Impact of Quick Diagnosis Unit Integrated in an Emergency Department Setting

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BACKGROUND: Hospitals in countries with public health systems have recently adopted organizational changes to improve efficiency and resource allocation, and reducing inappropriate hospitalizations has been established as an important goal, as well as avoiding or buffering overcrowding in Emergency Departments.

AIMS: Our goal was to describe the impact of a Quick Diagnosis Unit (QDU) established on January 1, 2012, integrated in an Emergency Department setting in a Danish public university hospital following its function for the first ¾ of a year.

DESIGN: Observational, descriptive and comparative study.

METHODS: Our sample comprised the total number of patients with simple internal medicine ailments admitted and discharged the first ¾ of the year 2012 from the QDU integrated in an Emergency Department setting. The QDU accommodated 16 patients and was comprised of 10 beds and 6 ambulatory seats / chairs. The sample was compared with the total number of general internal medicine ward patients admitted and discharged the first ¾ of the year 2011 from the hospital’s general Department of Internal Medicine.

RESULTS: Over a period of 9 months a number of 4508 patients with simple internal medicine ailments were admitted and discharged from the QDU integrated in an Emergency Department setting. This amounts to ~500 patients admitted and discharged per month or a turnover of ~ 1 patient per accommodation (bed or seat / chair) per day.

Compared with the first ¾ of the year 2011 the establishment of the QDU integrated in the Emergency Department resulted in the admittance and discharge of 1139 fewer patients (41%; p < 0.0001) to the hospital’s general Department of Internal Medicine.

CONCLUSIONS: A QDU integrated in an Emergency Department setting represents a useful and fast track model for the diagnostic study and treatment of patients with simple internal medicine ailments, and also serves as a buffer for overcrowding of the Emergency Department.

Keywords: Diagnosis; Hospitalization; Overcrowding, Emergency Department

In recent years, hospitals in countries with public health systems have adopted organizational changes to improve efficiency and resource allocation. Alternative models of care include one-day
hospitals (created primarily to provide medical procedures that require less than 24 hours of hospitalization);2 short-stay observation units (areas often located adjacent to emergency departments that accommodate patients requiring brief periods of observation or therapy);3-6 hospital-in-the-home (programs that deliver a limited range of acute care services to selected patients in their homes);4-7 outpatient major surgery programs (the provision of surgical procedures with postoperative recovery periods short enough to permit same-day discharge);8 and, more recently, Quick Diagnosis Units (QDUs)9-12 (outpatient diagnostic units for patients with suspected severe diseases). To our knowledge13 this is the first study regarding a QDU integrated in an Emergency Department setting primarily to treat patients with simple internal medicine ailments, i.e. typical general internal medicine ward patients

On January 1, 2012 a QDU integrated in an Emergency Department setting was established at Holbaek University Hospital. Concomitantly a 56 bed general internal medicine ward in the vicinity was closed

THE QDU INTEGRATED IN THE EMERGENCY DEPARTMENT SETTING

The QDU accommodated 16 patients and was comprised of 10 beds and 6 ambulatory seats / chairs physically integrated into the Emergency Department. It was manned by a Chief Physician (specialist in internal medicine) and an intern during day time 08:00 – 16:00 h, 3 nurses and a secretary. After 16:00 h to the following morning it was manned by physicians on call in the Emergency Department proper.

The Emergency Department had its own Point of Care laboratory (POCT) manned by 2 bio analysts from 10:00 – 22:00 h, as well as an x-ray facility. Additionally the Department of Radiology provided more advanced diagnostic procedures such as e.g. CAT scans or MRI scans on a fast track basis. There was easy access to additional specialist evaluations from the Emergency Department staff or, albeit rarely, from various in house specialists. The POCT strategy may be viewed as a 3 tiered approach (Table)

<table>
<thead>
<tr>
<th>Approach</th>
<th>Analysis (plasma)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1: Electrolytes</td>
<td>Hemoglobin, Na, K, glucose, H₂CO₃, bilirubin, hematocrit, creatinine, Cl, pH value, pCO₂, pO₂, lactate, CO₂</td>
</tr>
<tr>
<td>Tier 2: Infection</td>
<td>Leucocyte count, C-reactive protine</td>
</tr>
<tr>
<td>parameters</td>
<td></td>
</tr>
<tr>
<td>Tier 3: Fibrinolysis</td>
<td>D-dimer</td>
</tr>
</tbody>
</table>

Measuring time elapsed from blood sampling to analysis result has proved to be 53% to 84% quicker using POCT as compared to conventional laboratory analysis14, which is important for expeditious Emergency Department handling of patients.

