of the technological schemes and equipment.

The graduate is prepared for an independent professional activity in the following areas:

a) industrial-technological

- maintenance, repair and installation of technological equipment, and environmental chemical, petrochemical and microbiological production;

- development of manufacturing, repair and installation of technological and environmental equipment for engineering companies, assembly companies, repair and assembly of mechanical parts of the industrial enterprises;- испытание, сертификация технологического и природоохранного оборудования в испытательных лаборатория, сертификационных центрах, монтажных площадках;

- environmental protection technology and equipment from the effects of the environment;

- implementation of measures to ensure product quality;

- monitoring of technological discipline;

- maintenance of technical documentation for production and technological activities of enterprises and environmental systems.

b) design

- design of technological and environmental systems;

- design of manufacturing technology and environmental equipment;

- sketch development, technical and work projects of technological and environmental equipment;

- development of project documentation for installation process of technological and environmental equipment;

- development and revision of Standards, RTM, RD and technical conditions on the technological, environmental equipment and technological processes;

- development of project documentation of repair work to restore the technological and environmental equipment;

- project development of protection of technology and environmental equipment from the effects of the environment;

- protection of copyright of design and technology innovations by Russian Federation and international patents;

- development of business plans, feasibility studies for new design solutions.

c) Research

- conducting research on the study of the newly established equipment, study the processes occurring in the equipment;

- analysis and synthesis of scientific research using modern science and technology of domestic and foreign experience in the area of chemical plants and of Technology;

- systematic search and preliminary analysis of the scientific and technical information in the area of chemical plant and of Technology for research and practice, and patent support of basic and applied research in the field of modern chemical plant, machine and apparatus building and of Technology;

- mathematical modeling of technological processes and equipment based on custom developed and standard software packages;

- conducting research on advanced search methods, techniques and technologies of environmental protection technology and equipment from the effects of the environment;

- preparation and conduct of scientific workshops, scientific and technical conferences, the preparation and editing of scientific publications;

- definition of economic efficiency of research and scientific and industrial work;

- popularization of new knowledge in the chemical plants, machines and apparatus of chemical technology by the means of the Internet, through publications in national and foreign periodicals, during educational activities.

d) scientific and pedagogical

- preparing and conducting lectures, seminars and workshops, the leadership course and diploma design, organization of work practices of graduates;
- organization of research work of students in university courses in high school;
- preparation and issuance of educational and methodical literature on the relevant field of expertise;
- training of industrial enterprises, design and engineering organizations use sophisticated software and methodical complexes aided design and research.

f) organizational and managerial

- organization and management of teams of technology, engineering companies and environmental systems;
- organization and management of the research, design organizations and units;
- organization and management of machine-building enterprises, specializing in the production of chemical equipment;
- organization and management of assembly companies, specializing in the installation process and environmental equipment;
- organization and management of repair companies who specialize in the repair process and environmental equipment;
- organization of work on the design of technological and environmental systems, installation and repairs;
- organization of work on testing, certification and standardization of equipment, development and revision of Standards, RTM, RD and technical terms;
- organization works for the safe management of production processes, installing and repairing equipment, environmental monitoring and supervision;
- oversee compliance with the safe conduct of work in the industrial, technological and environmental control;
- organization of work on product quality control.

Requirements for basic education training program

Graduated in direction of «Energy-and resource-saving processes in chemical technology, oil chemistry and biotechnology» of specialty «Machines and apparatus of chemical industries» with qualification «**Specialist**», in accordance with the objectives of the basic educational program, facilities and types of professional activity should have the following **professional specialized expertise**: basic knowledge of the kinetic regularities of mechanical, hydromechanical, thermal, mass, chemical processes; ability to synthesize the technological scheme of production of various materials and products, to calculate material and energy balances, utilization of raw materials; ability to formulate terms of reference for the development of technological and environmental equipment; design sketch, technical and working projects for equipment; knowledge of construction materials and their grades, the elementary base of equipment, methods of calculation for strength, stability of the basic elements and components of equipment; knowledge structures, the application of the principle and basic performance characteristics of machines and apparatus for chemical production, machinery, machines and automatic lines for chemical production; knowledge of basic techniques and principles of technological schemes of waste gas, waste water, disposal and recycling of industrial and municipal solid waste; knowledge of technology of repair and installation of technological and environmental equipment; ability to formulate terms of reference, sketch design, technical and working drafts of chemical-technological and environmental systems; knowledge of methods and techniques of environmental protection technology and equipment from the effects of the environment; the ability to make business plans, feasibility studies on the development, manufacturing and production equipment, design, installation and operation of chemical-technological industries, and environmental systems. Mentioned objects, types and purposes of professional activities confirm the difficulty of developing a single unified government educational standard of higher professional education for direction «Chemical Engineering and Biotechnology», for which can be related the specialty «Machines and apparatus of chemical industries».

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Materials of Conference

INFLUENCE OF TRANSPORT FACTOR ON RURAL PEOPLING STRUCTURE OF JEWISH AUTONOMOUS REGION

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In connection with the fact that a greater number of population centers on Earth is rural and the entire territory outlying the city is referred to the rural area, the study of rural settlement has always been in the swim of geographical research. S.A. Kovalev, defining the rural settlement, characterized it by the features of distribution and combination of rural settlements in a certain area.

The rural peopling and rural-type settlements change with the course of time both quantitatively and qualitatively. The transformations occurring with them depend on many factors (natural, socioeconomic, geopolitical, etc.), having studied which one can find out the principles of the rural area sustainability. In our work we shall consider the influence of the transport factor on the modern structure of rural peopling of the Jewish Autonomous Region area (JAR), as the formation of a network of settlements and that of transport are always interdependent and interconditioned. The processes of rural peopling transformation of the Region are studied insufficiently, so, our work will help expanding the knowledge in this sphere.

The JAR area is situated in the south-east of Russia, in the middle part of the Amur-river, on the boundary with China. The modern administrative-territorial division of the autonomy is represented by 35 municipal units, which include 5 municipal areas, 13 urban settlements (inclusive of 2 cities), 17 rural settlements (consisting of 98 rural communities).

From the moment of developing and peopling the JAR territory (middle of XIX century) the transport routes had been playing a significant role in the formation of human settlement network, as the transport was a connecting link between the earlier developed territories of the European part of Russia and newly peopled Far Eastern lands. During the autonomy development the Amur with its tributaries was a natural transport corridor and the way out to the Pacific Ocean at the same time. It is the Amur, which appeared to be the axis for the development and peopling the Region's area. The population centers were located along the Amur in hilled flood-free plains in the places most favourable for life and farming.

The following equally important route of communication for the JAR was the royal tract (so called "Kolesukha"), which crossed the whole territory of the JAR. In connection with the complexity of using "Kolesukha" (only in the cold season) it was necessary to make new means of communication, more convenient and less dependent on natural environment. A railway, the construction of which was started as early as in 1881, conformed to these conditions. The construction of Transsib in the territory of the Region (1905-1916) defined a new axis of peopling. The settlements emerged at that time generally specialized in construction and servicing the railway, mining and processing natural resources and timber for the construction. By the 30-s of XX century the construction of several more roads, both railway – leading to Urgal and Komsomolsk-on-Amur, and automobile – village Leninskoye, started in the JAR. Along them the rural settlements, the main economic activity of which was to serve the transport routes and produce agricultural commodities for own requirements, situated. In the following years and up to the crisis of the 90-s the regional transportation network improvement took place.

Nowadays, the directions of population distribution in the JAR area are as follows: along the railroad, the Bira-river and highways – Birobidzhan - Leninskoye, Birobidzhan - Amurzet. The distribution of rural communities is practically linear, as between the transportation network the rural settlements is weakly-developed. Despite the fact that within the bounds of the Far Eastern economic area the JAR has a relatively developed transport infrastructure the roads of the Region are disposed extremely non-uniformly. There are three directions of highways in the Region: Chita – Khabarovsk (along Transsib), Birobidzhan – Amurzet – Chinese boundary (along the Amur-river), Birobidzhan – Leninskoye - Chinese boundary [10]. The population centers are generally located along the given traffic arteries. Thereat, the urban-type settlements are concentrated along the railroad, and the rural-type ones – along the rivers and roads of local notification. The hard-to-reach settlements and the ones distanced from the main transport routes are supplied with the social assets insufficiently, and some of them are on the verge of extinction.

So, the influence of the transport factor on the rural peopling of the JAR is evident: the rural-type settlements' development occurs along the main traffic arteries disposed linearly.

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Materials of Conferences

CONDITION AND PROSPECTS OF THE DEVELOPMENT OF OBJECTS OF GREEN BUILDING IN STAVROPOL

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Today the issue of ecology and rational nature management in the territorial complex scheme of the town-planning of Stavropol is considered according to "residual principle". At the same time in accordance with contemporary realias the development of approaches and methods allowing more completely to take into account a specific character of environmental factors of a territory is an urgent question during the development of town-planning policy.