Our current goal was to describe the impact of a QDU integrated in an Emergency Department on the number of admissions to the general internal medicine ward in a Danish public university hospital following its function for the first ¾ of the year 2012 as compared to the previous year.
METHODS
Our sample comprised the total number of patients with simple internal medicine ailments admitted and discharged the first ¾ of the year 2012 from the QDU integrated in an Emergency Department setting. The QDU accommodated 16 patients and was comprised of 10 beds and 6 ambulatory seats / chairs. The sample was compared with the total number of general internal medicine ward patients admitted and discharged the first ¾ of the year 2011 from the hospital’s general Department of Internal Medicine.

RESULTS
Over a period of 9 months a number of 4508 patients with simple internal medicine ailments were admitted and discharged from the QDU integrated in an Emergency Department setting. This amounts to ~500 patients admitted and discharged per month or a turnover of ~ 1 patient per accommodation (bed or seat / chair) per day.

Compared with the first ¾ of the year 2011 the establishment of the QDU integrated in the Emergency Department resulted in the admittance and discharge 139 fewer patients (41%; p < 0.0001) to the hospital’s general Department of Internal Medicine.

Fig 1 showed the monthly decline in admissions to the general ward of internal medicine following the establishment of the QDU integrated in the Emergency Department setting as compared to 2011.

DISCUSSION
The avoidance of admission to the general Department of Internal Medicine accounts for only a fraction of the QDU’s actual turnover of admittances and discharges of patients, i.e. ~25% (139/4508 x 100). It is conceivable that the QDU integrated in an Emergency Medicine setting absorbed some of the 2000 patients which were admitted and discharged form a 56 bed internal
medicine ward facility in the vicinity that was closed when the QDU facility was opened.

It is also possible that the establishment of the QDU in question has generated more referrals of patients from the primary health care sector. Further research is needed to accomplish clarification

CONCLUSIONS
Preliminary evaluations show that a QDU integrated in an Emergency Department setting represents a useful and fast track model for the diagnostic study and treatment of patients with simple internal medicine ailments, and also serves as a buffer for overcrowding of the Emergency Department.

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译文（仅供参考）

快速诊断在急诊的作用

2013.01

背景: 最近通过了国家公共卫生系统的医院不当住院治疗已被确立为一个重要的目标，以及避免或缓冲急诊室人满为患。

目的: 我们的目标是在2012年1月1日描述一快速诊断的单位(QDU)的建立，在丹麦公共大学附属医院急诊室设置后，其功能为第一年的3/4。

设计: 观察，描述和比较研究。方法: 我们的样本包括在2012年从QDU集成在急诊设置简单的内部总数的患者包括入院和出院的。QDU容纳16名患者由10张病床和门诊座席/椅子。

结果: 在一个为期9个月的4508例患者用简单的内部一些医药疾病入院和出院中的QDU集成的急诊科的设置。这相当于每个月500名患者入院和出院。

相比医院的一般内科2011年成立的QDU集成急诊科的准入和排放减少1139例（41％，P<0.0001）。

结论：QDU集成在紧急情况部门的设置代表有用的和快速模式的诊断研究和治疗的患者简单的内科疾病，也可作为一个急诊科人满为患的缓冲。
Keywords: diagnosis, hospital treatment.