Characterizing the main problems of the existing system of planting of trees and gardens in Stavropol it should be noted the following ones [4, 5]:

- a low provision of Stavropol with green areas in comparison with regulations;
- incompleteness of forming the uniform system of planting of the city including the system of forest parks, parks and gardens which meets contemporary town-planting, sanitary-ecological and recreational demands and will become the bases of ecological infrastructure;
- not carried out a passport system of objects of vegetation and not organized monitoring of a condition of green plantations as a basis of its current forming and management;
- the absence of qualitative and any other lawns within town boundaries with the exception of a central historical part of the town;
- a self-acquisition of municipal lands, a destruction of forest edges, a mass collections of prevernal plants, firing grass led to creeping fire, the absence of sanitary and improvement felling have resulted that forests becomes unattractive and littery places serving as dumps.

Contemporary forests within the town differ from each other by degree of safety. The Krugliy and Tamanskiy forests are subjected to the most recreational load. The recreational load is less in the Russian forest. However the felling especially of fine wood is more intensive here. The Chlinskiy and Mamayskiy forests are more surviving because of a relative isolation from residential areas. The widest variety of wood-shrubby kinds are registered here. Now almost all plantings demand a realization of some measures on increasing their resistance.

The square of Stavropol forests rapidly declines as a result of the town-planning policy of "point" building up. A large-scale offensive upon boundaries of forests has been developing for last 15 years. New apartment houses closely border with the territory of the forests or are wedge in it (an apartment complex "Garden-City", "Silver keys", "Alexandrovskiy Park" [1].

The role of green planting is very important in organizing a comfortable healthy habitat of a man in the town that it is difficult to overestimate it. That's why the system of green planting must be a basis of an ecological town-planning frame of the town. Unfortunately we can observe opposite processes in practice in Stavropol. The difficult ecological situation has reached crisis point connected with multitude forestry infringement. The necessary attention and supports of reforestation is absent. The planting of greenery is only in the central part and the outskirts are unattractive, unhealthy and uncomfortable from the point of view of places for living.

There is direct evidence of an absence of a complex approach to the different types of using of environmental objects. Numerous analyses of ecologists of Stavropol report about a threatening number of tree diseases in the town. So accordingly with researches of the leading recreational object of the town the Park Victory is in danger of rapid degradation in 15-30 years [2, 3].

So the condition of the environment in Stavropol which is not put on the list of cities with a high index of pollution is not very dangerous for population health. But it is necessary a variety of measures for its enhancement. Particularly it is necessary for improvement of an ecological situation to enlarge the area of green-planting territories, to relieve a number of traffic highways, to stop building on the territories with high degree of building up and etc.

Landscape and ecological analysis allow using a complex approach in the management when it should be taken into consideration landscape and ecological peculiarities of the territory while making every decision. Recommendations dealing with town-planning on the basis of landscape and ecological approach allow increasing the efficiency of planning of a town territory.

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THE BAIKAL LAKE AS AN EXTRA PROTECTED OBJECT

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More and more people became interested in the problem of nature protection. However, our knowledge about natural systems is limited. The tech-

nocratic approach to land development and invasion still predominates and considers the following categories in designing and building different objects: resources transportation, energy sources, additional resources (including manpower) and social infrastructure. Ecological parameters of the area are not taken into account and mostly are not studied. As a rule, the consequence of such approach is unnatural agglomerations appearance along with environment pollution that exceeds all permissible levels. The mankind as an element of a natural system can exist and survive only in the case when it uses natural resources reasonably and rationally. One must not forget that every creature has its development limits, and humans are not an exception. The mankind should understand that air, soil and water are not clean by themselves; they are cleaned by biogenic processes that are easily to breach. In their turn, the breached natural processes can lead to serious consequences that are dangerous for the population's health: life duration decreases and the frequency of respiratory, cardiovascular, cancer and allergic diseases increases.

Having dammed many rivers and thus having turned them into a cascade of not cleaned water storages, we created one more problem for our descendants. What will they do with that huge amount of heavy metals and organic pollutants accumulated on the bottoms of water storages? And this is only one side of the process that contradicts to natural system's ecological capabilities. The most serious is the problem of human societies' diversity. It is historically developed that every nationality lives in harmony with its environment and is engaged in sustainable natural management that was developed for many centuries. The lost of national diversity (both cultural and regional) leads to not only breaking the traditions but also to bad ecological consequences. Averaged life, culture and thinking lead to a human degradation – physical and moral. The mankind catastrophically exterminates species diversity at all natural and social levels. However, if we want to live in a stable environment, we must remember that the most stable are those natural systems where the amount of biological species is the highest.