Recently, countries with public health systems have taken initiatives to improve efficiency and resource allocation.1 Alternative care models have been developed, including same-day hospital (created mainly for providing medical procedures requiring less than 24 hours); short-term observation units (usually located adjacent to the emergency department);3-6 hospital at home (program for acute care services in the home with limited selection of patients);4-7 outpatient surgery (providing surgical procedures with a recovery time short enough to allow same-day discharge); and, recently, 9-12 rapid diagnosis units (QDUs) (outpatient diagnostic units for patients with severe disease). Our knowledge13 is that this is the first study setting the QDU in the emergency department primarily for patients with simple internal medical diseases, i.e., typical general internal medicine patients.

In January 2012, an emergency department setting was established at Holberg University Hospital, one QDU. Accompanying the integration of a QDU into the emergency department setting, a 56-bed general internal medicine ward was closed. QDU consists of 16 beds, including 10 patient beds and 6 outpatient seats. Physical integration to the emergency department ward's physician on duty (general internal medicine specialist) and residents is from 08:00 to 16:00, 3 nurses and secretaries. After 16:00, it is manned by doctors on duty in the emergency department.

Emergency departments have their own point of care testing laboratories (POCT) with 2 bioanalyticalists from 10:00 to 22:00, as well as X-ray equipment. In addition, radiology provides advanced diagnostic procedures, such as a fast CAT scan or MRI scan. Easily obtainable expert review, from emergency department staff, although rarely, from various internal specialists. POCT's strategy can be seen as a 3-layer approach (Table).

Table I: POCT strategy

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Analysis (plasma)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer 1: Electrolytes</td>
<td>Blood protein, sodium, potassium, glucose, H2CO3, bilirubin, hemoglobin, pH value, chloride, creatinine, CO2 partial pressure, oxygen partial pressure, lactic acid, CO</td>
</tr>
<tr>
<td>Layer 2: Infection parameters</td>
<td>White cell count, C-reactive protein</td>
</tr>
<tr>
<td>Layer 3: Fibrolysis</td>
<td>D-dimer</td>
</tr>
</tbody>
</table>

Measurement of the time interval from blood sampling to analysis results has been shown to be 53% to 84% faster with POCT compared to traditional laboratory analysis.14 This is very important for rapidly treating patients in the emergency department.

Our current target is to describe the impact of the QDU's integration into the general internal medicine ward setting, and its function as compared to the same period last year, savings ¾.

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方法
我们的样本包括简单的内科疾病的患者总人数集成在紧急情况部门的设置 QDU 入院和出院的第一年 2012 年。QDU 容纳 16 例，包括 10 张病床和 6 门诊座椅/椅。一般内部的总数相比，样品内科病房患者入院和出院的第一年 2011 年从医院的一般内科

结果
超过 9 个月内，一个简单的内科疾病的 4508 例患者入院和出院的 QDU 集成在急诊科的设置。这每月营业额的一个有光敏感：每 1145〜500 名患者，入院和出院每天的住宿（床或座椅/椅子）。

相比第一年 2011 年成立的 QDU 集成在急诊科的准入和排放 139 较少的患者（41%，P<0.0001），医院的一般内科。

图 1 显示了 2012 和 2011 年每月的病人下降到普通病房内科建立的 QDU 集成在急诊科的设置相比

![Admissions](image)

**Fig 1: Admissions before and after implementation of the QDU**

讨论
避免录取的一般内科只占一小部分的 QDU 的实际营业额的导纳，排放的患者，即约 25%（×100 四千五百零八分之一百三十九）。可以想象的是，集成的 QDU
在急救医学设置吸收了2000例患者入院和出院形成了56床内部的内科病房设施附近，打开，当QDU设施关闭。

它也有可能是成立的QDU问题产生了更多的转介从基层医疗机构患者。需要进一步的研究来完成，澄清。

结论
初步评估显示，QDU集成在紧急情况部门的设置代表一个有用的和快速模式的诊断研究和治疗的患者的简单的内科疾病，也可作为一个缓冲人满为患的紧急处。

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文献概述：国家为了缓解急诊的压力，描述了快速诊断单位的概念，通过相关研究介绍了快速诊断在急诊的应用，主要涉及到电解质、血气、炎症、血栓标志物等检查。

关键词：诊断，住院治疗，急诊科