There is an ecological legislation that is executed by a system of the government authorities. Its target is to allow people live in a stable environment. It must solve the following tasks: complex evaluating the environment conditions, defining the levels of environmental impact, preventing the hazards and liquidating the hazardous consequences (if there are any). To reach these targets the following environmental management activities must be carried out:

–organizing the general and continuous environment monitoring;

–standardizing the quality of environment and the rate of influence on it;

–establishing the adequate environmental impact fee;

–forming the especially protected territories;

–eliminating the environmental impact consequences;

–working out ecological programs.

However, these activities are not always carried out. Till now we are exploiting natural mechanisms of self-regulation and self-organization, and this can't last forever. Thus, to avoid natural system's degradation, we must provide privileges, governmental investments and guarantees for enterprises embedding safe, pollution-free and resource-saving production technologies. At present time our relation with natural environment is consumer, irrational. Owing the unique natural wealth we are realizing economic activities as consumers, without taking into account the consequences of environmental impact. Without the correct evaluation of natural conditions and resources such activity leads to the breach of matter and energy balance in natural systems. Incorrect activities can result in dangerous morphogenetic processes even within those territories where they are almost impossible. Existing indeterminacies in natural processes prediction on one side and the motivation of those who make decisions on natural resources exploitation on the other side are the additional risk factors. Anthropogenic influences within a certain area on the Earth will definitely have effect on the condition of the entire planet but at different rate. It is strongly recommended to find a new approach to natural territories development basing on their complex ecological volume evaluation technology.

A good example of incorrect activity on the planet is economic activity on the territory of the Lake Baikal. The assumed age of the lake is 20-30 billion years; the origin of the lake is related with global rift structure development that is characterized with high seismic activity. By the chemical composition Baikal waters are weakly mineralized soft waters of hydrocarbon class of calcium group (the average amount of ions is 96,4 mg/l). The lake's water is famous for its oxygen saturation and transparency at up to 40 meters. The lake is presented by the unique flora and fauna. There are more than 1550 kinds of animals and about 1080 kinds of plants. More than 2/3 of these amounts are endemic.

Due to its unique properties the Lake Baikal was included in the List of the world's heritage areas of UNESCO during the 12-th session of The World's Heritage Committee in Mexico, 2-7 December, 1996. In 1999 the Federal frame law "About the Lake Baikal protection" was accepted. Several Russian Federation Governmental Decisions were accepted as subordinate legislations to the law. All this means that the Lake Baikal and its territory are under the steadfast observation of regional, Russian and world-wide legislative organizations. What happened after these legislations were accepted? To answer this question we should analyze the pollution of the Lake Baikal and its territory.

The main sources of the Lake Baikal pollution and the economic factors of influence on its ecosystem are:

–industrial and household sewages from ports and cities within Selenga river basin;

–Baikal pulp and paper mill;

–Selenga pulp and cardboard mill;

–Irkutsk hydroelectric station;

–the part of Trans-Siberian trunk railway on the South of the lake's shore;

–the part of Baikal-Amur trunk railway on the North of the lake's shore;

–agricultural enterprises of Baikal region;

–cargo transportation;

–polluted air from Irkutsk-Cheremkhovo industrial node;

–tourism, recreational activity, trade and amateur bio-resources withdrawal;

–poaching;

–interregional and global atmospheric pollutants transfer.

It is evaluated that atmospheric emissions within the part of Irkutsk region territory close to the lake are settled on the lake's surface with a probability of 10-100%. Thus, the amount of pollutants in the atmosphere over the Lake Baikal in 1999 was probably about 13-130 thousands of tones. The total amount of atmospheric emission from Baikal pulp and paper mill in 1999 was 7,46 thousands of tones. The sewages from the mill contain oil products, phenols, lignin and aluminium which concentration is higher than normal. In 2002 the total amount of sewages from the mill was 8,144 thousands of tones, in 2004 – 7,761 thousands of tones.

The data of hydro-chemical survey in 1999 showed that the water quality doesn't match any norms. The amount of pollutants exceeds the highest permissible concentrations several times. According to the data of the United Institute of Geology and Geochemistry (Siberian Department of Russian Academy of Sciences), the modern deposits of the Lake Baikal contain up to 80 mkg/kg of mercury.

Moreover, long-term influence from the industrial centers led to the influence interference, and a huge ecologically unsuccessful region appeared. The most polluted area is Angarsk-Usolye-Cheremkhovo industrial zone (about 3 millions of hectares).

The protection of the surface waters is insufficient as well. The waters of Angara river and its inflows are polluted by oil products, phenols and copper. The water of Vikhoreva river is extremely polluted. Besides, the list of first-order protection objects includes Toporok river and Ust-Ilimsk and Bratsk water storages.

In the Governmental Report "About the condition of Irkutsk region environment in 2000" the following activities are suggested:

–to convert the heat-energetic, chemical and petrol-chemical industrial enterprises to natural gas that will result in decreasing the level of ash and sulfur dioxide emissions by 50%;

–to reorientate or to close the Baikal pulp and paper mill;

–to after-burn and repress by catalysts the sulfur-containing gas from pulp and paper mills that will result in decreasing the level of mercaptan, hydrogen sulfite and carbon bisulphide emissions by 60%;

–to reconstruct the aluminium factories that will reduce the level of fluorides by 2-4 times;

–to realize the target programs in Angarsk, Bratsk, Shelekhov and Cheremkhovo cities;

–to carry out a complex of activities targeted to reduce the influence of motor transport on the environment.

However, the present situation requires a new methodological approach to the natural system condition evaluation. Nowadays the basis for calculating of environment pollution fees is a permission to emit, to dump and to locate the wastes.

In our opinion, the most rational are the following activities:

–realization of methods of real ecological damage evaluation;

–evaluation of natural resources in natural conditions;

–following the environmental legislation in the condition of high requirements;

–ecological education of population.

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AIR POLLUTION AND PHYSICAL DEVELOPMENT, MOVING QUALITIES AND SKILLS OF FIRST-FORM PUPILS

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The physical development of children can be considered as the criterion of the quality of environment, since its indices are very dynamic and depend on the complex of factors, including from the level of the pollution in urban territories. It is known that not only the strong anthropogenic actions, but also relatively weak, for example, exhaust gases of motor transport, can have a negative effect on physical development. However, this question requires refinement. Each urban territory have unique complex of unfavorable anthropogenic factors, and their negative influence on the human organism can be reflected in a change in the different indices. Are studied the indices of physical development, physical preparedness and

level of the development of moving qualities and skills in 875 first-graders (470 boys and 405 girls), who are trained in 11 schools Kirov, from which 4 were located in the ecologically unfavorable city district, and 7 in the ecologically favorable region. The basic factor of pollution in ecologically unfavorable region are exhaust gases of the motor transport, traffic volume of which in the ecologically unfavorable region was higher than in the favorable. Special attention is given to gender differences in the sensitivity to the pollution of environment. Established that air pollution reduces the basic indices of the physical development of children, in particular the mass of body and the rate of its increase, but increases the rate of increase in the length of body it, i.e., contributes to asthenization. About the asthenization also testifies the fact that among the children of the unfavorable region more rarely it is encountered the macro-somatical type of build. Especially clearly reduction in the anthropometric indices is outlined in the attitude of boys, about which testifies the larger number of reliable changes in the physical development, which appear in boys in the unfavorable region and the appearance not of characteristic for the general massif indices - reduction in the circle of chest and length of body. Under the action of air pollution grow the muscular force of hand, power and vital index, diastolic AD, average AD, the addition of the vital capacity of lungs, the addition of the value of Shtange test, but the addition of the muscular force of brush is reduced. Air pollution reduces in boys rapidity, and in girls rapidity, flexibility, coordination abilities, aerobic productivity (maximum oxygen intake, [ml]/[min]/[kg]), the level of shaping of the moving skills, including of the habit of correct carriage, habits of walking and run, the fulfillment “of eight” by ball around the feet. In girls the level of the forming of the habit of the leap through the jumping rope is reduced. The deviations of the indices of physical development enumerated above can be considered the indicators of air pollution, which more frequently are manifested in boys. A decrease in the level of engine qualities under the effect of the pollution is characteristic for the girls. However, it was impossible to confirm literature data about the fact that the factors of air pollution negatively influence the harmony of development and the speed of biological ripening. In our study of differences according to the given indices it is not discovered. A question about the indicator indices requires further study, but it is even now clear that they depend on the sex of child and more frequently manifested in boys.

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